



**Iris**  
Biotech

Everything for

**CLICK**

**CHEMISTRY**



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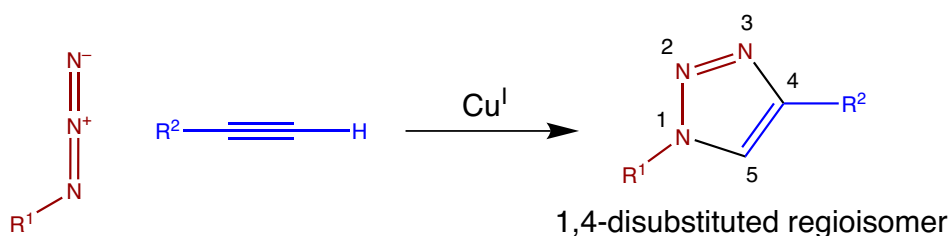
# Everything for Click Chemistry

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## 1. The Click Reaction

### 1.1. The First Generation Click Reaction: CuAAC

Alkynes and azides can undergo a Cu(I)-catalyzed azide-alkyne 1,3-dipolar cycloaddition (CuAAC) to afford 1,4-disubstituted 1,2,3-triazoles. Developed by K. Barry Sharpless and Morton Meldal, this type of chemical transformation was quickly dubbed "Click Chemistry". It has since become a widely used reaction that is orthogonal to many other types of chemical transformations and is used in various kinds of applications. Due to its high thermodynamic driving force, which is usually greater than 20 kcal/mol, the Click reaction rapidly proceeds to completion in almost all cases. Moreover, while the thermal Huisgen 1,3-dipolar cycloaddition affords a mixture of both the 1,4-substituted and the 1,5-substituted regioisomers, the CuAAC is highly selective for the 1,4-substituted isomer only (Fig. 1). Worth noting is the fact that ruthenium is also able to catalyze a 1,3-dipolar cycloaddition between an azide and an alkyne affording the 1,5-disubstituted regioisomer instead.



*Fig. 1: The copper-catalyzed azide-alkyne cycloaddition affords the 1,4-disubstituted isomers.*

Cycloaddition reactions such as the [3+2] azide-alkyne and the [4+2] Diels-Alder reaction, have become common conjugation techniques. Applications range from imaging and drug design to the development of sensors, thereby covering such diverse fields as chemical biology, material science, surface and polymer chemistry.

Tris(benzyltriazolylmethyl)amine (TBTA; RL-2010; see p. 70) is stabilizing copper(I) towards oxidation in solution by forming a complex and effectively catalyzes quantitative and regioselective Click cycloaddition reactions in a variety of aqueous and organic solvents. Among scientists, CuAAC has found widespread use as a biochemical tool for the site-specific labeling of peptides, proteins, and other biomolecules.

THPTA (see p. 70) is a water-soluble alternative to TBTA (RL-2010) and a highly efficient ligand for Click chemistry in partially organic and particularly in completely aqueous reactions. The benefits of a completely aqueous reaction include the biological labelling of live cells or the labelling of proteins without the concern of denaturing secondary structures. THPTA complexes Cu(I) and thus blocks its bioavailability. This mitigates potentially toxic effects while maintaining the catalytic effectiveness in Click conjugations. Successful Click reactions with oligonucleotides can be found in many publications.

A variety of azido and alkyne building blocks are available from Iris Biotech. Some of those compounds can be incorporated into peptides and proteins by recombinant syntheses, particularly by non-neutral protein translation using the amber-suppression-based orthogonal system, while others are suitable for solid phase peptide synthesis. The presence of an azido or alkyne function at a particular position of a peptide sequence opens up the possibility for the site-selective conjugation of other biomolecules (e.g. carbohydrates), labels or APIs.



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## 1.2. Catalyst-free Click Reactions: Second and Third Generation Click Chemistry

Introduced in 2002, the copper-catalyzed variant of the azide-alkyne cycloaddition (CuAAC) reaction has found broad applicability in various fields and is as such currently the most widely used conjugation technique. The presence of copper, however, limits *in vivo* applications of this reaction for several reasons:

- High cell toxicity
- Undesired oxidation of proteins and
- Inhibition of luminescence properties of nanocrystals

To allow for fast and efficient *in vivo* conjugations, new methodologies were developed that do not require the use of a metal catalyst while still making use of bioorthogonal functional groups. The most commonly used approaches can be classified into two categories.

## 1.2.1. 2nd Generation: Strain-Promoted Azide-Alkyne Cycloadditions (SPAAC)

As early as 1961, Wittig and Krebs noted the propensity of cyclooctyne to strongly react with phenyl azide via a 1,3-dipolar cycloaddition, forming a triazole product. This finding stood in stark contrast to previous research that found slow kinetics for Huisgen 1,3-dipolar cycloadditions of azides with unstrained, linear alkynes. The latter reaction can be drastically accelerated by copper catalysis. The use of this metal, however, is linked with several drawbacks as noted above.

This property of cyclooctynes was exploited by Bertozzi *et al.* in the design of SPAAC reagents for bioorthogonal couplings to azide-bearing biomolecules in live cells or organisms such as *C. elegans*, zebrafish or mice. By modifying the cyclooctyne core structure of SPAAC reagents with heteroatoms, fluorine substituents and fused rings, key properties such as cycloaddition kinetics, stability, solubility, and pharmacokinetics could be optimized.

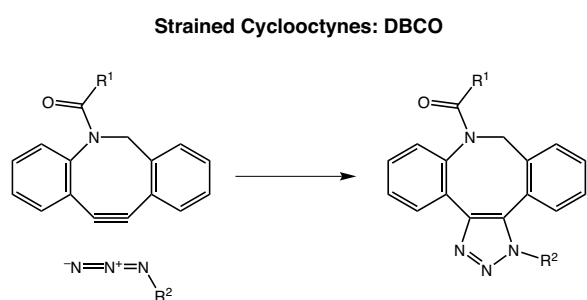


Fig. 2: Reaction of DBCO as an exemplary strained cyclooctyne with an azide.

In the figure below, various strained cyclooctynes and cyclononynes are depicted with their corresponding reactivities, as determined by their reaction with benzyl azide as a model compound. In general, the presence of atoms with high electronegativity next to the alkyne function, i.e. good  $\sigma$ -acceptors, leads to increased reactivity. A higher reactivity also correlates with increased ring strain, as exemplified by dibenzo-fused cyclooctynes (DiBO, DBCO) and bicyclo[6.1.0]non-4-yne (BCN).

A relatively new addition to this ensemble is 4,8-diazacyclononyne (DACN). While exhibiting a reactivity twice as high as OCT, DACN is also more hydrophilic than most cyclooctynes, highly stable (both thermal and chemical stability), and highly selective towards ynophiles. Additionally, the two endocyclic nitrogens in DACN may serve as additional attachment points for further conjugation, rendering the compound functionally versatile.

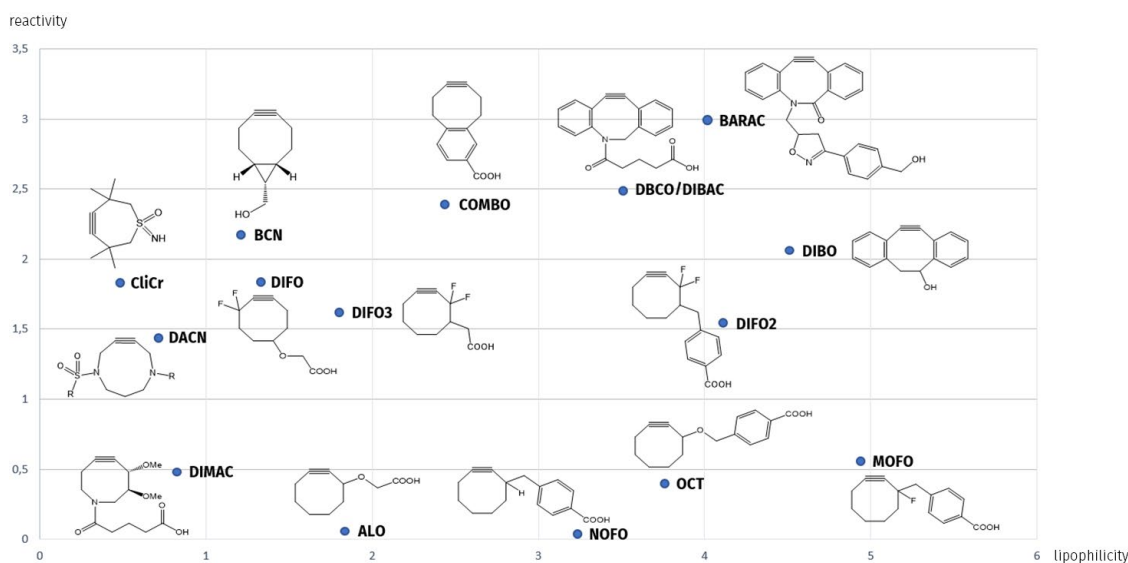
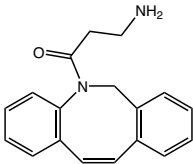
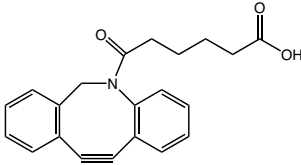
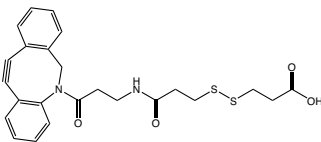
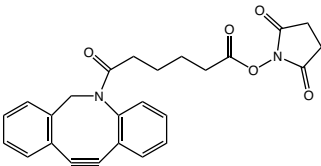
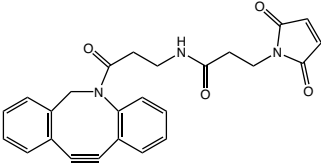


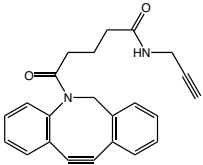
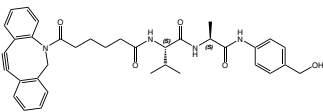
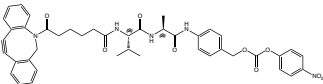
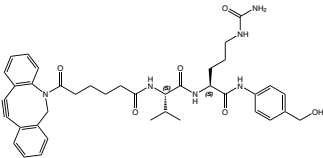
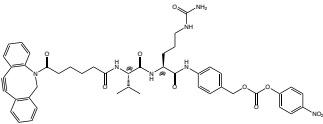
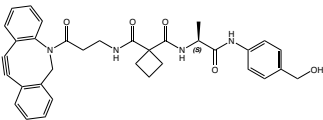
Fig. 3: Reaction rate constants for different strained cyclooctyne derivatives.

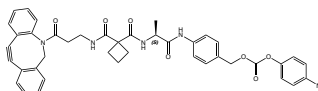
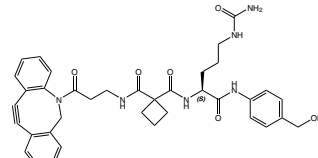
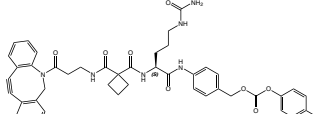

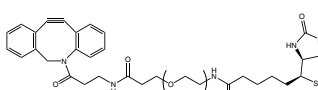
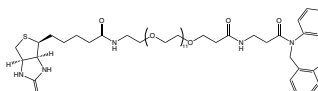


Our SPAAC reagents are based on dibenzocyclooctyne (DBCO or DIBAC) and DACN, since both combine a high reactivity with excellent stability and decent to good solubility. However, we also offer other cyclooctyne derivatives on a custom synthesis basis.

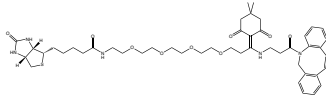
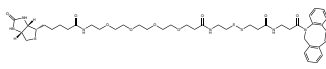
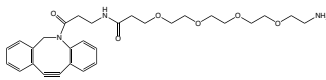
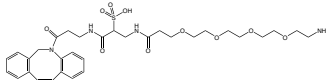
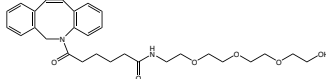
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<b>RL-2120</b> <b>DBCO-NH<sub>2</sub></b> Dibenzocyclooctyne-amine CAS-No.     1255942-06-3 Formula     C <sub>18</sub> H <sub>16</sub> N <sub>2</sub> O Mol. weight     276,33 g/mol		RL-2120.0025	25 mg	€ 190,00
		RL-2120.0100	100 mg	€ 250,00
		RL-2120.0250	250 mg	€ 600,00
		RL-2120.1000	1 g	€ 900,00
<b>RL-2430</b> <b>DBCO-COOH</b> Dibenzocyclooctyne-carboxylic acid CAS-No.     1425485-72-8 Formula     C <sub>21</sub> H <sub>19</sub> NO <sub>3</sub> Mol. weight     333,38 g/mol		RL-2430.0025	25 mg	€ 190,00
		RL-2430.0100	100 mg	€ 350,00
		RL-2430.0500	500 mg	€ 1.660,00
<b>RL-3340</b> <b>DBCO-SS-COOH</b> 3-((3-(3-(azadibenzocyclooctyn-1-yl)-3-oxopropylamino)-3-oxopropyl)disulfanyl)propanoic acid Formula     C <sub>24</sub> H <sub>24</sub> N <sub>2</sub> O <sub>4</sub> S <sub>2</sub> Mol. weight     468,59 g/mol		RL-3340.0000	please inquire	
<b>RL-2440</b> <b>DBCO-NHS</b> Dibenzocyclooctyne-carboxylic acid succinimidyl ester CAS-No.     1384870-47-6 Formula     C <sub>25</sub> H <sub>22</sub> N <sub>2</sub> O <sub>5</sub> Mol. weight     430,45 g/mol		RL-2440.0100	100 mg	€ 350,00
		RL-2440.1000	1 g	€ 1.660,00
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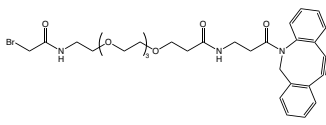
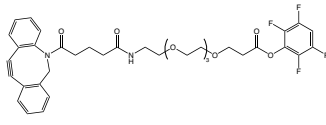
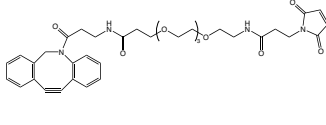
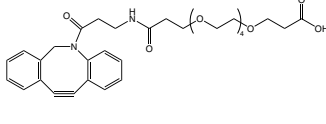
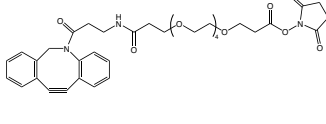
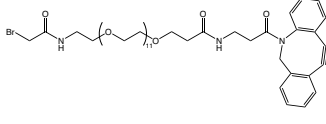
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<p>N-(5-oxo-5-(prop-2-ynoxy)pentanoyl)-dibenzoazacyclooctyne</p> <p>Formula <math>C_{23}H_{20}N_2O_2</math></p> <p>Mol. weight 356,42 g/mol</p> 		RL-2740.0000		please inquire
<b>ADC1420</b>	<b>DBCO-C6-Val-Ala-PAB</b>			
<p>6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-alanyl-(4-aminobenzyl alcohol)</p> <p>Formula <math>C_{36}H_{40}N_4O_5</math></p> <p>Mol. weight 608,73 g/mol</p> 		ADC1420.0100 ADC1420.0250	100 mg 250 mg	€ 450,00 € 900,00
<b>ADC1430</b>	<b>DBCO-C6-Val-Ala-PAB-PNP</b>			
<p>6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate</p> <p>Formula <math>C_{43}H_{43}N_5O_9</math></p> <p>Mol. weight 773,83 g/mol</p> 		ADC1430.0100 ADC1430.0250	100 mg 250 mg	€ 500,00 € 1.000,00
<b>ADC1250</b>	<b>DBCO-C6-Val-Cit-PAB</b>			
<p>6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-citrullyl-(4-aminobenzyl alcohol)</p> <p>Formula <math>C_{39}H_{46}N_6O_6</math></p> <p>Mol. weight 694,82 g/mol</p> 		ADC1250.0025 ADC1250.0100 ADC1250.0250	25 mg 100 mg 250 mg	€ 225,00 € 600,00 € 1.200,00
<b>ADC1260</b>	<b>DBCO-C6-Val-Cit-PAB-PNP</b>			
<p>6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate</p> <p>Formula <math>C_{46}H_{46}N_7O_{10}</math></p> <p>Mol. weight 859,92 g/mol</p> 		ADC1260.0025 ADC1260.0100 ADC1260.0250	25 mg 100 mg 250 mg	€ 300,00 € 900,00 € 1.800,00
<b>ADC1620</b>	<b>DBCO-cyclobutane-1,1-dicarboxamide-Ala-PAB</b>			
<p>dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl alcohol)</p> <p>Formula <math>C_{34}H_{34}N_4O_5</math></p> <p>Mol. weight 578,66 g/mol</p> 		ADC1620.0000		please inquire

	Product code	Packing unit	Price
<b>ADC1630 DBCO-cyclobutane-1,1-dicarboxamide-Ala-PAB-PNP</b> dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate  Formula $C_{41}H_{37}N_5O_9$ Mol. weight 743,76 g/mol	ADC1630.0000		please inquire
<b>ADC1520 DBCO-cyclobutane-1,1-dicarboxamide-Cit-PAB</b> dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl alcohol)  Formula $C_{37}H_{40}N_6O_6$ Mol. weight 664,75 g/mol	ADC1520.0000		please inquire
<b>ADC1530 DBCO-cyclobutane-1,1-dicarboxamide-Cit-PAB-PNP</b> dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate  Formula $C_{44}H_{43}N_7O_{10}$ Mol. weight 829,85 g/mol	ADC1530.0000		please inquire
<b>RL-2480 DBCO-PEG(3)-BisSulfonThiol-Linker</b> Dibenzoazacyclooctyne-PEG(3)-BisSulfonThiol-Linker  Formula $C_{59}H_{69}N_3O_{14}S_3$ Mol. weight 1140,39 g/mol	RL-2480.0010 RL-2480.0025 RL-2480.0100	10 mg 25 mg 100 mg	€ 230,00 € 350,00 € 1.120,00
<b>RL-2520 DBCO-PEG(4)-Biotin</b> Dibenzoazacyclooctyne-tetra(ethylene glycol)-biotin  CAS-No. 1255942-07-4 Formula $C_{39}H_{51}N_3O_8S$ Mol. weight 749,92 g/mol	RL-2520.0010 RL-2520.0025 RL-2520.0100	10 mg 25 mg 100 mg	€ 230,00 € 390,00 € 1.120,00
<b>PEG6820 Biotin-PEG(12)-DBCO</b> Biotinyl-dodeca(ethylene glycol)-amido-dibenzoazacyclooctyne  Formula $C_{55}H_{83}N_3O_{16}S$ Mol. weight 1102,34 g/mol	PEG6820.0010 PEG6820.0025 PEG6820.0100	10 mg 25 mg 100 mg	€ 310,00 € 490,00 € 1.540,00

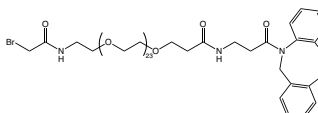
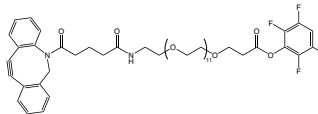
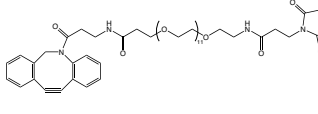
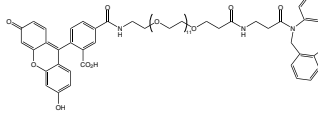
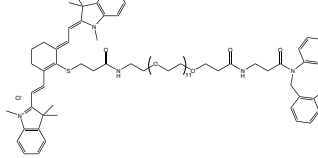
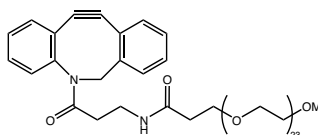
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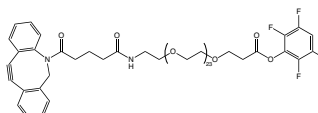
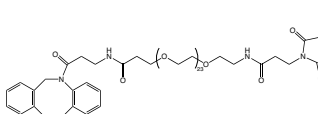
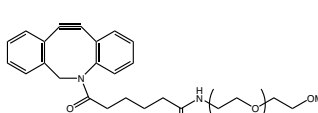
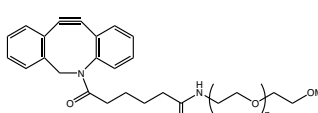
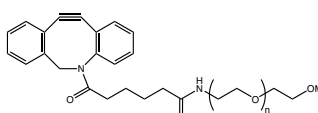
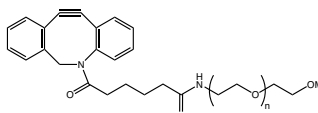
		Product code	Packing unit	Price
<b>PEG8140</b>	<b>Biotin-PEG(4)-Dde-DBCO</b>	PEG8140.0000	please inquire	
<p>N-(15-(4,4-dimethyl-2,6-dioxocyclohexylidene)-19-oxo-19-(azadibenzocyclooctyn-1-yl)-3,6,9,12-tetraoxa-16-azonadecyl)-5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamide</p> 				
CAS-No.	1807512-43-1			
Formula	C <sub>47</sub> H <sub>61</sub> N <sub>5</sub> O <sub>9</sub> S			
Mol. weight	872,08 g/mol			
<b>PEG8120</b>	<b>Biotin-PEG(4)-SS-DBCO</b>	PEG8120.0025 PEG8120.0100 PEG8120.0500	25 mg	€ 225,00
<p>N-(2-((3-(3-(azadibenzocyclooctyn-1-yl)-3-oxo-propylamino)-3-oxopropyl)disulfanyl)ethyl)-1-(5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamido)-3,6,9,12-tetraoxapentadecan-15-amide</p> 			100 mg	€ 650,00
<p>Formula C<sub>64</sub>H<sub>60</sub>N<sub>6</sub>O<sub>9</sub>S<sub>3</sub> Mol. weight 913,18 g/mol</p>			500 mg	€ 2.600,00
<b>RL-2420</b>	<b>DBCO-PEG(4)-NH<sub>2</sub></b>	RL-2420.0025 RL-2420.0100 RL-2420.0500	25 mg	€ 375,00
<p>Dibenzoazacyclooctyne-tetra(ethylene glycol)-amine</p> 			100 mg	€ 850,00
<p>CAS-No. 1255942-08-5 Formula C<sub>29</sub>H<sub>37</sub>N<sub>3</sub>O<sub>6</sub> Mol. weight 523,62 g/mol</p>			500 mg	€ 2.000,00
<b>RL-2421</b>	<b>DBCO-Sulfo-PEG(4)-NH<sub>2</sub></b>	RL-2421.0025 RL-2421.0100 RL-2421.0500	25 mg	€ 285,00
<p>Dibenzoazacyclooctyne-tetra(ethylene glycol) amine</p> 			100 mg	€ 600,00
<p>CAS-No. 2055198-05-3 Formula C<sub>32</sub>H<sub>42</sub>N<sub>4</sub>O<sub>10</sub>S Mol. weight 674,76 g/mol</p>			500 mg	€ 1.900,00
<b>RL-2510</b>	<b>DBCO-PEG(4)-OH</b>	RL-2510.0025 RL-2510.0100 RL-2510.1000	25 mg	€ 170,00
<p>Dibenzoazacyclooctyne-tetra(ethylene glycol)</p> 			100 mg	€ 410,00
<p>CAS-No. 1416711-60-8 Formula C<sub>29</sub>H<sub>36</sub>N<sub>2</sub>O<sub>6</sub> Mol. weight 508,61 g/mol</p>			1 g	€ 2.070,00



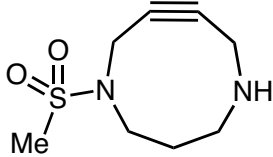
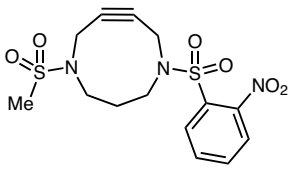
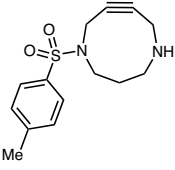
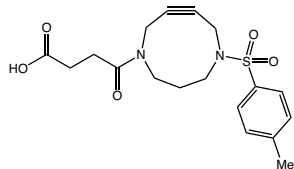
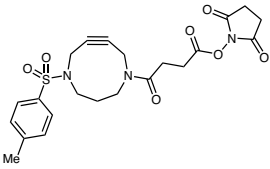
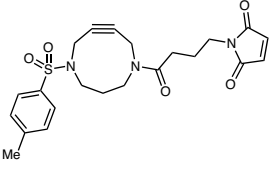
		Product code	Packing unit	Price
<b>PEG6790 Bromoacetamido-PEG(4)-DBCO</b> Bromoacetamido-tetra(ethylene glycol)-amido-dibenzoazacycloctyne Formula $C_{31}H_{38}BrN_3O_7$ Mol. weight 644,55 g/mol		PEG6790.0025	25 mg	€ 310,00
		PEG6790.0100	100 mg	€ 660,00
		PEG6790.0500	500 mg	€ 2.010,00
<b>PEG6740 DBCO-PEG(4)-TFP</b> Dibenzoazacycloctyne-tetra(ethylene glycol)-propionyl 2,3,5,6-tetrafluorophenol ester Formula $C_{37}H_{38}F_4N_2O_8$ Mol. weight 714,7 g/mol		PEG6740.0025	25 mg	€ 310,00
		PEG6740.0100	100 mg	€ 640,00
		PEG6740.0500	500 mg	€ 2.010,00
<b>RL-2500 DBCO-PEG(4)-mal</b> Dibenzoazacycloctyne-tetra(ethylene glycol)-maleimide CAS-No. 1480516-75-3 Formula $C_{36}H_{42}N_4O_9$ Mol. weight 674,74 g/mol		RL-2500.0010	10 mg	€ 170,00
		RL-2500.0025	25 mg	€ 295,00
		RL-2500.0100	100 mg	€ 675,00
		RL-2500.0500	500 mg	€ 2.070,00
<b>RL-2450 DBCO-PEG(5)-COOH</b> Dibenzoazacycloctyne-penta(ethylene glycol)-propanoic acid Formula $C_{32}H_{40}N_2O_9$ Mol. weight 596,67 g/mol		RL-2450.0025	25 mg	€ 260,00
		RL-2450.0100	100 mg	€ 530,00
		RL-2450.0500	500 mg	€ 1.480,00
<b>RL-2460 DBCO-PEG(5)-NHS</b> Dibenzoazacycloctyne-penta(ethylene glycol)-propanoic acid succinimidyl ester CAS-No. 1378531-80-6 Formula $C_{36}H_{43}N_3O_{11}$ Mol. weight 693,74 g/mol		RL-2460.0010	10 mg	€ 170,00
		RL-2460.0025	25 mg	€ 270,00
		RL-2460.0100	100 mg	€ 530,00
		RL-2460.0500	500 mg	€ 1.600,00
<b>PEG6800 Bromoacetamido-PEG(12)-DBCO</b> Bromoacetamido-dodeca(ethylene glycol)-amido-dibenzoazacycloctyne Formula $C_{47}H_{70}BrN_3O_{17}$ Mol. weight 996,97 g/mol		PEG6800.0025	25 mg	€ 330,00
		PEG6800.0100	100 mg	€ 760,00
		PEG6800.0500	500 mg	€ 2.300,00

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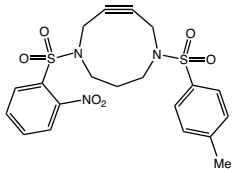
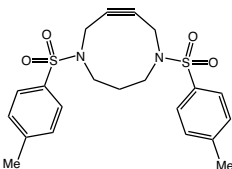
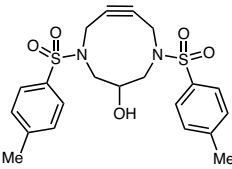
		Product code	Packing unit	Price
<b>PEG6810 Bromoacetamido-PEG(24)-DBCO</b> Bromoacetamido-24(ethylene glycol)-amido-dibenzoazacyclooctyne Formula $C_{71}H_{118}BrN_3O_{27}$ Mol. weight 1525,6 g/mol		PEG6810.0025	25 mg	€ 360,00
		PEG6810.0100	100 mg	€ 840,00
		PEG6810.0500	500 mg	€ 2.530,00
<b>PEG6750 DBCO-PEG(12)-TFP</b> Dibenzoazacyclooctyne-dodeca(ethylene glycol)-propionyl 2,3,5,6-tetrafluorophenol ester Formula $C_{53}H_{70}F_4N_2O_{16}$ Mol. weight 1067,12 g/mol		PEG6750.0025	25 mg	€ 310,00
		PEG6750.0100	100 mg	€ 710,00
		PEG6750.0500	500 mg	€ 2.130,00
<b>PEG6770 DBCO-PEG(12)-MAL</b> Dibenzoazacyclooctyne-dodeca(ethylene glycol)-maleimide CAS-No. 2011777-01-6 Formula $C_{52}H_{74}N_4O_{17}$ Mol. weight 1027,16 g/mol		PEG6770.0025	25 mg	€ 330,00
		PEG6770.0100	100 mg	€ 760,00
		PEG6770.0500	500 mg	€ 2.300,00
<b>PEG6830 DBCO-dPEG(12)-(5)6-carboxyfluorescein</b> Dibenzoazacyclooctyne-dodeca(ethylene glycol)-(5)6-carboxyfluorescein Formula $C_{46}H_{39}N_3O_{10}$ Mol. weight 1234,34 g/mol		PEG6830.0001	1 mg	€ 300,00
		PEG6830.0005	5 mg	€ 500,00
<b>PEG6840 DBCO-dPEG(12)-meso-TP-IR775</b> Dibenzoazacyclooctyne-dodeca(ethylene glycol)-meso-TP-IR775 Formula $C_{80}H_{108}ClN_5O_{15}S$ Mol. weight 1447,26 g/mol		PEG6840.0001	1 mg	€ 310,00
		PEG6840.0005	5 mg	€ 490,00
<b>PEG7460 DBCO-PEG(24)-OMe</b> alpha-Methoxy-24(ethylene glycol)-amido-dibenzoazacyclooctyne Formula $C_{68}H_{114}N_2O_{26}$ Mol. weight 1375,63 g/mol		PEG7460.0100	100 mg	€ 610,00

		Product code	Packing unit	Price
<b>PEG6760 DBCO-PEG(24)-TFP</b> Dibenzoazacyclooctyne-24(ethylene glycol)-propionyl 2,3,5,6-tetrafluorophenol ester Formula $C_{77}H_{118}F_4N_2O_{28}$ Mol. weight 1595,75 g/mol		PEG6760.0025	25 mg	€ 350,00
		PEG6760.0100	100 mg	€ 780,00
		PEG6760.0500	500 mg	€ 2.240,00
<b>PEG6780 DBCO-PEG(24)-MAL</b> Dibenzoazacyclooctyne-24(ethylene glycol)-maleimide Formula $C_{76}H_{122}N_4O_{29}$ Mol. weight 1555,79 g/mol		PEG6780.0025	25 mg	€ 360,00
		PEG6780.0100	100 mg	€ 840,00
		PEG6780.0500	500 mg	€ 2.530,00
<b>RL-2530 DBCO-mPEG (5kDa)</b> alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 5000 Da		RL-2530.0025	25 mg	€ 170,00
		RL-2530.0100	100 mg	€ 290,00
		RL-2530.1000	1 g	€ 1.240,00
<b>RL-2540 DBCO-mPEG (10kDa)</b> alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 10000 Da		RL-2540.0025	25 mg	€ 170,00
		RL-2540.0100	100 mg	€ 290,00
		RL-2540.1000	1 g	€ 1.240,00
<b>RL-2550 DBCO-mPEG (20kDa)</b> alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 20000 Da		RL-2550.0025	25 mg	€ 170,00
		RL-2550.0100	100 mg	€ 290,00
		RL-2550.1000	1 g	€ 1.240,00
<b>RL-2560 DBCO-mPEG (30kDa)</b> alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 30000 Da		RL-2560.0025	25 mg	€ 170,00
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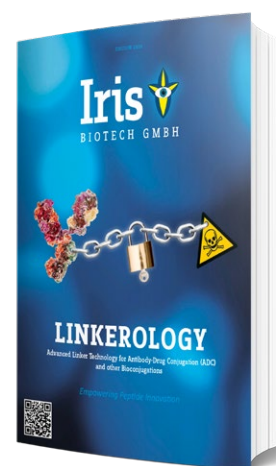
		Product code	Packing unit	Price	
<b>RL-3600</b>	<b>DACN(Ms)*HCl</b> N-(Mesityl)-4,8-diazacyclononyne hydrochloride CAS-No. 2331322-16-6 Formula $C_8H_{14}N_2O_2S \cdot HCl$ Mol. weight 202,27*36,46 g/mol		RL-3600.0025	25 mg	€ 450,00
<b>RL-3610</b>	<b>DACN(Ms,Ns)</b> N-(Mesityl)-N'-(2-nosyl)-4,8-diazacyclononyne CAS-No. 2411082-25-0 Formula $C_{14}H_{17}N_2O_6S_2$ Mol. weight 387,43 g/mol		RL-3610.0025	25 mg	€ 275,00
<b>RL-2735</b>	<b>DACN(Tos)*HCl</b> N-(p-toluenesulfonyl)-4,8-diazacyclononyne hydrochloride CAS-No. 2331322-18-8 Formula $C_{14}H_{18}N_2O_2S \cdot HCl$ Mol. weight 278,37*36,46 g/mol		RL-2735.0025	25 mg	€ 350,00
<b>RL-2720</b>	<b>DACN(Tos,Suc-OH)</b> N-succinoyl-N'-(p-toluenesulfonyl)-4,8-diazacyclononyne CAS-No. 2109751-68-8 Formula $C_{18}H_{22}N_2O_5S$ Mol. weight 378,44 g/mol		RL-2720.0025 RL-2720.0100	25 mg 100 mg	€ 275,00 € 550,00
<b>RL-2725</b>	<b>DACN(Tos,Suc-NHS)</b> N-(succinoyl-NHS ester)-N'-(p-toluenesulfonyl)-4,8-diazacyclononyne CAS-No. 2411082-26-1 Formula $C_{22}H_{25}N_3O_7S$ Mol. weight 475,52 g/mol		RL-2725.0025	25 mg	€ 350,00
<b>RL-3630</b>	<b>DACN(Tos,Mal)</b> N-(maleimidobutyl)-N'-(p-toluenesulfonyl)-4,8-diazacyclononyne CAS-No. 2411082-28-3 Formula $C_{22}H_{25}N_3O_5S$ Mol. weight 443,52 g/mol		RL-3630.0025	25 mg	€ 350,00



		Product code	Packing unit	Price
<b>RL-2710 DACN(Tos,Ns)</b> N-(o-nitrobenzenesulfonyl)-N'-(p-toluenesulfonyl)-4,8-diazacyclononyne CAS-No. 1797508-58-7 Formula $C_{20}H_{21}N_3O_6S_2$ Mol. weight 463,53 g/mol		RL-2710.0025	25 mg	€ 250,00
		RL-2710.0100	100 mg	€ 400,00
<b>RL-2730 DACN(Tos<sub>2</sub>)</b> N,N'-bis(p-toluenesulfonyl)-4,8-diazacyclononyne CAS-No. 1797508-57-6 Formula $C_{21}H_{24}N_2O_4S_2$ Mol. weight 432,56 g/mol		RL-2730.0025	25 mg	€ 225,00
		RL-2730.0100	100 mg	€ 350,00
<b>RL-2737 DACN(Tos<sub>2</sub>,6-OH)</b> 4,8-Bis(p-toluenesulfonyl)-4,8-diazacyclononyn-6-ol CAS-No. 2109751-74-6 Formula $C_{21}H_{24}N_2O_5S_2$ Mol. weight 448,55 g/mol		RL-2737.0025	25 mg	€ 275,00



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- Facile assembly of three cycloalkyne-modules onto a platform compound bearing thiophene S,S-dioxide moiety and two azido groups; T. Meguro, Y. Sakata, T. Morita, T. Hosoya and S. Yoshida; **Chem Commun (Camb)** 2020; **56**: 4720-4723. <https://doi.org/10.1039/d0cc01810d>
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## 1.2.2. 3<sup>rd</sup> Generation: Inverse Electron-Demand Diels-Alder (IEDDA) Reactions

Click Chemistry is frequently the method of choice for site-selective labeling and crosslinking. However, in biological systems, the cytotoxicity of copper used for the classical Cu-promoted 1,3-dipolar cycloaddition may cause major problems. The copper-free strain-promoted alkyne-azide cycloaddition (SPAAC) utilizing cyclooctynes, on the other hand, is limited by its moderate reaction kinetics for the application in live cells, where the concentration of biomolecules is usually low. Another potential drawback of cyclooctynes is the extensive patent coverage of many variants.

Tetrazine ligation presents the option for a copper-free, rapid, and fully bioorthogonal type of Click chemistry. Mechanistically, this reaction proceeds via an inverse electron-demand Diels-Alder cycloaddition reaction between a tetrazine and a strained alkene such as *trans*-cyclooctene (TCO), cyclopropane or norbornene, followed by a retro-Diels-Alder reaction under elimination of N<sub>2</sub>, the latter rendering the reaction irreversible.

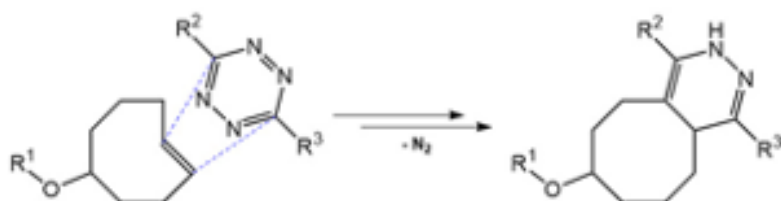


Fig. 4: Reaction between a trans-cyclooctene (TCO) and a tetrazine.

This method excels at very low concentrations (e.g. in biological systems) due to the extremely rapid second order reaction rate constants (between approx.  $800 \text{ M}^{-1}\text{s}^{-1}$  and  $30000 \text{ M}^{-1}\text{s}^{-1}$ ). Moreover, the tetrazine-TCO ligation can be performed in aqueous media and has been applied in live cell imaging. These properties make tetrazine Click chemistry the method of choice for labeling or crosslinking biomolecules in living cells.

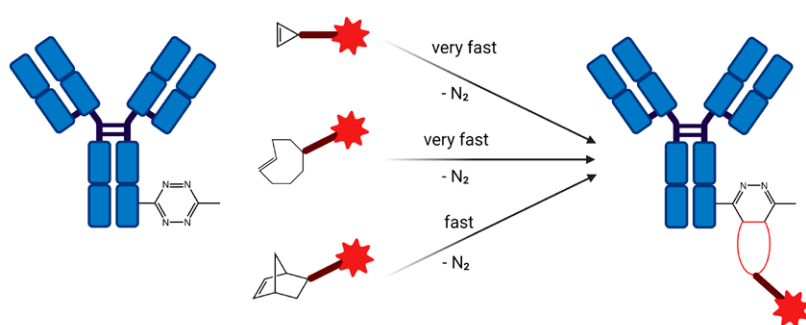
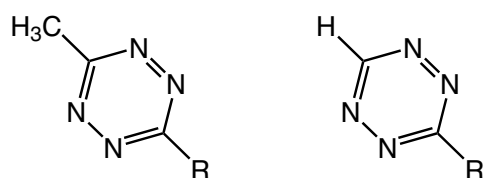


Fig. 5: Common reaction partners for tetrazines.

### Stability vs. Faster Reaction Kinetics: 6-Me or 6-H Tetrazines



There are two main types of tetrazines that are widely applied: 6-Methyl-substituted tetrazines and 6-hydrogen-substituted tetrazines. Methyl-substituted tetrazines exhibit a high stability even when dissolved in aqueous media, while still offering faster reaction kinetics with TCO derivatives than any other bioorthogonal reaction pairs (approx.  $1000 \text{ M}^{-1}\text{s}^{-1}$ ). Moreover, they tolerate a wide array of reaction conditions which renders them the prime choice for applications such as protein labeling. Hydrogen-substituted tetrazines, on the other hand, show lower stability and less tolerance to harsh reaction conditions, but offer extremely fast reaction kinetics (up to  $30000 \text{ M}^{-1}\text{s}^{-1}$ ) for applications like *in vivo* imaging.

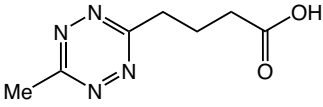
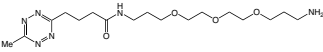
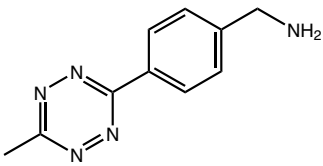
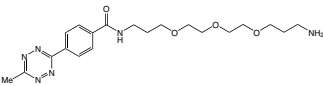
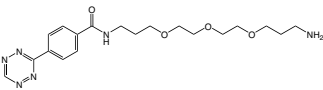
### Choice of Spacer: Alkyl or PEG?

Tetrazines equipped with alkyl spacers are suitable for reactions in organic solvents. For applications in aqueous media, however, PEG spacers are usually the superior choice. Moreover, tetrazines equipped with PEG-spacers are ideal for the functionalization of proteins since PEGs are known to reduce the aggregation of labeled polypeptides.

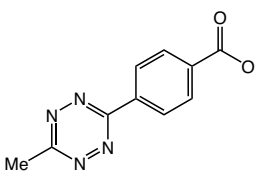
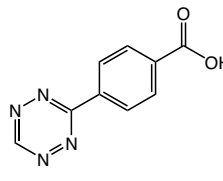
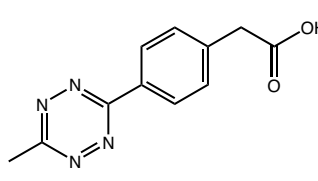
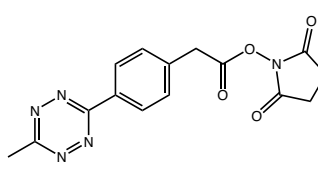
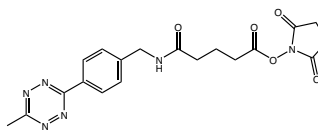
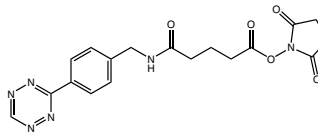
In summary, the reaction between a tetrazine (Tz) and a trans-cyclooctene (TCO) is the innovative third generation Click reaction that proceeds without the use of copper or other catalysts. It is rapid, fully bioorthogonal, irreversible and excels at very low concentrations.

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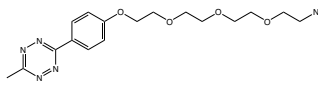
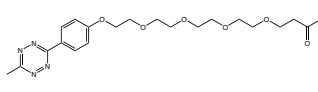
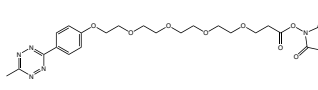
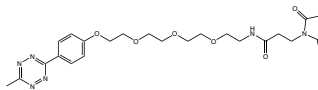
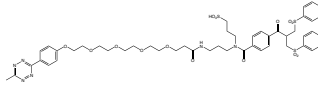
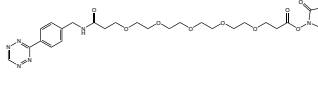
## Products with Tetrazine

		Product code	Packing unit	Price
<b>RL-2140</b> <b>MeTz-butanoic acid</b> 4-(6-methyl-1,2,4,5-tetrazin-3-yl)butanoic acid CAS-No.      1923268-81-8 Formula      C <sub>7</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub> Mol. weight    182,18 g/mol		RL-2140.0250	250 mg	€ 925,00
		RL-2140.0500	500 mg	€ 1.680,00
		RL-2140.0001	1 g	€ 2.800,00
<b>RL-2100</b> <b>MeTz-Butanoyl-TOTA*TFA</b> 4-(6-methyl-1,2,4,5-tetrazin-3-yl)-N-(4,7,10-trioxatridecane-13-amine)butanamide trifluoroacetate salt Formula      C <sub>17</sub> H <sub>32</sub> N <sub>6</sub> O <sub>4</sub> *CF <sub>3</sub> CO <sub>2</sub> H Mol. weight    384,47*114,02 g/mol		RL-2100.0025	25 mg	€ 250,00
		RL-2100.0100	100 mg	€ 925,00
		RL-2100.0250	250 mg	€ 2.150,00
<b>RL-2360</b> <b>MeTz-Bzl-NH<sub>2</sub>*HCl</b> Methyltetrazine-benzylamine*HCl CAS-No.      1596117-29-1 Formula      C <sub>10</sub> H <sub>11</sub> N <sub>5</sub> *HCl Mol. weight    201,23*36,46 g/mol		RL-2360.0025	25 mg	€ 170,00
		RL-2360.0100	100 mg	€ 290,00
		RL-2360.0500	500 mg	€ 640,00
		RL-2360.1000	1 g	€ 1.190,00
<b>RL-2110</b> <b>MeTz-Phenyl-TOTA*TFA</b> 4-(6-methyl-1,2,4,5-tetrazin-3-yl)-N-(4,7,10-trioxatridecane-13-amine)benzamide trifluoroacetate salt Formula      C <sub>20</sub> H <sub>30</sub> N <sub>6</sub> O <sub>4</sub> *CF <sub>3</sub> CO <sub>2</sub> H Mol. weight    418,49*114,02 g/mol		RL-2110.0025	25 mg	€ 200,00
		RL-2110.0100	100 mg	€ 600,00
<b>RL-2590</b> <b>Tz-benzoyl-TOTA*TFA</b> Tz-benzoyl-TOTA*TFA Formula      C <sub>19</sub> H <sub>28</sub> N <sub>6</sub> O <sub>4</sub> *C <sub>2</sub> HF <sub>2</sub> O <sub>2</sub> Mol. weight    404,46*114,02 g/mol		RL-2590.0050	50 mg	€ 525,00
		RL-2590.0100	100 mg	€ 875,00
		RL-2590.0250	250 mg	€ 2.100,00
		RL-2590.0500	500 mg	€ 3.700,00



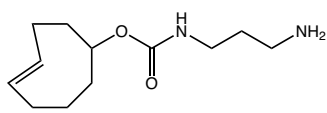
		Product code	Packing unit	Price
<b>RL-2130 MeTz-benzoic acid</b> 4-(6-methyl-1,2,4,5-tetrazin-3-yl)benzoic acid CAS-No. 1345866-66-1 Formula $C_{10}H_8N_4O_2$ Mol. weight 216,2 g/mol		RL-2130.0050	50 mg	€ 195,00
		RL-2130.0100	100 mg	€ 325,00
		RL-2130.0250	250 mg	€ 750,00
		RL-2130.0001	1 g	€ 2.100,00
<b>RL-2580 Tz-benzoic acid</b> 4-(1,2,4,5-tetrazin-3-yl)benzoic acid CAS-No. 1345866-65-0 Formula $C_9H_6N_4O_2$ Mol. weight 202,17 g/mol		RL-2580.0050	50 mg	€ 200,00
		RL-2580.0100	100 mg	€ 350,00
		RL-2580.0250	250 mg	€ 800,00
		RL-2580.0500	500 mg	€ 1.450,00
		RL-2580.1000	1 g	€ 2.400,00
<b>RL-2300 MeTz-PhAcOH</b> Methyltetrazine-phenylacetic acid CAS-No. 1380500-88-8 Formula $C_{11}H_{10}N_4O_2$ Mol. weight 230,22 g/mol		RL-2300.0025	25 mg	€ 170,00
		RL-2300.0100	100 mg	€ 290,00
		RL-2300.0500	500 mg	€ 640,00
		RL-2300.1000	1 g	€ 1.070,00
<b>RL-2320 MeTz-PhAc-NHS</b> Methyltetrazine-phenylacetyl succinimidyl ester CAS-No. 1644644-96-1 Formula $C_{15}H_{13}N_5O_4$ Mol. weight 327,29 g/mol		RL-2320.0025	25 mg	€ 170,00
		RL-2320.0100	100 mg	€ 290,00
		RL-2320.0500	500 mg	€ 710,00
		RL-2320.1000	1 g	€ 1.190,00
<b>RL-2230 Bz-MeTz-NHS</b> 2,5-dioxopyrrolidin-1-yl 5-(4-(6-methyl-1,2,4,5-tetrazin-3-yl)benzylamino)-5-oxopentanoate CAS-No. 1454558-58-7 Mol. weight 412,41 g/mol		RL-2230.0000		please inquire
<b>RL-2240 Bz-Tz-NHS</b> 2,5-dioxopyrrolidin-1-yl 5-(4-(1,2,4,5-tetrazin-3-yl)benzylamino)-5-oxopentanoate CAS-No. 1244040-64-9 Formula $C_{18}H_{18}N_6O_5$ Mol. weight 398,37 g/mol		RL-2240.0000		please inquire

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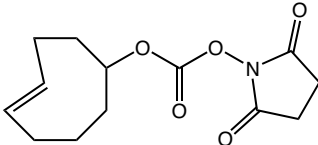
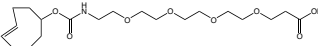
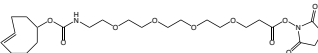
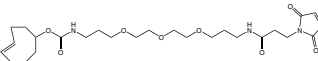
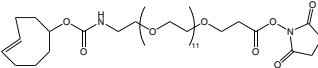
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<b>RL-2370</b>	<b>MeTz-PEG(4)-NH<sub>2</sub>*HCl</b>			
Methyltetrazine-PEG(4)-amine HCl salt				
CAS-No.	1802908-05-9 net	 RL-2370.0025	25 mg	€ 170,00
Formula	C <sub>17</sub> H <sub>25</sub> N <sub>5</sub> O <sub>4</sub> *HCl	RL-2370.0100	100 mg	€ 410,00
Mol. weight	363,41*HCl g/mol	RL-2370.0500	500 mg	€ 1.190,00
		RL-2370.1000	1 g	€ 1.840,00
<b>RL-2310</b>	<b>MeTz-PEG(4)-COOH</b>			
Methyltetrazine-PEG(4)-acid				
CAS-No.	1802907-91-0	 RL-2310.0025	25 mg	€ 175,00
Formula	C <sub>20</sub> H <sub>28</sub> N <sub>4</sub> O <sub>7</sub>	RL-2310.0100	100 mg	€ 565,00
Mol. weight	436,56 g/mol	RL-2310.0500	500 mg	€ 1.250,00
		RL-2310.1000	1 g	€ 2.100,00
<b>RL-2330</b>	<b>MeTz-PEG(4)-NHS</b>			
Methyltetrazine-PEG(4)-propanoyl succinimidyl ester				
CAS-No.	1802907-92-1	 RL-2330.0010	10 mg	€ 200,00
Formula	C <sub>24</sub> H <sub>31</sub> N <sub>5</sub> O <sub>9</sub>	RL-2330.0025	25 mg	€ 290,00
Mol. weight	533,53 g/mol	RL-2330.0100	100 mg	€ 640,00
		RL-2330.0500	500 mg	€ 2.070,00
<b>RL-2340</b>	<b>MeTz-PEG(4)-mal</b>			
Methyltetrazine-PEG(4)-maleimide				
CAS-No.	1802908-02-6	 RL-2340.0010	10 mg	€ 200,00
Formula	C <sub>24</sub> H <sub>30</sub> N <sub>6</sub> O <sub>7</sub>	RL-2340.0025	25 mg	€ 290,00
Mol. weight	514,53 g/mol	RL-2340.0100	100 mg	€ 640,00
<b>RL-2350</b>	<b>MeTz-PEG(4)-BisSulfonThiol-Linker</b>			
Methyltetrazine-PEG(4)-BisSulfon-Thiol-Linker				
Formula	C <sub>51</sub> H <sub>64</sub> N <sub>6</sub> O <sub>15</sub> S <sub>3</sub>	 RL-2350.0010	10 mg	€ 230,00
Mol. weight	1097,28 g/mol	RL-2350.0025	25 mg	€ 350,00
		RL-2350.0100	100 mg	€ 1.120,00
<b>RL-2250</b>	<b>Bz-Tz-PEG(5)-NHS</b>			
2,5-dioxopyrrolidin-1-yl 1-(4-(1,2,4,5-tetrazin-3-yl)phenyl)-3-oxo-6,9,12,15,18-pentaoxa-2-azahenicosan-21-oate				
CAS-No.	1682653-80-0	 RL-2250.0000		please inquire
Formula	C <sub>27</sub> H <sub>36</sub> N <sub>6</sub> O <sub>10</sub>			
Mol. weight	604,61 g/mol			

	Product code	Packing unit	Price
<b>RL-2380 MeTz-mPEG (5kDa)</b> alpha-Methyltetrazine-omega-methoxy-poly(ethylene glycol) Mol. weight 5000 Da 	RL-2380.0000		please inquire
<b>RL-2390 MeTz-mPEG (10kDa)</b> alpha-Methyltetrazine-omega-methoxy-poly(ethylene glycol) Mol. weight 10000 Da 	RL-2390.0000		please inquire
<b>RL-2400 MeTz-mPEG (20kDa)</b> alpha-Methyltetrazine-omega-methoxy-poly(ethylene glycol) Mol. weight 20000 Da 	RL-2400.0000		please inquire
<b>RL-2410 MeTz-mPEG (30kDa)</b> alpha-Methyltetrazine-omega-methoxy-poly(ethylene glycol) Mol. weight 30000 Da 	RL-2410.0000		please inquire

## Products with TCO

	Product code	Packing unit	Price
<b>TCO1060 TCO-NH<sub>2</sub>*HCl</b> trans-Cyclooctene-amine hydrochloride CAS-No. 1609659-02-0 Formula C <sub>12</sub> H <sub>22</sub> N <sub>2</sub> O <sub>2</sub> *HCl Mol. weight 226,32*36,45 g/mol 	TCO1060.0025 TCO1060.0100 TCO1060.1000	25 mg 100 mg 1 g	€ 290,00 € 640,00 € 3.620,00

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		Product code	Packing unit	Price
<b>TCO1000</b>	<b>TCO-NHS</b>			
trans-Cyclooctene succinimidyl carbonate				
CAS-No.	1191901-33-3			
Formula	$C_{13}H_{17}NO_5$			
Mol. weight	267,28 g/mol			
				
		TCO1000.0025	25 mg	€ 310,00
		TCO1000.0100	100 mg	€ 800,00
		TCO1000.1000	1 g	€ 2.850,00
<b>TCO1040</b>	<b>TCO-PEG(4)-COOH</b>			
trans-Cyclooctene-PEG(4)-Acid				
Formula	$C_{20}H_{35}NO_8$			
Mol. weight	417,49 g/mol			
				
		TCO1040.0025	25 mg	€ 290,00
		TCO1040.0100	100 mg	€ 640,00
		TCO1040.0500	500 mg	€ 1.960,00
<b>TCO1010</b>	<b>TCO-PEG(4)-NHS</b>			
trans-Cyclooctene-PEG(4)-carboxy succinimidyl ester				
CAS-No.	1621096-79-4			
Formula	$C_{24}H_{38}N_2O_{10}$			
Mol. weight	514,57 g/mol			
				
		TCO1010.0010	10 mg	€ 325,00
		TCO1010.0025	25 mg	€ 450,00
		TCO1010.0100	100 mg	€ 950,00
<b>TCO1050</b>	<b>TCO-PEG(3)-mal</b>			
trans-Cyclooctene-PEG(3)-maleimide				
CAS-No.	1609659-01-9			
Formula	$C_{26}H_{41}N_3O_8$			
Mol. weight	523,62 g/mol			
				
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		TCO1050.0100	100 mg	€ 850,00
<b>TCO1020</b>	<b>TCO-PEG(12)-NHS</b>			
trans-Cyclooctene-PEG(12)-carboxy succinimidyl ester				
Formula	$C_{40}H_{70}N_2O_{18}$			
Mol. weight	866,99 g/mol			
				
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		TCO1020.0100	100 mg	€ 940,00

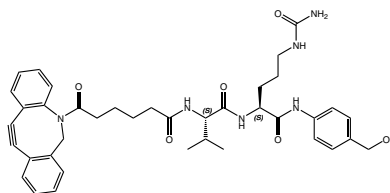
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## 1.2.3. Custom Synthesis of DBCO, Tetrazine and TCO Derivatives

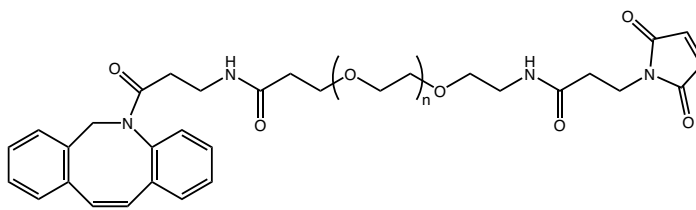
### DBCO with Cleavable Linkers

e.g. ADC linkers, Dde-based linkers, disulfide-based linkers.



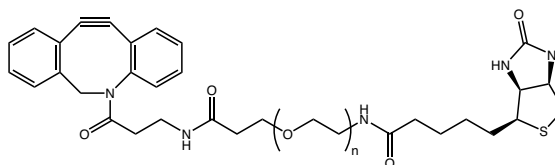
### DBCO-PEG-Derivatives

DBCO-PEG-NHS  
 DBCO-PEG-mal  
 DBCO-PEG-Bis-Sulfone-Thiol  
 DBCO-PEG-COOH  
 DBCO-PEG-NH<sub>2</sub>  
 With mono- or polydisperse PEG.



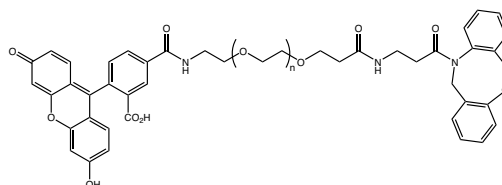
### DBCO-Biotin

With both monodisperse and polydisperse PEG spacers.



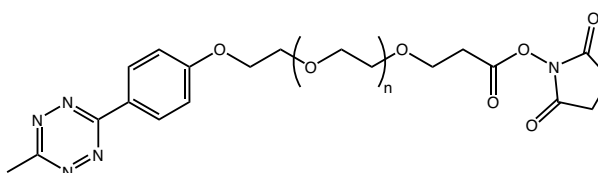
### DBCO-Dye

With both monodisperse and polydisperse PEG spacers.  
 With the dye of your choice,  
 e.g. ICG, (5)6-carboxyfluorescein.



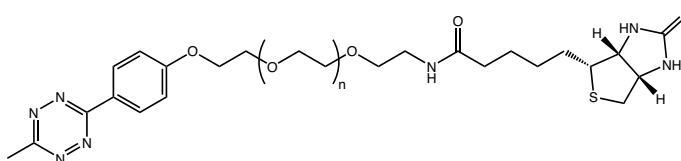
### Tetrazine-PEG-Derivatives

Tetrazine-PEG-NHS  
 Tetrazine-PEG-mal  
 Tetrazine-PEG-COOH  
 Tetrazine-PEG-NH<sub>2</sub>  
 With both monodisperse and polydisperse PEG spacers.



### Tetrazine-Biotin

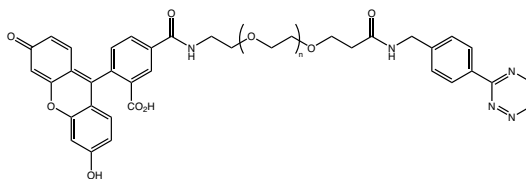
With both monodisperse and polydisperse PEG spacers, or alkyl spacers.





### Tetrazine-Dye

With both monodisperse and polydisperse PEG spacers. With the dye of your choice, e.g. ICG, (5)6-carboxyfluorescein.



### TCO-PEG-Derivatives

TCO-PEG-NHS  
 TCO-PEG-mal  
 TCO-PEG-COOH  
 TCO-PEG-NH<sub>2</sub>

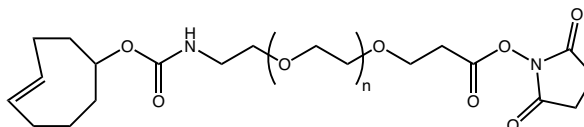


Table 1: A selection of derivatives of tetrazine, TCO and DBCO available by custom synthesis.



**We offer custom synthesis of DBCO, DACN, TCO and tetrazine derivatives and related conjugations.**

Send us your inquiry to [info@iris-biotech.de](mailto:info@iris-biotech.de)

## 2. Amino Acid Derivatives and Related Building Blocks for Click Chemistry

### 2.1. Recombinant Incorporation of Amino Acids into Proteins

Genetic code expansion is a powerful technology in proteomics, facilitating the site-specific incorporation of noncanonical amino acids (ncAAs) into proteins using the cellular machinery. A wide variety of ncAAs can be incorporated into proteins using this technology that relies on aminoacyl-tRNA synthetase/tRNA pairs.

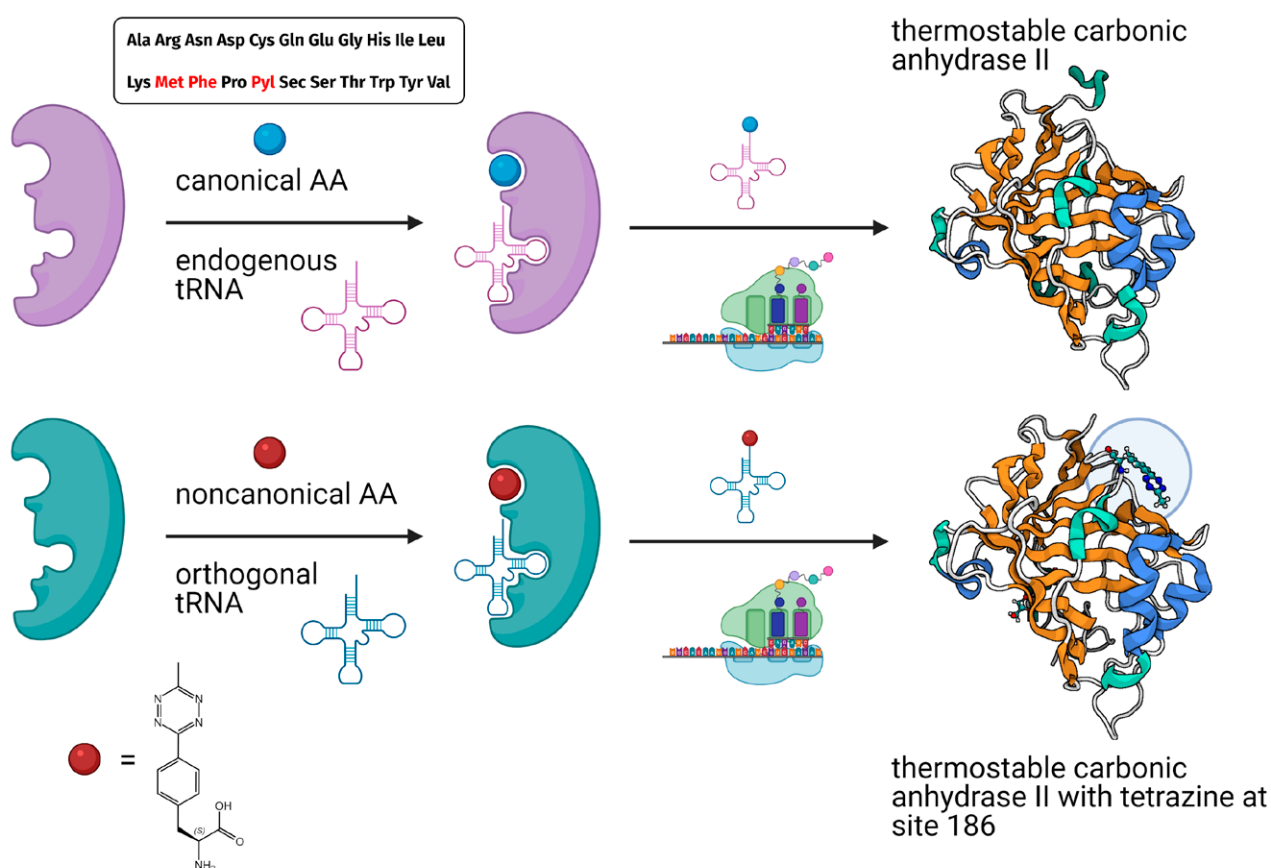
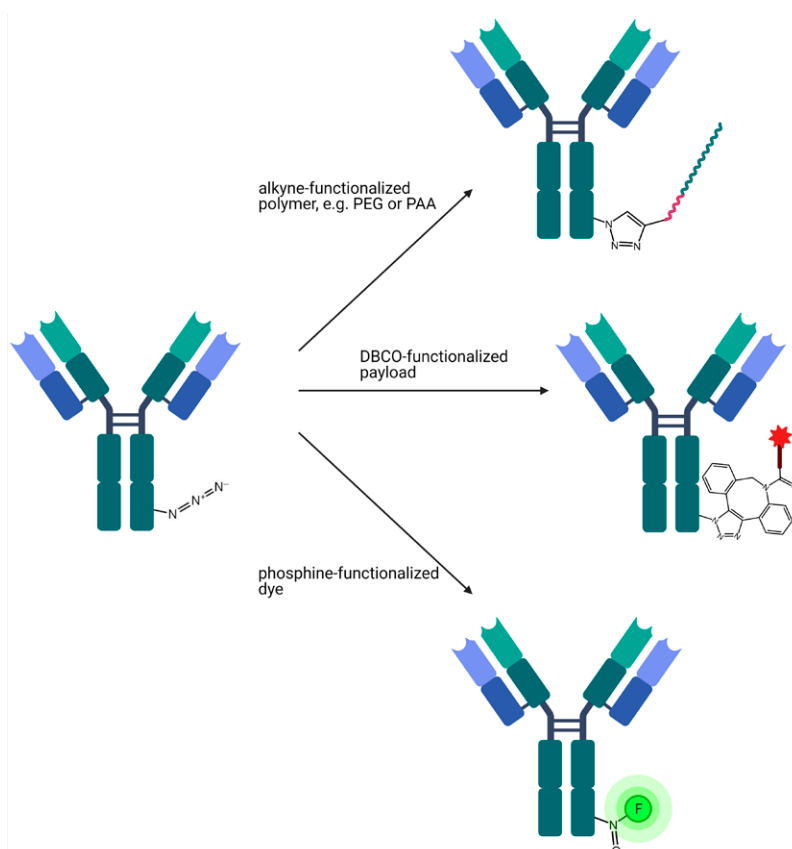


Fig. 6: Principle of genetic code expansion (protein structures adapted from Kean et al., *Protein Sci.* 2018 ; Bednar et al., *ACS Appl. Mater. Interfaces* 2019).

Certain amino acids such as azidohomoalanine (Aha) can be incorporated into proteins using the cell's native translational apparatus. Aha is a structural analogue of methionine (Met), and as such activated by the native methionyl-tRNA synthetase of *Escherichia coli*, replacing Met in proteins expressed in methionine-depleted bacterial cultures. Aside from being a clickable amino acid, azidohomoalanine is an excellent conformationally sensitive IR probe to study protein folding and protein structure.

In most cases, researchers resort to engineering suitable aminoacyl-tRNA synthetase/tRNA pairs in order to incorporate ncAAs. For example, the usually promiscuous pyrrolysyl-tRNA synthetase (PylRS) machinery can be engineered to accommodate more than 100 ncAAs or  $\alpha$ -hydroxy acids into proteins at amber codons, and can be reassigned to other codons such as ochre (UAA) or opal (UGA). Among the most prominent noncanonical amino acids that are routinely incorporated by engineered PylRS/ tRNA<sup>Pyl</sup> pairs are azido and propargyl analogues of L-lysine, enabling the biochemist to site-specifically introduce an azido or alkyne group into a protein for further Click conjugation.

Recent developments in the field of genetic code expansion include the directed evolution of tRNA synthetases to improve substrate selectivity, as well as the reassignment of further codons to encode ncAAs. Once an azido or alkyne function has been built into the protein sequence, conjugation with a large number of diverse clickable compounds opens up a wide field of possibilities. Alternatively, a protein bearing an azido group can be selectively modified *via* Staudinger ligation (see Fig. 7). Many different applications from therapeutics to diagnostics can be addressed through conjugates with PEG-polymers, dyes, cofactors, antibodies, small molecules, toxins, additional proteins, and peptides.

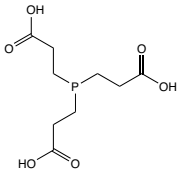


**Fig. 7: Site-specific conjugation to an azido-functionalized IgG antibody.**

One recent example of a sophisticated application of genetic code expansion is the site-directed incorporation of two different non-canonical amino acids into human erythropoietin *via* cell-free protein synthesis (Zemella *et al.*, *Sci. Rep.* 2018). Either *p*-propargyloxyphenylalanine (pPa) or *p*-azido-L-phenylalanine (AzF) was incorporated into an erythropoietin amber-mutant (EPO-Amb) *via* amber suppression in a eukaryotic translationally active lysate. This eukaryotic system also facilitated the glycosylation of EPO which is known to be crucial for its pharmacokinetics. The recombinant EPO variants were subsequently labelled with various fluorophores, as well as functionalized with a PEG of 10 kDa. Similar to glycosylation, the attachment of PEGs has been shown to improve solubility, stability and activity of recombinantly produced EPO (Hoffmann *et al.*, *Mol. Biosyst.* 2016).

The usefulness of the cell-free protein synthesis approach for the incorporation of ncAAs was further demonstrated by the preparation and ligand-free dimerization of functional human epidermal growth factor receptor (EGFR), a complex eukaryotic transmembrane protein (Quast *et al.*, *Sci. Rep.* 2016). EGFR is a receptor tyrosine kinase that dimerizes and autophosphorylates upon binding to its ligand, thereby initiating an intracellular signal transduction cascade. In order to facilitate dimerization in the absence of a ligand, *p*-azido-L-phenylalanine (AzF) was site-selectively incorporated into EGFR, which was verified by Staudinger ligation of a phosphine dye to AzF. Two different EGFR amber mutants that incorporate AzF in the intracellular juxtamembrane domain were synthesized and reacted with a bis-COMBO Click-crosslinking reagent, thereby generating covalently linked receptor dimers.

[back to content](#) ↑

		Product code	Packing unit	Price
<b>LS-3405</b>	<b>TCEP*HCl</b>			
Tris-(2-carboxyethyl)phosphine hydrochloride salt		LS-3405.0025	25 g	€ 190,00
CAS-No.	51805-45-9	LS-3405.0100	100 g	€ 480,00
Formula	C <sub>9</sub> H <sub>15</sub> O <sub>6</sub> P*HCl			
Mol. weight	250,19*36,45 g/mol			

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## 2.2. Peptide Synthesis with Azido and Alkyne Amino Acids

Both Boc- and Fmoc-protected derivatives of azido and alkyne amino acids can be readily introduced into peptide sequences by standard SPPS protocols. Such building blocks have found widespread use in techniques such as peptide ligation, bioconjugation, labeling, immobilization and linkerology. Bioconjugation, which is defined as the joining of two biomolecules or the ligation of a synthetic molecule with a biomolecule, stands out in particular among those applications. Targets that are notoriously difficult to access such as glycopeptides and -proteins can be synthesized in a straightforward and chemoselective fashion *via* Click reaction to afford neoglycopeptides and -proteins. Peptides or proteins that aid in the translocation into cells or that facilitate the targeting to certain tissues or organelles may be conjugated to toxins, fluorophores, or oligonucleotides by means of the Click reaction.

Another potential application is the cyclization of peptides *via* Click chemistry. This technique is a well-known approach to stabilize specific conformations in order to optimize peptide binding, and to increase resistance toward proteolytic degradation. If two clickable groups are placed at a suitable distance from each other in a peptide, they can undergo intramolecular cycloaddition with good yields and minimal side reactions. For example, this Click-mediated cyclization may be used to stabilize an  $\alpha$ -helical secondary structure when azide and alkyne are located in side chains at positions *i* and *i*+4, respectively.

### Example for a Protocol for Click Reactions in Peptide Synthesis:

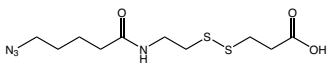
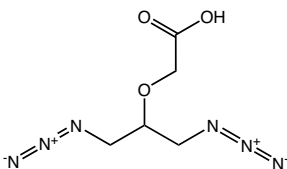
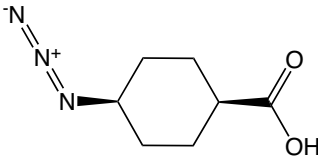
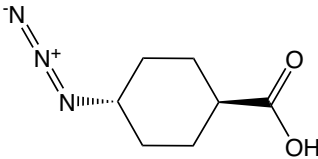
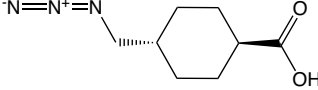
Successful protocols have been published applying to 3  $\mu$ mol peptide in 4 ml tBuOH/H<sub>2</sub>O (1:2) with excess of ascorbic acid (40  $\mu$ mol) and CuSO<sub>4</sub>\*5 H<sub>2</sub>O (40  $\mu$ mol) generating Cu(I) *in situ*. Stirring at room temperature overnight is followed by appropriate chromatographic work up. [Le Chevalier-Isaad *et al.*, **Eur. J. Org. Chem.** 2010]

#### References:

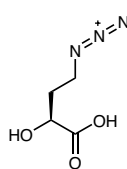
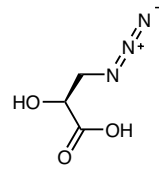
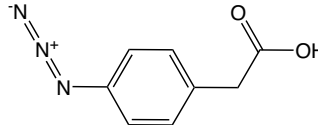
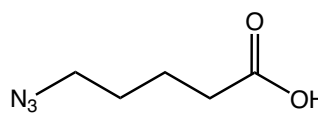
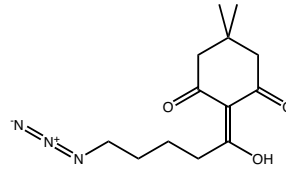
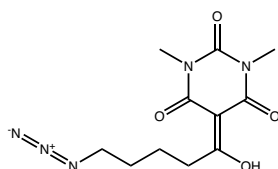
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## 2.3. Azido Amino Acids

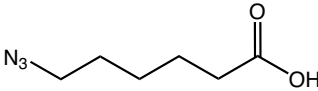
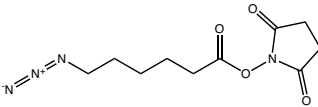
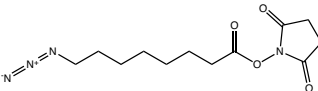
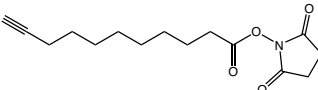
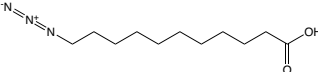
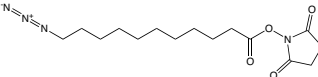
### Azido-Alkyl Acids and Azido-Aryl Acids

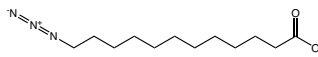
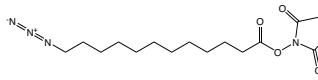
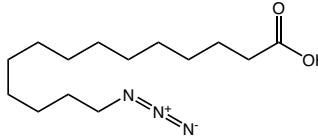
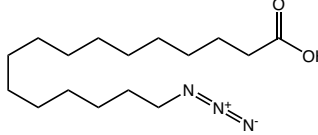
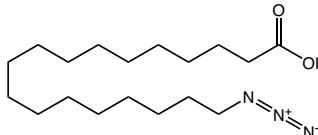
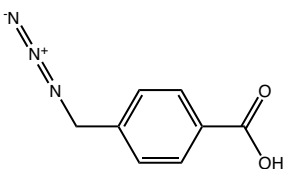
		Product code	Packing unit	Price
<b>RL-3320</b>	<b>Azido-SS-COOH</b> 3-((2-(5-azidopentanamido)ethyl)disulfanyl)propanoic acid Formula: $C_{10}H_{18}N_4O_3S_2$ Mol. weight: 306,40 g/mol	 RL-3320.0000		please inquire
<b>AAA2190</b>	<b>DAPOA*DCHA</b> 2-(1,3-diazidopropan-2-yloxy)acetic acid dicyclohexylamine CAS-No. 2389064-43-9 net Formula $C_9H_8N_6O_3 \cdot C_{12}H_{23}N$ Mol. weight 200,16*181,32 g/mol	 AAA2190.0250 AAA2190.0500 AAA2190.1000 AAA2190.5000	250 mg 500 mg 1 g 5 g	€ 120,00 € 216,00 € 336,00 € 1.200,00
<b>HAA2230</b>	<b><math>N_3</math>-1,4-cis-CHC-OH</b> cis-4-Azidocyclohexanecarboxylic acid CAS-No. 863222-21-3 Formula $C_7H_{11}N_3O$ Mol. weight 169,18 g/mol	 HAA2230.0001 HAA2230.0005 HAA2230.0025	1 g 5 g 25 g	€ 125,00 € 450,00 € 1.800,00
<b>HAA2235</b>	<b><math>N_3</math>-1,4-trans-CHC-OH</b> trans-4-Azidocyclohexanecarboxylic acid CAS-No. 1931895-14-5 Formula $C_7H_{11}N_3O_2$ Mol. weight 169,18 g/mol	 HAA2235.0001 HAA2235.0005 HAA2235.0025	1 g 5 g 25 g	€ 125,00 € 450,00 € 1.800,00
<b>HAA2240</b>	<b><math>N_3</math>-trans-MCHC-OH</b> trans-4-(Azidomethyl)cyclohexanecarboxylic acid CAS-No. 170811-10-6 Formula $C_8H_{13}N_3O_2$ Mol. weight 183,21 g/mol	 HAA2240.0001 HAA2240.0005 HAA2240.0025	1 g 5 g 25 g	€ 110,00 € 375,00 € 1.500,00



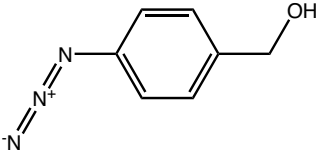
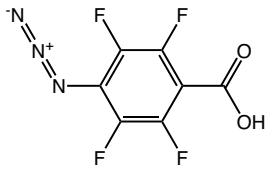
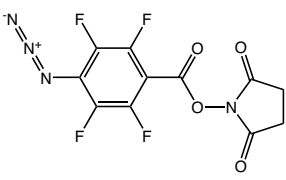
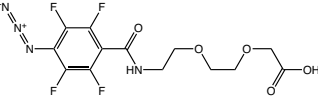
		Product code	Packing unit	Price
<b>HAA3175 N<sub>3</sub>-HABA*DCHA (2S)</b> (S)-4-azido-2-hydroxybutyric acid dicyclohexalamine CAS-No. 959148-55-1 net Formula C <sub>4</sub> H <sub>7</sub> N <sub>3</sub> O <sub>3</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 145,12*181,32 g/mol		HAA3175.0250	250 mg	€ 80,00
		HAA3175.0500	500 mg	€ 145,00
		HAA3175.1000	1 g	€ 225,00
		HAA3175.5000	5 g	€ 800,00
<b>HAA3365 N<sub>3</sub>-IsoSer*DCHA (2S)</b> (S)-2-Hydroxy-3-azidopropanoic acid dicyclohexalamine CAS-No. 1620171-65-4 net Formula 3H <sub>5</sub> N <sub>3</sub> O <sub>3</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 131,09*181,32 g/mol		HAA3365.0250	250 mg	€ 80,00
		HAA3365.0500	500 mg	€ 145,00
		HAA3365.1000	1 g	€ 225,00
		HAA3365.5000	5 g	€ 800,00
<b>HAA2245 N<sub>3</sub>-PhAc-OH</b> (4-Azidophenyl)acetic acid CAS-No. 62893-37-2 Formula C <sub>8</sub> H <sub>7</sub> N <sub>3</sub> O <sub>2</sub> Mol. weight 177,16 g/mol		HAA2245.0500	500 mg	€ 81,00
		HAA2245.0001	1 g	€ 126,00
		HAA2245.0005	5 g	€ 450,00
		HAA2245.0025	25 g	€ 1.800,00
<b>AAA1970 N<sub>3</sub>-Pen-OH</b> 5-Azido-pentanoic acid CAS-No. 79583-98-5 Formula C <sub>5</sub> H <sub>9</sub> N <sub>3</sub> O <sub>2</sub> Mol. weight 143,14 g/mol		AAA1970.0001	1 g	€ 120,00
		AAA1970.0005	5 g	€ 450,00
<b>RL-3280 N<sub>3</sub>-Pen-Dde</b> 2-(5-azido-1-hydroxypentylidene)-5,5-dimethylcyclohexane-1,3-dione CAS-No. 1867129-38-1 Formula C <sub>13</sub> H <sub>19</sub> N <sub>3</sub> O <sub>3</sub> Mol. weight 265,31 g/mol		RL-3280.0250	250 mg	€ 125,00
		RL-3280.0001	1 g	€ 350,00
		RL-3280.0005	5 g	€ 1.400,00
<b>RL-3290 N<sub>3</sub>-Pen-Dtp</b> 5-(5-azido-1-hydroxypentylidene)-1,3-dimethylpyrimidine-2,4,6(1H,3H,5H)-trione CAS-No. 1867129-42-7 Formula C <sub>11</sub> H <sub>15</sub> N <sub>5</sub> O <sub>4</sub> Mol. weight 281,27 g/mol		RL-3290.0250	250 mg	€ 125,00
		RL-3290.0001	1 g	€ 350,00
		RL-3290.0005	5 g	€ 1.400,00

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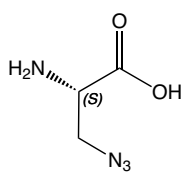
		Product code	Packing unit	Price
<b>AAA1960</b> <b>N<sub>3</sub>-Hx-OH</b> 6-Azido-hexanoic acid CAS-No.    79598-53-1 Formula    C <sub>6</sub> H <sub>11</sub> N <sub>3</sub> O <sub>2</sub> Mol. weight 157,17 g/mol		AAA1960.0001	1 g	€ 120,00
		AAA1960.0005	5 g	€ 450,00
<b>RL-2980</b> <b>N<sub>3</sub>-Aca-OSu</b> 6-Azidocaproic acid N-hydroxysuccinimidyl ester CAS-No.    866363-70-4 Formula    C <sub>10</sub> H <sub>14</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 254,24		RL-2980.0100	100 mg	€ 115,00
		RL-2980.0250	250 mg	€ 195,00
		RL-2980.0500	500 mg	€ 320,00
		RL-2980.0001	1 g	€ 480,00
		RL-2980.0005	5 g	€ 1.600,00
<b>RL-3480</b> <b>8-azido-octanoyl-OSu</b> 8-Azidooctanoic acid N-hydroxysuccinimide ester Formula    C <sub>12</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 282,30 g/mol		RL-3480.0250	250 mg	€ 120,00
		RL-3480.0500	500 mg	€ 216,00
		RL-3480.1000	1 g	€ 336,00
		RL-3480.5000	5 g	€ 1.200,00
<b>RL-3460</b> <b>10-Undecynoyl-OSu</b> 10-Undecynoic acid N-hydroxysuccinimide ester CAS-No.    1006592-57-9 Formula    C <sub>15</sub> H <sub>21</sub> NO <sub>4</sub> Mol. weight 279,34 g/mol		RL-3460.0250	250 mg	€ 89,00
		RL-3460.0500	500 mg	€ 160,00
		RL-3460.0001	1 g	€ 250,00
		RL-3460.0005	5 g	€ 890,00
<b>RL-3200</b> <b>11-Azidoundecanoic acid</b> 11-Azido-undecanoic acid CAS-No.    118162-45-1 Formula    C <sub>11</sub> H <sub>21</sub> N <sub>3</sub> O <sub>2</sub> Mol. weight 227,30 g/mol		RL-3200.0500	500 mg	€ 108,00
		RL-3200.0001	1 g	€ 168,00
		RL-3200.0005	5 g	€ 600,00
		RL-3200.0025	25 g	€ 2.400,00
<b>RL-3170</b> <b>11-azido-undecanoyl-OSu</b> 11-azidoundecanoic acid N-hydroxysuccinimide ester CAS-No.    850080-13-6 Formula    C <sub>15</sub> H <sub>24</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 324,38 g/mol		RL-3170.0250	250 mg	€ 100,00
		RL-3170.0500	500 mg	€ 180,00
		RL-3170.1000	1 g	€ 280,00
		RL-3170.5000	5 g	€ 1.000,00

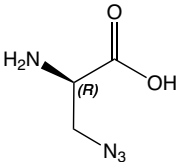
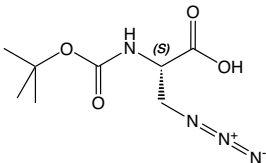
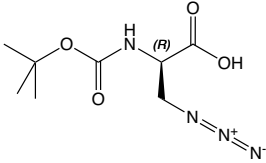
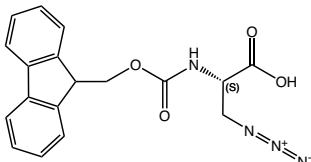
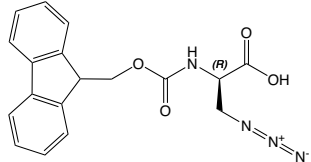
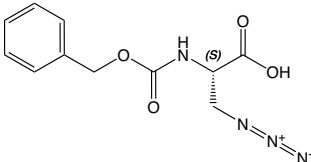
		Product code	Packing unit	Price
<b>RL-3210</b>	<b>12-Azidododecanoic acid</b>			
12-Azido-dodecanoic acid		RL-3210.0500	500 mg	€ 108,00
CAS-No.	80667-36-3	RL-3210.0001	1 g	€ 168,00
Formula	C <sub>12</sub> H <sub>23</sub> N <sub>3</sub> O <sub>2</sub>	RL-3210.0005	5 g	€ 600,00
Mol. weight	241,33 g/mol	RL-3210.0025	25 g	€ 2.400,00
<b>RL-3220</b>	<b>12-azido-dodecanoyl-OSu</b>			
12-Azidododecanoic acid N-hydroxysuccinimide ester		RL-3220.0250	250 mg	€ 100,00
CAS-No.	2489524-00-5	RL-3220.0500	500 mg	€ 180,00
Formula	C <sub>16</sub> H <sub>26</sub> N <sub>4</sub> O <sub>4</sub>	RL-3220.0001	1 g	€ 280,00
Mol. weight	338,40 g/mol	RL-3220.0005	5 g	€ 1.000,00
<b>RL-3230</b>	<b>14-Azido-myristic acid</b>			
14-azidotetradecanoic acid		RL-3230.0100	100 mg	€ 175,00
CAS-No.	176108-61-5	RL-3230.0500	500 mg	€ 600,00
Formula	C <sub>14</sub> H <sub>27</sub> N <sub>3</sub> O <sub>2</sub>	RL-3230.0001	1 g	€ 1.000,00
Mol. weight	269,38 g/mol			
<b>RL-3240</b>	<b>16-Azido-palmitic acid</b>			
16-azidohexadecanoic acid		RL-3240.0100	100 mg	€ 250,00
CAS-No.	112668-54-9	RL-3240.0500	500 mg	€ 960,00
Formula	C <sub>16</sub> H <sub>31</sub> N <sub>3</sub> O <sub>2</sub>	RL-3240.1000	1 g	€ 1.600,00
Mol. weight	297,44 g/mol			
<b>RL-3250</b>	<b>18-Azido-stearic acid</b>			
18-azidooctadecanoic acid		RL-3250.0100	100 mg	€ 375,00
CAS-No.	1529763-58-3	RL-3250.0250	250 mg	€ 750,00
Formula	C <sub>18</sub> H <sub>35</sub> N <sub>3</sub> O <sub>2</sub>	RL-3250.0500	500 mg	€ 1.450,00
Mol. weight	325,49 g/mol	RL-3250.0001	1 g	€ 2.400,00
<b>RL-2995</b>	<b>4-(Azidomethyl)benzoic acid</b>			
4-Azidomethylbenzoic acid		RL-2995.9500	500 mg	€ 90,00
CAS-No.	79584-03-5	RL-2995.0001	1 g	€ 140,00
Formula	C <sub>8</sub> H <sub>7</sub> N <sub>3</sub> O <sub>2</sub>	RL-2995.0005	5 g	€ 500,00
Mol. weight	177,16 g/mol	RL-2995.0025	25 g	€ 2.000,00

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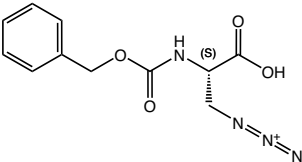
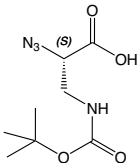
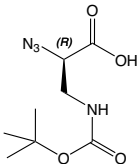
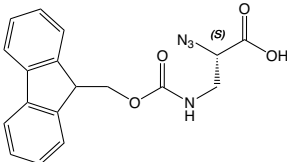
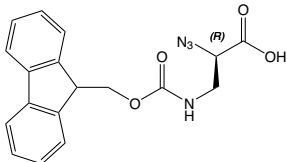
		Product code	Packing unit	Price
<b>RL-2990</b> <b>4-Azidobenzyl alcohol</b> (4-azidophenyl)methanol CAS-No.     31499-54-4 Formula     C <sub>7</sub> H <sub>7</sub> N <sub>3</sub> O Mol. weight   149,15 g/mol		RL-2990.0100	100 mg	€ 150,00
		RL-2990.0250	250 mg	€ 250,00
		RL-2990.0500	500 mg	€ 450,00
		RL-2990.0001	1 g	€ 700,00
<b>RL-2035</b> <b>ATFB</b> 4-Azido-2,3,5,6-tetrafluorobenzoic acid CAS-No.     122590-77-6 Formula     C <sub>7</sub> HF <sub>4</sub> N <sub>3</sub> O <sub>2</sub> Mol. weight   235,1 g/mol		RL-2035.0250	250 mg	€ 100,00
		RL-2035.0500	500 mg	€ 180,00
		RL-2035.0001	1 g	€ 280,00
		RL-2035.0005	5 g	€ 1.000,00
<b>RL-2045</b> <b>ATFB-NHS</b> N-Succinimidyl 4-azido-2,3,5,6-tetrafluorobenzoate CAS-No.     126695-58-7 Formula     C <sub>11</sub> H <sub>4</sub> F <sub>4</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight   332,17 g/mol		RL-2045.0100	100 mg	€ 96,00
		RL-2045.0250	250 mg	€ 160,00
		RL-2045.0500	500 mg	€ 288,00
		RL-2045.1000	1 g	€ 448,00
		RL-2045.5000	5 g	€ 1.600,00
<b>PEG5000</b> <b>N<sub>3</sub>-TFBA-O2Oc</b> {2-[2-(4-Azido-2,3,5,6-tetrafluorobenzoyl-amino)ethoxy]ethoxy}acetic acid CAS-No.     1993119-45-1 Formula     C <sub>13</sub> H <sub>12</sub> F <sub>4</sub> N <sub>4</sub> O <sub>5</sub> Mol. weight   380,25 g/mol		PEG5000.0100	100 mg	€ 120,00
		PEG5000.0250	250 mg	€ 200,00
		PEG5000.0500	500 mg	€ 360,00
		PEG5000.1000	1 g	€ 560,00
		PEG5000.5000	5 g	€ 2.000,00

## Azido-Alanine and Propionic Acid Derivatives

		Product code	Packing unit	Price
<b>HAA1880</b> <b>H-L-Aza-OH*HCl hydrate</b> (S)-2-Amino-3-azidopropanoic acid hydrochloride hydrate CAS-No.     1620171-64-3 Formula     C <sub>3</sub> H <sub>6</sub> N <sub>4</sub> O <sub>2</sub> *HCl*nH <sub>2</sub> O Mol. weight   130,11*36,45 g/mol		HAA1880.0500	500 mg	€ 108,00
		HAA1880.0001	1 g	€ 168,00
		HAA1880.0005	5 g	€ 600,00
		HAA1880.0025	25 g	€ 2.400,00

		Product code	Packing unit	Price
<b>HAA1885 H-D-Aza-OH*HCl hydrate</b> (R)-2-Amino-3-azidopropanoic acid hydrochloride hydrate CAS-No. 1379690-01-3 Formula $C_3H_6N_4O_2 \cdot HCl \cdot nH_2O$ Mol. weight 130,11*36,45 g/mol		HAA1885.0250	250 mg	€ 70,00
		HAA1885.0500	500 mg	€ 126,00
		HAA1885.0001	1 g	€ 196,00
		HAA1885.0005	5 g	€ 700,00
<b>BAA1820 Boc-L-Aza-OH*CHA</b> (S)-2-t-Butyloxycarbonylamino-3-azidopropanoic acid cyclohexylamine CAS-No. 2098496-88-7 Formula $C_8H_{14}N_4O_4 \cdot C_6H_{13}N$ Mol. weight 230,22*99,18 g/mol		BAA1820.0001	1 g	€ 112,00
		BAA1820.0005	5 g	€ 400,00
		BAA1820.0025	25 g	€ 1.600,00
<b>BAA1825 Boc-D-Aza-OH*CHA</b> (R)-2-t-Butyloxycarbonylamino-3-azidopropanoic acid cyclohexylamine CAS-No. 225780-77-8net Formula $C_8H_{14}N_4O_4 \cdot C_6H_{13}N$ Mol. weight 230,22*99,18 g/mol		BAA1825.0500	500 mg	€ 99,00
		BAA1825.0001	1 g	€ 154,00
		BAA1825.0005	5 g	€ 550,00
		BAA1825.0025	25 g	€ 2.200,00
<b>FAA1820 Fmoc-L-Aza-OH (solv.)</b> (S)-2-(9-Fluorenylmethyloxycarbonylamino)-3-azidopropanoic acid, solvate with DIPE CAS-No. 684270-46-0 Formula $C_{18}H_{16}N_4O_4$ Mol. weight 352,34 g/mol		FAA1820.0500	500 mg	€ 81,00
		FAA1820.0001	1 g	€ 126,00
		FAA1820.0005	5 g	€ 450,00
		FAA1820.0025	25 g	€ 1.800,00
<b>FAA6870 Fmoc-D-Aza-OH</b> (R)-2-(9-Fluorenylmethyloxycarbonylamino)-3-azidopropanoic acid CAS-No. 1016163-79-3 Formula $C_{18}H_{16}N_4O_4$ Mol. weight 352,34 g/mol		FAA6870.0500	500 mg	€ 108,00
		FAA6870.0001	1 g	€ 168,00
		FAA6870.0005	5 g	€ 600,00
		FAA6870.0025	25 g	€ 2.400,00
<b>ZAA1280 Z-L-Dap(N<sub>3</sub>)-OH*CHA</b> (S)-2-Benzoyloxycarbonylamino-3-azidopropanoic acid cyclohexylamine CAS-No. 684270-44-8 net Formula $C_{17}H_{12}N_4O_4 \cdot C_6H_{13}N$ Mol. weight 264,24*99,18 g/mol		ZAA1280.0500	500 mg	€ 72,00
		ZAA1280.0001	1 g	€ 112,00
		ZAA1280.0005	5 g	€ 400,00
		ZAA1280.0025	25 g	€ 1.600,00

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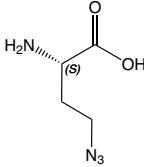
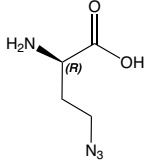
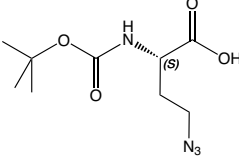
		Product code	Packing unit	Price
<b>ZAA1300 Z-L-Dap(N<sub>3</sub>)-OH</b> N-alpha-Benzyloxycarbonyl-L-2-amino-3-azido-propanoic acid CAS-No. 684270-44-8 Formula C <sub>11</sub> H <sub>12</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 264,24 g/mol		ZAA1300.0500	500 mg	€ 72,00
		ZAA1300.0001	1 g	€ 112,00
		ZAA1300.0005	5 g	€ 400,00
		ZAA1300.0025	25 g	€ 1.600,00
<b>HAA2130 N<sub>3</sub>-L-Dap(Boc)-OH</b> (S)-2-Azido-3-((t-butyloxycarbonyl)amino)propanoic acid CAS-No. 1932432-15-9 Formula C <sub>8</sub> H <sub>14</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 230,22 g/mol		HAA2130.0500	500 mg	€ 90,00
		HAA2130.0001	1 g	€ 140,00
		HAA2130.0005	5 g	€ 500,00
		HAA2130.0025	25 g	€ 2.000,00
<b>HAA2135 N<sub>3</sub>-D-Dap(Boc)-OH</b> (R)-2-Azido-3-((t-butyloxycarbonyl)amino)propanoic acid Formula C <sub>8</sub> H <sub>14</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 230,22 g/mol		HAA2135.0500	500 mg	€ 126,00
		HAA2135.0001	1 g	€ 196,00
		HAA2135.0005	5 g	€ 700,00
		HAA2135.0025	25 g	€ 2.800,00
<b>HAA2140 N<sub>3</sub>-L-Dap(Fmoc)-OH</b> (S)-2-Azido-3-[(9-fluorenylmethyloxycarbonyl)amino]propanoic acid CAS-No. 880637-82-1 Formula C <sub>18</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 352,34 g/mol		HAA2140.0500	500 mg	€ 108,00
		HAA2140.0001	1 g	€ 168,00
		HAA2140.0005	5 g	€ 600,00
		HAA2140.0025	25 g	€ 2.400,00
<b>HAA2145 N<sub>3</sub>-D-Dap(Fmoc)-OH</b> (R)-2-Azido-3-[(9-fluorenylmethyloxycarbonyl)amino]propanoic acid CAS-No. 1807631-13-5 Formula C <sub>18</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 352,34 g/mol		HAA2145.0250	250 mg	€ 80,00
		HAA2145.0500	500 mg	€ 144,00
		HAA2145.0001	1 g	€ 224,00
		HAA2145.0005	5 g	€ 800,00
		HAA2145.0025	25 g	€ 3.200,00



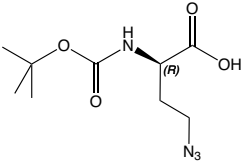
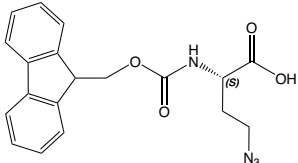
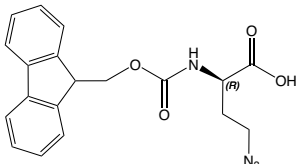
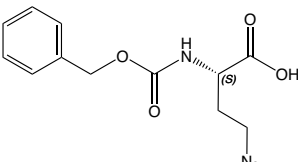
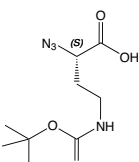
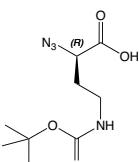
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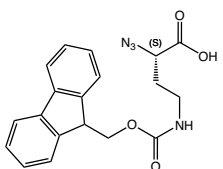
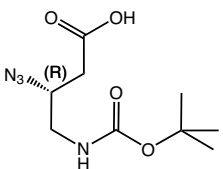
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## Azido-Homoalanine and Butanoic Acid Derivatives

		Product code	Packing unit	Price
<b>HAA5730 H-L-Aha-OH*HCl</b> (S)-2-Amino-4-azidobutanoic acid hydrochloride CAS-No. 942518-29-8 Formula C <sub>6</sub> H <sub>9</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 144,13*36,45 g/mol		HAA5730.0500	500 mg	€ 108,00
		HAA5730.0001	1 g	€ 168,00
		HAA5730.0005	5 g	€ 600,00
		HAA5730.0025	25 g	€ 2.400,00
<b>HAA1630 H-D-Aha-OH*HCl</b> (R)-2-Amino-4-azidobutanoic acid hydrochloride CAS-No. 1858224-26-6 Formula C <sub>6</sub> H <sub>9</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 144,13*36,45 g/mol		HAA1630.0250	250 mg	€ 70,00
		HAA1630.0500	500 mg	€ 126,00
		HAA1630.0001	1 g	€ 196,00
		HAA1630.0005	5 g	€ 700,00
<b>BAA1800 Boc-L-Aha-OH*CHA</b> (S)-2-t-Butyloxycarbonylamino-4-azidobutanoic acid cyclohexylamine CAS-No. 120042-08-2net Formula C <sub>9</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 244,25*99,18 g/mol		BAA1800.0500	500 mg	€ 72,00
		BAA1800.0001	1 g	€ 112,00
		BAA1800.0005	5 g	€ 400,00
		BAA1800.0025	25 g	€ 1.600,00

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		Product code	Packing unit	Price
<b>BAA1805 Boc-D-Aha-OH*CHA</b> (R)-2-t-Butyloxycarbonylamino-4-azidobutanoic acid cyclohexylamine CAS-No. 1609202-75-6 net Formula $C_9H_{16}N_4O_4 \cdot C_6H_{13}N$ Mol. weight 244,25*99,18 g/mol		BAA1805.0500	500 mg	€ 99,00
		BAA1805.0001	1 g	€ 154,00
		BAA1805.0005	5 g	€ 550,00
		BAA1805.0025	25 g	€ 2.200,00
<b>FAA6620 Fmoc-L-Aha-OH</b> (S)-2-(9-Fluorenylmethyloxycarbonylamino)-4-azidobutanoic acid CAS-No. 942518-20-9 Formula $C_{19}H_{18}N_4O_4$ Mol. weight 366,41 g/mol		FAA6620.0500	500 mg	€ 81,00
		FAA6620.0001	1 g	€ 126,00
		FAA6620.0005	5 g	€ 450,00
		FAA6620.0025	25 g	€ 1.800,00
<b>FAA6810 Fmoc-D-Aha-OH</b> (R)-2-(9-Fluorenylmethyloxycarbonylamino)-4-azidobutanoic acid CAS-No. 1263047-53-5 Formula $C_{19}H_{18}N_4O_4$ Mol. weight 366,41 g/mol		FAA6810.0500	500 mg	€ 108,00
		FAA6810.0001	1 g	€ 168,00
		FAA6810.0005	5 g	€ 600,00
		FAA6810.0025	25 g	€ 2.400,00
<b>ZAA5700 Z-L-Aha-OH*DCHA</b> (S)-2-Benzyloxycarbonylamino-4-azidobutanoic acid dicyclohexylamine CAS-No. 1263047-43-3 net Formula $C_{12}H_{14}N_4O_4 \cdot C_{12}H_{23}N$ Mol. weight 278,26*181,34 g/mol		ZAA5700.0500	500 mg	€ 72,00
		ZAA5700.0001	1 g	€ 112,00
		ZAA5700.0005	5 g	€ 400,00
		ZAA5700.0025	25 g	€ 1.600,00
<b>HAA2150 N<sub>3</sub>-L-Dab(Boc)-OH</b> (S)-2-Azido-4-((t-butylloxycarbonyl)amino)butanoic acid CAS-No. 1932403-71-8 Formula $C_9H_{16}N_4O_4$ Mol. weight 244,25 g/mol		HAA2150.0500	500 mg	€ 90,00
		HAA2150.0001	1 g	€ 140,00
		HAA2150.0005	5 g	€ 500,00
		HAA2150.0025	25 g	€ 2.000,00
<b>HAA2155 N<sub>3</sub>-D-Dab(Boc)-OH</b> (R)-2-Azido-4-((t-butylloxycarbonyl)amino)butanoic acid CAS-No. 1922891-74-4 Formula $C_9H_{16}N_4O_4$ Mol. weight 244,25 g/mol		HAA2155.0500	500 mg	€ 135,00
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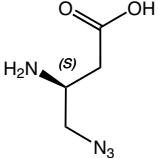
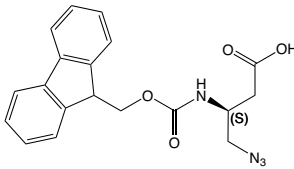
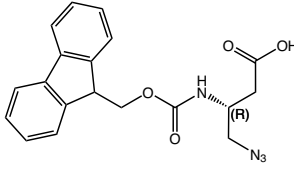
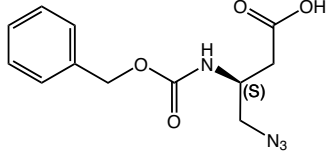
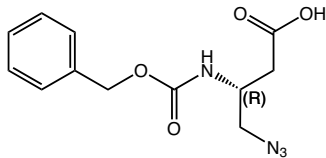
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<b>HAA3170 N<sub>3</sub>-L-Dab(Fmoc)-OH</b> (S)-2-Azido-4-[(9-fluorenylmethyloxycarbonyl)amino]butanoic acid CAS-No. 2250436-44-1 Formula C <sub>9</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 366,37 g/mol		HAA3170.0250	250 mg	€ 60,00
		HAA3170.0500	500 mg	€ 108,00
		HAA3170.0001	1 g	€ 168,00
		HAA3170.0005	5 g	€ 600,00
		HAA3170.0025	25 g	€ 2.400,00
<b>HAA2280 N<sub>3</sub>-Dbu(Boc)-OH (R)</b> (R)-3-Azido-4-((t-butyloxycarbonyl)amino)butanoic acid CAS-No. 1923268-76-1 Formula C <sub>9</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 244,25 g/mol		HAA2280.0100	100 mg	€ 108,00
		HAA2280.0250	250 mg	€ 180,00
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#### References:

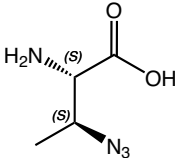
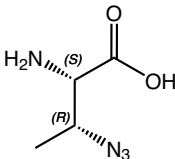
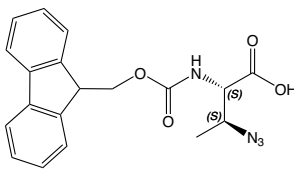
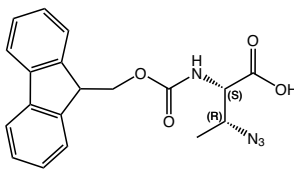
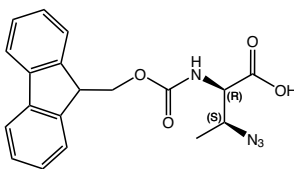
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## Azido-beta-Homoalanine

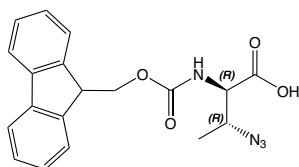
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<b>HAA3970 H-L-Dbu(N<sub>3</sub>)-OH*HCl</b> (S)-3-Amino-4-azidobutanoic acid hydrochloride CAS-No. 2389078-78-6 net Formula C <sub>6</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 144,13*36,45 g/mol		HAA3970.0250	250 mg	€ 100,00
		HAA3970.0500	500 mg	€ 180,00
		HAA3970.0001	1 g	€ 280,00
		HAA3970.0005	5 g	€ 1.000,00
<b>FAA2035 Fmoc-L-Dbu(N<sub>3</sub>)-OH</b> (S)-3-(9-Fluorenylmethyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 934502-72-4 Formula C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 366,37 g/mol		FAA2035.0500	500 mg	€ 135,00
		FAA2035.0001	1 g	€ 210,00
		FAA2035.0005	5 g	€ 750,00
		FAA2035.0025	25 g	€ 3.000,00
<b>FAA3650 Fmoc-D-Dbu(N<sub>3</sub>)-OH</b> (R)-3-(9-Fluorenylmethyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 1932023-47-6 Formula C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 366,37 g/mol		FAA3650.0250	250 mg	€ 100,00
		FAA3650.0500	500 mg	€ 180,00
		FAA3650.0001	1 g	€ 280,00
		FAA3650.0005	5 g	€ 1.000,00
<b>ZAA1290 Z-L-Dbu(N<sub>3</sub>)-OH</b> (S)-3-(Benzyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 1932657-23-2 Formula C <sub>12</sub> H <sub>14</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 278,26 g/mol		ZAA1290.0000		please inquire
<b>ZAA1285 Z-D-Dbu(N<sub>3</sub>)-OH</b> (R)-3-(Benzyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 1931958-82-5 Formula C <sub>12</sub> H <sub>14</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 278,26 g/mol		ZAA1285.0000		please inquire

## 2-Amino-3-Azido-Butanoic Acid

		Product code	Packing unit	Price
<b>HAA3010 H-Abu(3-N<sub>3</sub>)-OH*HCl (2S,3S)</b> (2S,3S)-2-amino-3-azidobutanoic acid hydrochloride Formula C <sub>4</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 144,13*36,45 g/mol		HAA3010.0100	100 mg	€ 145,00
		HAA3010.0250	250 mg	€ 240,00
		HAA3010.0500	500 mg	€ 435,00
		HAA3010.1000	1 g	€ 675,00
		HAA3010.5000	5 g	€ 2.400,00
<b>HAA3020 H-Abu(3-N<sub>3</sub>)-OH*HCl (2S,3R)</b> (2S,3R)-2-amino-3-azidobutanoic acid hydrochloride Formula C <sub>4</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 144,13*36,45 g/mol		HAA3020.0100	100 mg	€ 390,00
		HAA3020.0250	250 mg	€ 650,00
		HAA3020.0500	500 mg	€ 1.150,00
		HAA3020.1000	1 g	€ 1.800,00
<b>FAA2040 Fmoc-Abu(3-N<sub>3</sub>)-OH (2S,3S)</b> (2S,3S)-2-(9-Fluorenylmethoxycarbonyl)amino-3-azido-butanoic acid CAS-No. 131669-42-6 Formula C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 366,37 g/mol		FAA2040.0250	250 mg	€ 75,00
		FAA2040.0500	500 mg	€ 135,00
		FAA2040.0001	1 g	€ 210,00
		FAA2040.0005	5 g	€ 750,00
		FAA2040.0025	25 g	€ 3.000,00
<b>FAA3200 Fmoc-Abu(3-N<sub>3</sub>)-OH (2S,3R)</b> (2S,3R)-2-(9-Fluorenylmethoxycarbonyl)amino-3-azido-butanoic acid CAS-No. 146306-79-8 Formula C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 366,37 g/mol		FAA3200.0100	100 mg	€ 132,00
		FAA3200.0250	250 mg	€ 220,00
		FAA3200.0500	100 mg	€ 396,00
		FAA3200.1000	1 g	€ 616,00
		FAA3200.5000	5 g	€ 2.200,00
<b>FAA3540 Fmoc-Abu(3-N<sub>3</sub>)-OH (2R,3S)</b> (2R,3S)-2-(9-Fluorenylmethoxycarbonyl)amino-3-azido-butanoic acid CAS-No. 1932349-21-7 Formula C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 366,37 g/mol		FAA3540.0100	100 mg	€ 240,00
		FAA3540.0250	250 mg	€ 400,00
		FAA3540.0500	500 mg	€ 720,00
		FAA3540.1000	1 g	€ 1.120,00
		FAA3540.5000	5 g	€ 4.000,00

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		Product code	Packing unit	Price
<b>FAA2095</b>	<b>Fmoc-Abu(3-N<sub>3</sub>)-OH (2R,3R)</b>			
(2R,3R)-2-(9-Fluorenylmethoxycarbonyl)amino-3-azidobutanoic acid		FAA2095.0250	250 mg	€ 100,00
CAS-No. 1229394-75-5		FAA2095.0500	500 mg	€ 180,00
Formula C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub>		FAA2095.0001	1 g	€ 280,00
Mol. weight 366,37 g/mol		FAA2095.0005	5 g	€ 1.000,00



## vAzido-Masked Amino Function

Azido groups located in amino acid side chains can be used for various applications. 2-amino-3-azidobutanoic acid is shown as an example below.

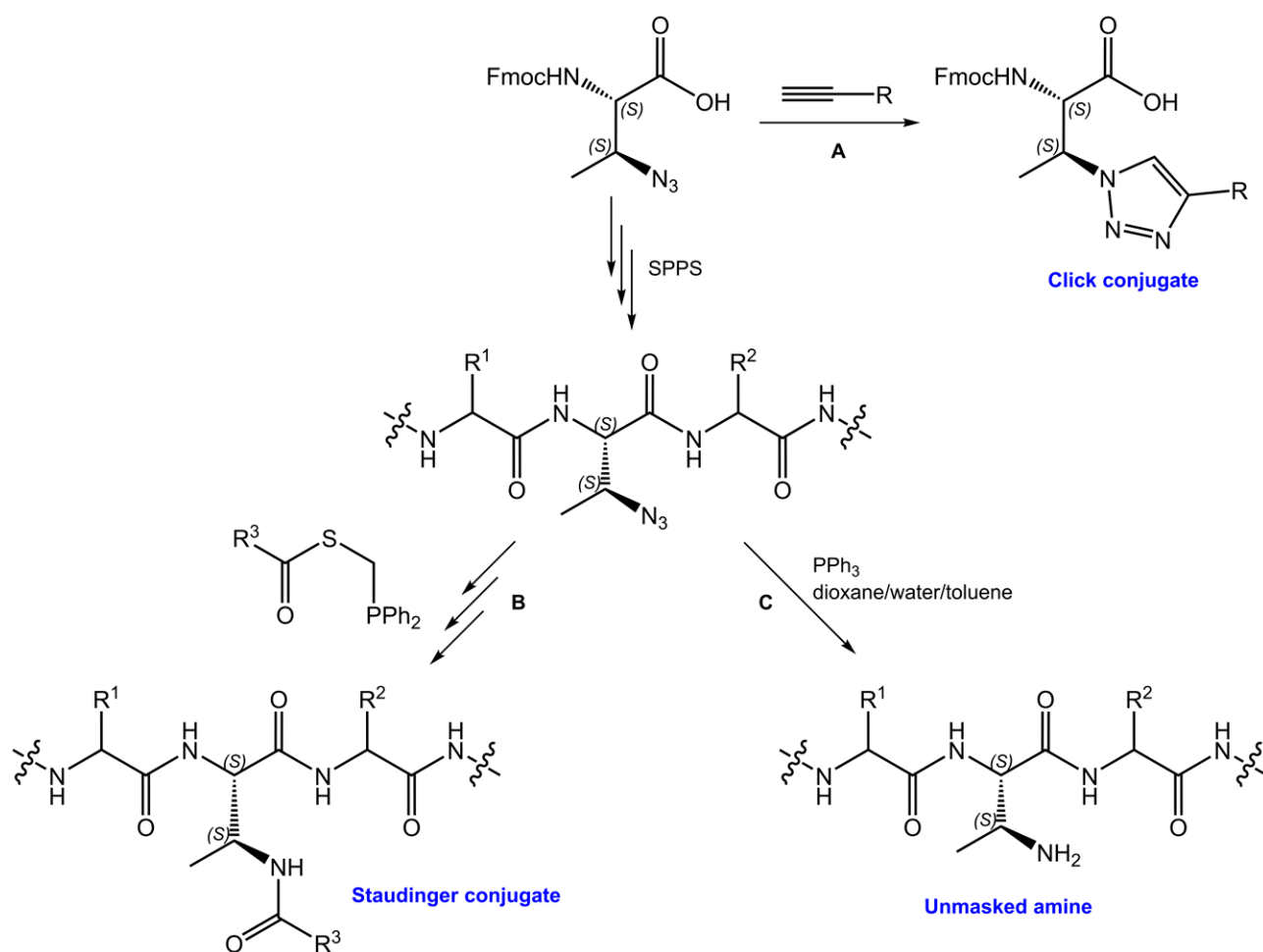


Fig. 8: Possible applications of amino acids bearing azide groups in the side chain.



**A)** Azido groups can be used for any type of Click conjugation with any available alkynyl residue forming conjugates with peptides or any other organic molecule.

**B)** Azido groups may also be used for another prominent type of bioconjugation, namely the Staudinger ligation, which is a further development of the Staudinger reaction. The Staudinger ligation is characterized by high selectivity and a typically rapid and high-yielding turnover. As a biorthogonal reaction, it has been used for the semisynthesis of proteins, for installing posttranslational modifications such as glycosylations, and for DNA labeling.

**C)** The azido group can be reduced to an amino function and hereby serve as a masked amino group. Prominent methods for the reduction of azido groups include the Staudinger reaction as well as the reduction by DTT. Azido groups are stable towards treatment with piperidine (Fmoc deprotection), Pd(0) (Alloc removal) and acidic treatment (cleavage of Mtt, Trt or other acid-sensitive groups). However, as it is a pseudohalogenide, care must be taken during coupling steps, as HATU will cause a high degree of racemization. This can be avoided using collidine or other non-nucleophilic bases instead of DIPEA.

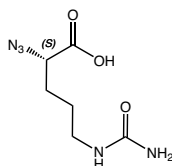
Chiral  $\alpha,\beta$ -diamines and diamino acids have increasingly become motifs of interest in organic synthesis owing to their ubiquity in natural products and medicinal agents. For example, these motifs are found in biotin, penicillins, and the antiinfluenza neuraminidase inhibitor Tamiflu. Chiral vicinal diamines and their metal complexes have been employed in stereoselective organic synthesis, in particular as chiral auxiliaries and ligands in catalytic asymmetric synthesis.

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## Azido-Citrulline

		Product code	Packing unit	Price
<b>HAA4980</b>	<b>N<sub>3</sub>-L-Cit-OH*DCHA</b>			
(S)-2-Azido-citrulline dicyclohexylamine				
CAS-No.	1799421-66-1 net	HAA4980.0500	500 mg	€ 90,00
Formula	C <sub>6</sub> H <sub>11</sub> N <sub>5</sub> O <sub>3</sub> *C <sub>12</sub> H <sub>23</sub> N	HAA4980.0001	1 g	€ 140,00
Mol. weight	201,18*181,32 g/mol	HAA4980.0005	5 g	€ 500,00
		HAA4980.0025	25 g	€ 2.000,00

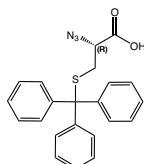
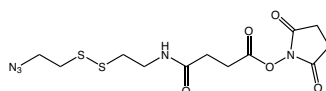


## Azido-Cysteine

		Product code	Packing unit	Price
<b>HAA2255</b>	<b>N<sub>3</sub>-Cystamine-Suc-OSu</b>			
4-((2-Azidoethyl)disulfanyl)ethylamino)-4-oxobutanoic acid succinimidyl ester				
CAS-No.	1987341-40-1	HAA2255.0100	100 mg	€ 171,00
Formula	C <sub>12</sub> H <sub>17</sub> N <sub>5</sub> O <sub>5</sub> S <sub>2</sub>	HAA2255.0250	250 mg	€ 286,00
Mol. weight	375,42 g/mol	HAA2255.0500	500 mg	€ 514,00
		HAA2255.1000	1 g	€ 800,00

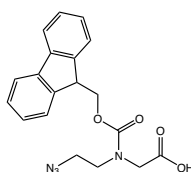
  

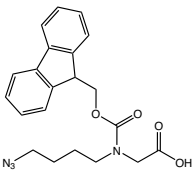
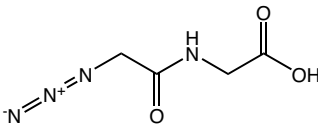
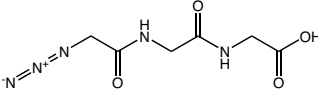
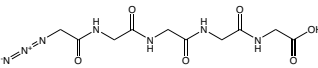
<b>HAA2810</b>	<b>N<sub>3</sub>-L-Cys(Trt)-OH*CHA</b>			
(R)-2-azido-3-(tritylthio)propanoic acid cyclohexylamine				
CAS-No.	1286670-90-3	HAA2810.0250	250 mg	€ 80,00
Formula	C <sub>22</sub> H <sub>19</sub> N <sub>3</sub> O <sub>2</sub> S*C <sub>6</sub> H <sub>13</sub> N	HAA2810.0500	500 mg	€ 144,00
Mol. weight	389,47*99,17 g/mol	HAA2810.0001	1 g	€ 224,00
		HAA2810.0005	5 g	€ 800,00
		HAA2810.0025	25 g	€ 3.200,00



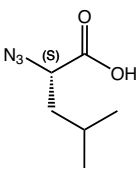
## Azido-Glycine

		Product code	Packing unit	Price
<b>FAA4060</b>	<b>Fmoc-Aeg(N<sub>3</sub>)-OH</b>			
N-(9-Fluorenylmethyloxycarbonyl)-N-(2-azidoethyl)glycine				
CAS-No.	1935981-35-3	FAA4060.0001	1 g	€ 200,00
Formula	C <sub>19</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub>	FAA4060.0005	5 g	€ 800,00
Mol. weight	366,37 g/mol			



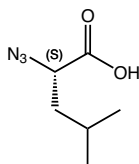
		Product code	Packing unit	Price
<b>FAA4055 Fmoc-Abg(N<sub>3</sub>)-OH</b> N-(9-Fluorenylmethyloxycarbonyl)-N-(4-azido-butyl)glycine CAS-No. 2250433-81-7 Formula C <sub>21</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 394,42 g/mol		FAA4055.0001	1 g	€ 200,00
		FAA4055.0005	5 g	€ 800,00
<b>HAA2850 N<sub>3</sub>-Gly-Gly-OH*DCHA</b> Azido-glycylglycine dicyclohexylamine CAS-No. 855750-87-7 net Formula C <sub>4</sub> H <sub>6</sub> N <sub>4</sub> O <sub>3</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 158,12*181,32 g/mol		HAA2850.0001	1 g	€ 125,00
		HAA2850.0005	5 g	€ 400,00
		HAA2850.0025	25 g	€ 1.600,00
<b>HAA2840 N<sub>3</sub>-Gly-Gly-Gly-OH</b> Azido-glycylglycylglycine CAS-No. 1993176-75-2 Formula C <sub>6</sub> H <sub>9</sub> N <sub>5</sub> O <sub>4</sub> Mol. weight 215,17 g/mol		HAA2840.0500	500 mg	€ 81,00
		HAA2840.0001	1 g	€ 126,00
		HAA2840.0005	5 g	€ 450,00
		HAA2840.0025	25 g	€ 1.800,00
<b>HAA2860 N<sub>3</sub>-Gly-Gly-Gly-Gly-Gly-OH</b> CAS-No. 2250433-77-1 Formula C <sub>10</sub> H <sub>15</sub> N <sub>7</sub> O <sub>6</sub> Mol. weight 329,27 g/mol		HAA2860.0250	250 mg	€ 90,00
		HAA2860.0500	500 mg	€ 162,00
		HAA2860.0001	1 g	€ 252,00
		HAA2860.0005	5 g	€ 900,00
		HAA2860.0025	25 g	€ 3.600,00

## Azido-Leucine

		Product code	Packing unit	Price
<b>HAA3350 N<sub>3</sub>-L-Leu-OH*BHA</b> (S)-2-azido-4-methylpentanoic acid benzhydrylamine salt CAS-No. 79410-33-6 Formula C <sub>6</sub> H <sub>11</sub> N <sub>3</sub> O <sub>2</sub> *C <sub>13</sub> H <sub>13</sub> N Mol. weight 157,17*183,25 g/mol		HAA3350.0001	1 g	€ 120,00
		HAA3350.0005	5 g	€ 400,00
		HAA3350.0025	25 g	€ 1.600,00

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		Product code	Packing unit	Price
<b>HAA2820</b>	<b>N<sub>3</sub>-L-Leu-OH*CHA</b>			
(S)-2-Azido-4-methylpentanoic acid cyclohexylamine				
CAS-No.	1286670-79-8	HAA2820.0500	500 mg	€ 72,00
Formula	C <sub>6</sub> H <sub>11</sub> N <sub>3</sub> O <sub>2</sub> *C <sub>6</sub> H <sub>13</sub> N	HAA2820.0001	1 g	€ 112,00
Mol. weight	157,17*99,18 g/mol	HAA2820.0005	5 g	€ 400,00
		HAA2820.0025	25 g	€ 1.600,00



## Azido-Lysine

		Product code	Packing unit	Price
<b>HAA9210</b>	<b>H-Lys(N<sub>3</sub>)-OH</b>			
N-epsilon-azido-L-lysine				
CAS-No.	159610-92-1	HAA9210.0250	250 mg	€ 70,00
Formula	C <sub>6</sub> H <sub>12</sub> N <sub>4</sub> O <sub>2</sub>	HAA9210.0500	500 mg	€ 126,00
Mol. weight	172,19 g/mol	HAA9210.1000	1 g	€ 196,00
		HAA9210.5000	5 g	€ 700,00
		HAA9210.9025	25 g	€ 2.800,00

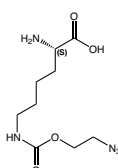
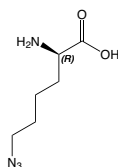
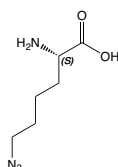
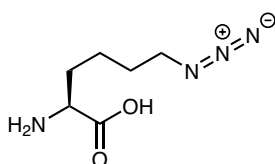
<b>HAA1625</b>	<b>H-Lys(N<sub>3</sub>)-OH*HCl</b>			
N-epsilon-Azido-L-lysine hydrochloride				
CAS-No.	1454334-76-9	HAA1625.0500	500 mg	€ 99,00
Formula	C <sub>6</sub> H <sub>12</sub> N <sub>4</sub> O <sub>2</sub> *HCl	HAA1625.0001	1 g	€ 154,00
Mol. weight	172,19*36,45 g/mol	HAA1625.0005	5 g	€ 550,00
		HAA1625.0025	25 g	€ 2.200,00
		HAA1625.0100	100 g	€ 6.600,00

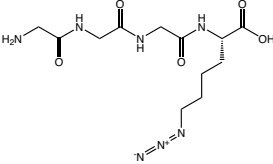
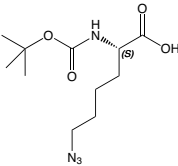
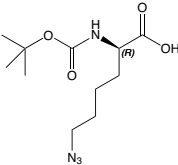
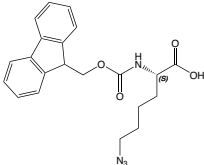
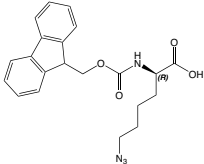
  

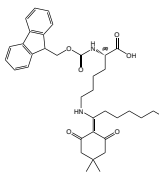
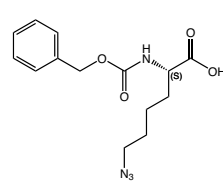
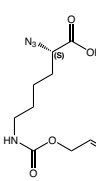
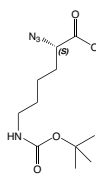
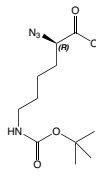
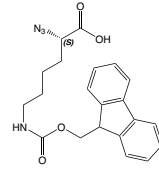
<b>HAA1890</b>	<b>H-D-Lys(N<sub>3</sub>)-OH*HCl</b>			
N-epsilon-Azido-D-lysine hydrochloride				
CAS-No.	2098497-01-7	HAA1890.0250	250 mg	€ 70,00
Formula	C <sub>6</sub> H <sub>12</sub> N <sub>4</sub> O <sub>2</sub> *HCl	HAA1890.0500	500 mg	€ 126,00
Mol. weight	172,19*36,45 g/mol	HAA1890.0001	1 g	€ 196,00
		HAA1890.0005	5 g	€ 700,00

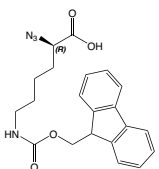
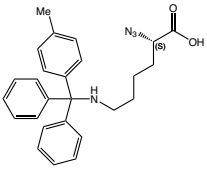
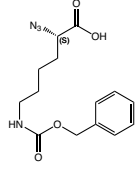
  

<b>HAA2080</b>	<b>H-Lys(EO-N<sub>3</sub>)-OH*HCl</b>			
(S)-2-amino-6-((2-azidoethoxy)carbonylamino)hexanoic acid hydrochloride				
CAS-No.	1994331-17-7	HAA2080.0250	250 mg	€ 70,00
Formula	C <sub>9</sub> H <sub>17</sub> N <sub>5</sub> O <sub>4</sub> *HCl	HAA2080.0500	500 mg	€ 126,00
Mol. weight	259,26*36,46 g/mol	HAA2080.0001	1 g	€ 196,00
		HAA2080.0005	5 g	€ 700,00
		HAA2080.0025	25 g	€ 2.800,00

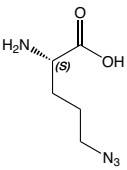
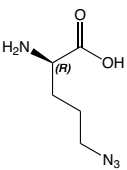


		Product code	Packing unit	Price
<b>HAA2870 H-(Gly)<sub>3</sub>-Lys(N<sub>3</sub>)-OH*HCl</b> Triglycyl-epsilon-azido-L-lysine hydrochloride CAS-No. 2250437-45-5 net Formula C <sub>12</sub> H <sub>21</sub> N <sub>7</sub> O <sub>5</sub> *HCl Mol. weight 343,34*36,45 g/mol		HAA2870.0025	25 mg	€ 250,00
		HAA2870.0100	100 mg	€ 750,00
<b>BAA1810 Boc-L-Lys(N<sub>3</sub>)-OH*CHA</b> N-alpha-t-Butyloxycarbonyl-epsilon-azido-L-lysine cyclohexylamine CAS-No. 846549-33-5net Formula C <sub>11</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 272,30*99,18 g/mol		BAA1810.0001	1 g	€ 98,00
		BAA1810.0005	5 g	€ 350,00
		BAA1810.0025	25 g	€ 1.400,00
<b>BAA1815 Boc-D-Lys(N<sub>3</sub>)-OH*CHA</b> N-alpha-t-Butyloxycarbonyl-epsilon-azido-D-lysine cyclohexylamine CAS-No. 1620410-04-9 net Formula C <sub>11</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 272,30*99,18 g/mol		BAA1815.0500	500 mg	€ 99,00
		BAA1815.0001	1 g	€ 154,00
		BAA1815.0005	5 g	€ 550,00
		BAA1815.0025	25 g	€ 2.200,00
<b>FAA1793 Fmoc-L-Lys(N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-epsilon-azido-L-lysine CAS-No. 159610-89-6 Formula C <sub>21</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 394,42 g/mol		FAA1793.0500	500 mg	€ 72,00
		FAA1793.0001	1 g	€ 112,00
		FAA1793.0005	5 g	€ 400,00
		FAA1793.0025	25 g	€ 1.600,00
		FAA1793.0100	100 g	€ 4.800,00
<b>FAA1835 Fmoc-D-Lys(N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-epsilon-azido-D-lysine CAS-No. 1198791-53-5 Formula C <sub>21</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 394,42 g/mol		FAA1835.0500	500 mg	€ 90,00
		FAA1835.0001	1 g	€ 140,00
		FAA1835.0005	5 g	€ 500,00
		FAA1835.0025	25 g	€ 2.000,00

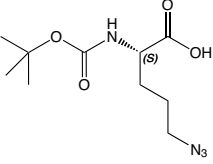
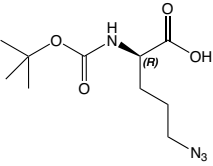
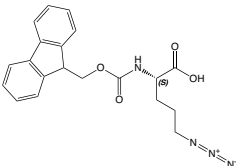
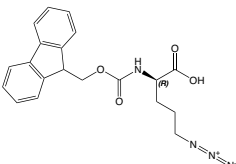
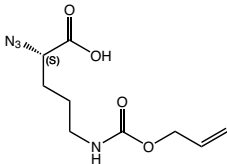
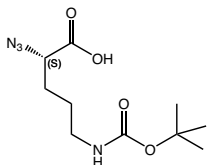
		Product code	Packing unit	Price
<b>FAA8145 Fmoc-L-Lys(N<sub>3</sub>-Aca-DIM)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-epsilon-[6-azido-1-(4,4-dimethyl-2,6-dioxocyclohexylidene)hexyl]-L-lysine CAS-No. 2408993-39-3 Formula C <sub>35</sub> H <sub>43</sub> N <sub>5</sub> O <sub>6</sub> Mol. weight 629,76 g/mol		FAA8145.0100	100 mg	€ 120,00
		FAA8145.0250	250 mg	€ 200,00
		FAA8145.0500	500 mg	€ 360,00
		FAA8145.0001	1 g	€ 560,00
		FAA8145.0005	5 g	€ 2.000,00
<b>ZAA1295 Z-L-Lys(N<sub>3</sub>)-OH*CHA</b> N-alpha-Benzylloxycarbonyl-epsilon-azido-L-lysine-cyclohexylamin CAS-No. 901300-81-0 Formula C <sub>14</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 306,32*99,18 g/mol		ZAA1295.0001	1 g	€ 125,00
		ZAA1295.0005	5 g	€ 350,00
		ZAA1295.0025	25 g	€ 1.400,00
<b>HAA2900 N<sub>3</sub>-L-Lys(Alloc)-OH*DCHA</b> (S)-2-Azido-6-[(allyloxycarbonyl)amino]hexanoic acid dicyclohexylamine CAS-No. 1799661-51-0 Formula C <sub>10</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 256,26*181,32 g/mol		HAA2900.0500	500 mg	€ 81,00
		HAA2900.0001	1 g	€ 126,00
		HAA2900.0005	5 g	€ 450,00
		HAA2900.0025	25 g	€ 1.800,00
<b>HAA2170 N<sub>3</sub>-L-Lys(Boc)-OH</b> (S)-2-Azido-6-[(t-butyloxycarbonyl)amino]hexanoic acid CAS-No. 333366-32-8 Formula C <sub>17</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 272,3 g/mol		HAA2170.0500	500 mg	€ 81,00
		HAA2170.0001	1 g	€ 126,00
		HAA2170.0005	5 g	€ 450,00
		HAA2170.0025	25 g	€ 1.800,00
<b>HAA2175 N<sub>3</sub>-D-Lys(Boc)-OH</b> (R)-2-Azido-6-[(t-butyloxycarbonyl)amino]hexanoic acid CAS-No. 1178899-92-7 Formula C <sub>17</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 272,3 g/mol		HAA2175.0500	500 mg	€ 85,50
		HAA2175.0001	1 g	€ 133,00
		HAA2175.0005	5 g	€ 475,00
		HAA2175.0025	25 g	€ 1.900,00
<b>HAA2160 N<sub>3</sub>-L-Lys(Fmoc)-OH</b> (S)-2-Azido-6-[(9-fluorenylmethyloxycarbonyl)amino]hexanoic acid CAS-No. 473430-12-5 Formula C <sub>31</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 394,42 g/mol		HAA2160.0500	500 mg	€ 90,00
		HAA2160.0001	1 g	€ 140,00
		HAA2160.0005	5 g	€ 500,00
		HAA2160.0025	25 g	€ 2.000,00

		Product code	Packing unit	Price
<b>HAA2165 N<sub>3</sub>-D-Lys(Fmoc)-OH</b> (R)-2-Azido-3-[(9-fluorenylmethyloxycarbonyl)amino]propanoic acid CAS-No. 1994300-35-4 Formula C <sub>21</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 394,42 g/mol		HAA2165.0500	500 mg	€ 126,00
		HAA2165.0001	1 g	€ 196,00
		HAA2165.0005	5 g	€ 700,00
		HAA2165.0025	25 g	€ 2.800,00
<b>HAA2880 N<sub>3</sub>-L-Lys(Mtt)-OH</b> (S)-2-Azido-6-[(4-methyltrityl)amino]hexanoic acid CAS-No. 1333231-26-7 Formula C <sub>26</sub> H <sub>28</sub> N <sub>4</sub> O <sub>2</sub> Mol. weight 428,53 g/mol		HAA2880.0500	500 mg	€ 108,00
		HAA2880.0001	1 g	€ 168,00
		HAA2880.0005	5 g	€ 600,00
		HAA2880.0025	25 g	€ 2.400,00
<b>HAA2910 N<sub>3</sub>-L-Lys(Z)-OH*DCHA</b> (S)-2-Azido-6-[(benzyloxycarbonyl)amino]hexanoic acid dicyclohexylamine CAS-No. 1414891-50-1 Formula C <sub>14</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 306,32*181,22 g/mol		HAA2910.0001	1 g	€ 110,00
		HAA2910.0005	5 g	€ 375,00
		HAA2910.0025	25 g	€ 1.500,00

## Azido-Ornithine

		Product code	Packing unit	Price
<b>HAA1620 H-L-Orn(N<sub>3</sub>)-OH*HCl</b> N-delta-Azido-L-ornithine hydrochloride CAS-No. 1782935-10-7 Formula C <sub>5</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 158,16*36,45 g/mol		HAA1620.0250	250 mg	€ 90,00
		HAA1620.0500	500 mg	€ 135,00
		HAA1620.0001	1 g	€ 210,00
		HAA1620.0005	5 g	€ 750,00
		HAA1620.0025	25 g	€ 3.000,00
<b>HAA1895 H-D-Orn(N<sub>3</sub>)-OH*HCl</b> N-delta-Azido-D-ornithine hydrochloride CAS-No. 1858224-08-4 Formula C <sub>5</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 158,16*36,45 g/mol		HAA1895.0250	250 mg	€ 75,00
		HAA1895.0500	500 mg	€ 135,00
		HAA1895.0001	1 g	€ 210,00
		HAA1895.0005	5 g	€ 750,00

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		Product code	Packing unit	Price
<b>BAA1830 Boc-L-Orn(N<sub>3</sub>)-OH*CHA</b> N-alpha-t-Butyloxycarbonyl-delta-azido-L-ornithine cyclohexylamine CAS-No. 763139-35-1net Formula C <sub>10</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 258,27*99,18 g/mol		BAA1830.0500	500 mg	€ 81,00
		BAA1830.0001	1 g	€ 126,00
		BAA1830.0005	5 g	€ 450,00
		BAA1830.0025	25 g	€ 1.800,00
<b>BAA1835 Boc-D-Orn(N<sub>3</sub>)-OH*CHA</b> N-alpha-t-Butyloxycarbonyl-delta-azido-D-ornithine cyclohexylamine CAS-No. 1858224-18-6 net Formula C <sub>10</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 258,27*99,18 g/mol		BAA1835.0500	500 mg	€ 108,00
		BAA1835.0001	1 g	€ 168,00
		BAA1835.0005	5 g	€ 600,00
		BAA1835.0025	25 g	€ 2.400,00
<b>FAA6880 Fmoc-L-Orn(N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-delta-azido-L-ornithine CAS-No. 1097192-04-5 Formula C <sub>20</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 380,4 g/mol		FAA6880.0500	500 mg	€ 90,00
		FAA6880.0001	1 g	€ 140,00
		FAA6880.0005	5 g	€ 500,00
		FAA6880.0025	25 g	€ 2.000,00
<b>FAA6890 Fmoc-D-Orn(N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-delta-azido-D-ornithine CAS-No. 1176270-25-9 Formula C <sub>20</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 380,4 g/mol		FAA6890.0500	500 mg	€ 126,00
		FAA6890.0001	1 g	€ 196,00
		FAA6890.0005	5 g	€ 700,00
		FAA6890.0025	25 g	€ 2.800,00
<b>HAA2920 N<sub>3</sub>-L-Orn(Alloc)-OH*DCHA</b> (S)-2-Azido-5-[[allyloxycarbonyl]amino]pentanoic acid dicyclohexylamine CAS-No. 2250436-43-0 net Formula C <sub>9</sub> H <sub>14</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 242,23*181,32 g/mol		HAA2920.0500	500 mg	€ 81,00
		HAA2920.0001	1 g	€ 126,00
		HAA2920.0005	5 g	€ 450,00
		HAA2920.0025	25 g	€ 1.800,00
<b>HAA2220 N<sub>3</sub>-L-Orn(Boc)-OH*CHA</b> (S)-2-Azido-5-[[t-butyloxycarbonyl]amino]pentanoic acid cyclohexylamine CAS-No. 2301169-18-4 Formula C <sub>10</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 258,27*99,18 g/mol		HAA2220.0500	500 mg	€ 81,00
		HAA2220.0001	1 g	€ 126,00
		HAA2220.0005	5 g	€ 450,00
		HAA2220.0025	25 g	€ 1.800,00



	Product code	Packing unit	Price
<b>HAA2210 N<sub>3</sub>-D-Orn(Boc)-OH*CHA</b> (R)-2-Azido-5-[(t-butylloxycarbonyl)amino]pentanoic acid cyclohexylamine CAS-No. 2165877-62-1 net Formula C <sub>10</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 258,27*99,18 g/mol			
<b>HAA2225 N<sub>3</sub>-L-Orn(Fmoc)-OH</b> (S)-2-Azido-5-[(9-fluorenylmethyloxycarbonyl)amino]pentanoic acid CAS-No. 1994267-98-9 Formula C <sub>20</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 380,4 g/mol			
<b>HAA2215 N<sub>3</sub>-D-Orn(Fmoc)-OH</b> (R)-2-Azido-5-[(9-fluorenylmethyloxycarbonyl)amino]pentanoic acid CAS-No. 1994300-41-2 Formula C <sub>20</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 380,4 g/mol			

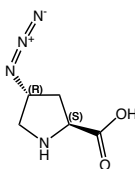
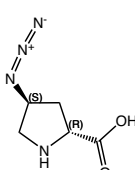
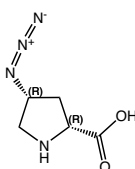
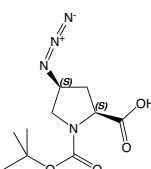
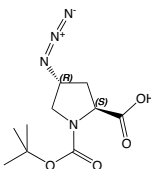
#### References:

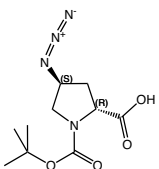
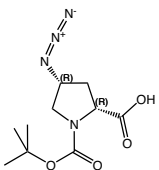
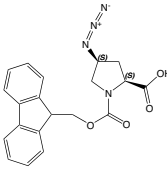
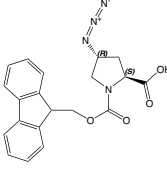
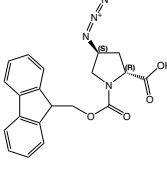
→ Application of metal-free triazole formation in the synthesis of cyclic RGD-DTPA conjugates; S. S. van Berkel, A. Dirks, S. A. Meeuwissen, D. L. Pingen, O. C. Boerman, P. Laverman, F. L. van Delft, J. J. Cornelissen and F. P. Rutjes; *ChemBiochem* 2008; **9**: 1805-15. <https://doi.org/10.1002/cbic.200800074>

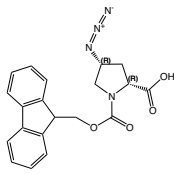
## Azido-Proline

	Product code	Packing unit	Price
<b>HAA2125 H-L-Pro(4-N<sub>3</sub>)-OH*HCl (2S,4S)</b> (2S,4S)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride CAS-No. 892128-58-4 net Formula C <sub>5</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 156,14*36,45 g/mol			

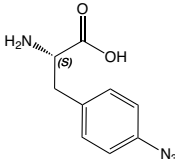
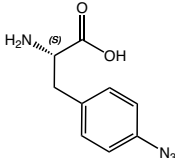
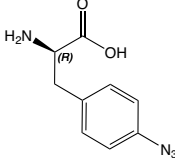
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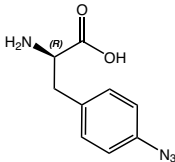
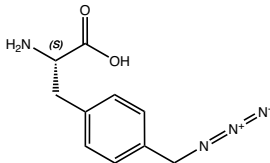
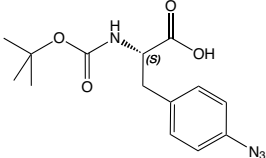
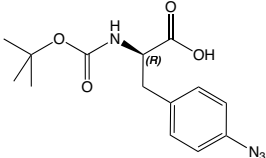
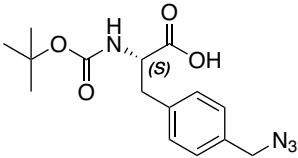
		Product code	Packing unit	Price
<b>HAA3150 H-L-Pro(4-N<sub>3</sub>)-OH*HCl (2S,4R)</b> (2S,4R)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride CAS-No. 1019849-13-8 net Formula C <sub>5</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 156,14*36,45 g/mol		HAA3150.0250	250 mg	€ 100,00
		HAA3150.0500	500 mg	€ 180,00
		HAA3150.0001	1 g	€ 250,00
		HAA3150.0005	5 g	€ 1.000,00
<b>HAA3140 H-D-Pro(4-N<sub>3</sub>)-OH*HCl (2R,4S)</b> (2R,4S)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride CAS-No. 2137086-50-9 Formula C <sub>5</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 156,14*36,45 g/mol		HAA3140.0250	250 mg	€ 120,00
		HAA3140.0500	500 mg	€ 220,00
		HAA3140.0001	1 g	€ 300,00
		HAA3140.0005	5 g	€ 1.200,00
<b>HAA3190 H-D-Pro(4-N<sub>3</sub>)-OH*HCl (2R,4R)</b> (2R,4R)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride Formula C <sub>5</sub> H <sub>8</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 156,14*36,45 g/mol		HAA3190.0100	100 mg	€ 85,00
		HAA3190.0250	250 mg	€ 140,00
		HAA3190.0500	500 mg	€ 255,00
		HAA3190.0001	1 g	€ 395,00
		HAA3190.0005	5 g	€ 1.400,00
<b>BAA1905 Boc-L-Pro(4-N<sub>3</sub>)-OH (2S,4S)</b> cis-N-alpha-(t-Butyloxycarbonyl)-4-azido-L-proline CAS-No. 132622-65-2 Formula C <sub>10</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 256,26 g/mol		BAA1905.0500	500 mg	€ 126,00
		BAA1905.0001	1 g	€ 196,00
		BAA1905.0005	5 g	€ 700,00
		BAA1905.0025	25 g	€ 2.800,00
<b>BAA1930 Boc-L-Pro(4-N<sub>3</sub>)-OH*DCHA (2S,4R)</b> trans-N-alpha-(t-Butyloxycarbonyl)-4-azido-L-proline dicyclohexylamine CAS-No. 132622-68-5 net Formula C <sub>10</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight 256,26*181,32 g/mol		BAA1930.0250	250 mg	€ 80,00
		BAA1930.0500	500 mg	€ 144,00
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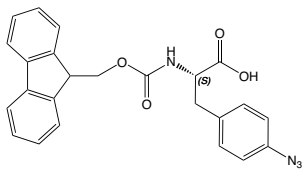
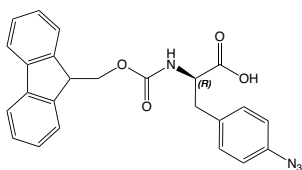
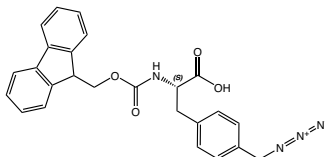
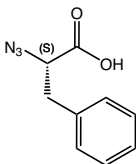
		Product code	Packing unit	Price
<b>BAA3110</b> <b>Boc-D-Pro(4-N<sub>3</sub>)-OH*DCHA (2R,4S)</b> trans-N-alpha-(t-Butyloxycarbonyl)-4-azido-D-proline dicyclohexylamine CAS-No.            132622-77-6 net Formula            C <sub>10</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight        256,26*181,32 g/mol		BAA3110.0250	250 mg	€ 80,00
		BAA3110.0500	500 mg	€ 145,00
		BAA3110.0001	1 g	€ 225,00
		BAA3110.0005	5 g	€ 800,00
		BAA3110.0025	25 g	€ 3.200,00
<b>BAA3120</b> <b>Boc-D-Pro(4-N<sub>3</sub>)-OH (2R,4R)</b> cis-N-alpha-(t-Butyloxycarbonyl)-4-azido-D-proline CAS-No.            650601-59-5 Formula            C <sub>10</sub> H <sub>16</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight        256,26 g/mol		BAA3120.0250	250 mg	€ 90,00
		BAA3120.0500	500 mg	€ 165,00
		BAA3120.0001	1 g	€ 255,00
		BAA3120.0005	5 g	€ 900,00
<b>FAA2050</b> <b>Fmoc-L-Pro(4-N<sub>3</sub>)-OH (2S,4S)</b> cis-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-L-proline CAS-No.            263847-08-1 Formula            C <sub>20</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight        378,38 g/mol		FAA2050.0500	500 mg	€ 90,00
		FAA2050.0001	1 g	€ 140,00
		FAA2050.0005	5 g	€ 500,00
		FAA2050.0025	25 g	€ 2.000,00
<b>FAA3000</b> <b>Fmoc-L-Pro(4-N<sub>3</sub>)-OH (2S,4R)</b> trans-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-L-proline CAS-No.            702679-55-8 Formula            C <sub>20</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight        378,38 g/mol		FAA3000.0250	250 mg	€ 120,00
		FAA3000.0500	500 mg	€ 216,00
		FAA3000.0001	1 g	€ 336,00
		FAA3000.0005	5 g	€ 1.200,00
<b>FAA4630</b> <b>Fmoc-D-Pro(4-N<sub>3</sub>)-OH (2R,4S)</b> trans-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-D-proline CAS-No.            2137142-63-1 Formula            C <sub>20</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight        378,38 g/mol		FAA4630.0250	250 mg	€ 120,00
		FAA4630.0500	500 mg	€ 220,00
		FAA4630.0001	1 g	€ 340,00
		FAA4630.0005	5 g	€ 1.200,00

		Product code	Packing unit	Price
<b>FAA4720</b>	<b>Fmoc-D-Pro(4-N<sub>3</sub>)-OH (2R,4R)</b>			
cis-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-D-proline		FAA4720.0100	100 mg	€ 85,00
CAS-No.	1378847-51-8	FAA4720.0250	250 mg	€ 140,00
Formula	C <sub>20</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub>	FAA4720.0500	500 mg	€ 255,00
Mol. weight	378,38 g/mol	FAA4720.0001	1 g	€ 395,00
		FAA4720.0005	5 g	€ 1.400,00

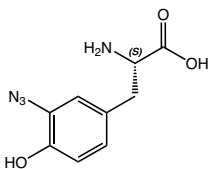
## Azido-Phenylalanine

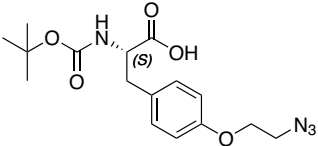
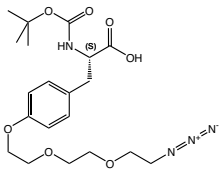
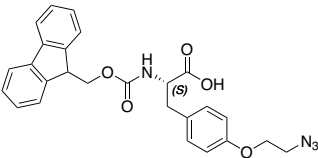
		Product code	Packing unit	Price
<b>HAA1850</b>	<b>H-L-Phe(4-N<sub>3</sub>)-OH</b>			
4-Azido-L-phenylalanine		HAA1850.0250	250 mg	€ 80,00
CAS-No.	33173-53-4	HAA1850.0500	500 mg	€ 144,00
Formula	C <sub>9</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub>	HAA1850.0001	1 g	€ 224,00
Mol. weight	206,20 g/mol	HAA1850.0005	5 g	€ 800,00
		HAA1850.0025	25 g	€ 3.200,00
<b>HAA2980</b>	<b>H-L-Phe(4-N<sub>3</sub>)-OH*HCl</b>			
4-Azido-L-phenylalanine hydrochloride		HAA2980.0250	250 mg	€ 80,00
CAS-No.	34670-43-4	HAA2980.0500	500 mg	€ 110,00
Formula	C <sub>9</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub> *HCl	HAA2980.1000	1 g	€ 170,00
Mol. weight	206,2*36,45 g/mol	HAA2980.5000	5 g	€ 600,00
		HAA2980.9025	25 g	€ 2.400,00
		HAA2980.9100	100 g	€ 7.200,00
<b>HAA1855</b>	<b>H-D-Phe(4-N<sub>3</sub>)-OH</b>			
4-Azido-D-phenylalanine		HAA1855.0001	1 g	€ 425,00
CAS-No.	1241681-80-0	HAA1855.0005	5 g	€ 1.600,00
Formula	C <sub>9</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub>			
Mol. weight	206,20 g/mol			
				

		Product code	Packing unit	Price
<b>HAA1856 H-D-Phe(4-N<sub>3</sub>)-OH*HCl</b> 4-Azido-D-phenylalanine hydrochloride CAS-No. 1241681-80-0 net Formula C <sub>9</sub> H <sub>10</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 206,2*36,45 g/mol		HAA1856.0500	500 mg	€ 135,00
		HAA1856.1000	1 g	€ 210,00
		HAA1856.5000	5 g	€ 750,00
		HAA1856.9025	25 g	€ 3.000,00
<b>HAA4090 H-L-Phe(4-CH<sub>2</sub>-N<sub>3</sub>)*HCl</b> 4-azidomethyl-L-phenylalanine hydrochloride CAS-No. 1446772-80-0 Formula C <sub>10</sub> H <sub>12</sub> N <sub>4</sub> O <sub>2</sub> *HCl Mol. weight 220,23*36,45 g/mol		HAA4090.0100	100 mg	€ 84,00
		HAA4090.0250	250 mg	€ 140,00
		HAA4090.0500	500 mg	€ 252,00
		HAA4090.1000	1 g	€ 392,00
		HAA4090.5000	5 g	€ 1.400,00
<b>BAA1850 Boc-L-Phe(4-N<sub>3</sub>)-OH</b> N-alpha-t-Butyloxycarbonyl-4-azido-L-phenylalanine CAS-No. 33173-55-6 Formula C <sub>14</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 306,32 g/mol		BAA1850.9500	500 mg	€ 110,00
		BAA1850.0001	1 g	€ 170,00
		BAA1850.0005	5 g	€ 600,00
		BAA1850.0025	25 g	€ 2.400,00
<b>BAA1855 Boc-D-Phe(4-N<sub>3</sub>)-OH</b> N-alpha-t-Butyloxycarbonyl-4-azido-D-phenylalanine CAS-No. 214630-05-4 Formula C <sub>14</sub> H <sub>18</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 306,32 g/mol		BAA1855.9250	250 mg	€ 90,00
		BAA1855.9500	500 mg	€ 165,00
		BAA1855.0001	1 g	€ 255,00
		BAA1855.0005	5 g	€ 900,00
		BAA1855.0025	25 g	€ 3.600,00
<b>BAA4660 Boc-L-Phe(4-CH<sub>2</sub>-N<sub>3</sub>)-OH</b> N-alpha-t-Butyloxycarbonyl-4-azido-methyl-L-phenylalanine CAS-No. 205127-59-9 Formula C <sub>15</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 320,35 g/mol		BAA4660.0000		please inquire

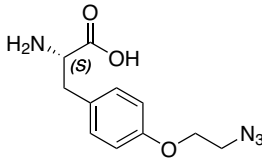
		Product code	Packing unit	Price
<b>FAA1905 Fmoc-L-Phe(4-N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-L-phenylalanine CAS-No. 163217-43-4 Formula C <sub>24</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 428,44 g/mol		FAA1905.9500	500 mg	€ 110,00
		FAA1905.0001	1 g	€ 170,00
		FAA1905.0005	5 g	€ 600,00
		FAA1905.0025	25 g	€ 2.400,00
<b>FAA1910 Fmoc-D-Phe(4-N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-D-phenylalanine CAS-No. 1391586-30-3 Formula C <sub>24</sub> H <sub>20</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 428,44 g/mol		FAA1910.9250	250 mg	€ 90,00
		FAA1910.9500	500 mg	€ 165,00
		FAA1910.0001	1 g	€ 255,00
		FAA1910.0005	5 g	€ 900,00
		FAA1910.0025	25 g	€ 3.600,00
<b>FAA7740 Fmoc-L-Phe(4-CH<sub>2</sub>-N<sub>3</sub>)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azidomethyl-L-phenylalanine CAS-No. 2375587-79-2 Formula C <sub>25</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 442,47 g/mol		FAA7740.0250	250 mg	€ 120,00
		FAA7740.0500	500 mg	€ 220,00
		FAA7740.0001	1 g	€ 300,00
		FAA7740.0005	5 g	€ 1.200,00
<b>HAA3360 N<sub>3</sub>-L-Phe-OH*DCHA</b> (S)-2-Azido-3-phenylpropanoic acid dicyclohexylamine CAS-No. 79410-36-9 Formula C <sub>9</sub> H <sub>9</sub> N <sub>3</sub> O <sub>2</sub> *C <sub>13</sub> H <sub>23</sub> N Mol. weight 191,19*181,32 g/mol		HAA3360.0001	1 g	€ 120,00
		HAA3360.0005	5 g	€ 400,00
		HAA3360.0025	25 g	€ 1.600,00

## Azido-Tryptophane

		Product code	Packing unit	Price
<b>HAA3940 H-L-Tyr(3-N<sub>3</sub>)-OH</b> 3-Azido-L-tyrosine CAS-No. 129960-90-3 Formula C <sub>9</sub> H <sub>10</sub> N <sub>4</sub> O <sub>3</sub> Mol. weight 222,2 g/mol		HAA3940.0001	1 g	€ 570,00
		HAA3940.0005	5 g	€ 2.070,00

	Product code	Packing unit	Price
<b>BAA4650 Boc-L-Tyr(2-azidoethyl)-OH</b> N-alpha-t-Butyloxycarbonyl-O-(2-azidoethyl)-L-tyrosine CAS-No. 1434445-10-9 Formula $C_{16}H_{22}N_4O_5$ Mol. weight 350,38 g/mol	BAA4650.0000		please inquire
			
<b>BAA2235 Boc-L-Tyr(PEG(3)-N<sub>3</sub>)-OH*DCHA</b> N-alpha-t-Butyloxycarbonyl-O-(2-(2-(2-azidoethoxy)ethoxy)ethyl)-L-tyrosine dicyclohexylamine CAS-No. 1831059-64-3 net Formula $C_{20}H_{30}N_4O_7 \cdot C_{12}H_{23}N$ Mol. weight 438,47*181,32 g/mol	BAA2235.0000		please inquire
			
<b>FAA8535 Fmoc-L-Tyr(2-azidoethyl)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-O-(2-azidoethyl)-L-tyrosine CAS-No. 1454816-10-4 Formula $C_{26}H_{24}N_4O_5$ Mol. weight 472,50 g/mol	FAA8535.0000		please inquire
			

## Azido-Tyrosine

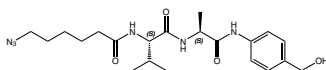
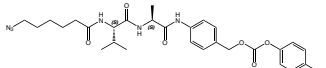
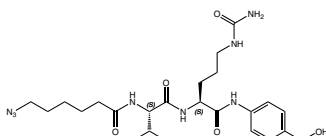
	Product code	Packing unit	Price
<b>HAA9215 H-L-Tyr(2-azidoethyl)-OH*HCl</b> O-(2-azidoethyl)-L-tyrosine hydrochloride CAS-No. 1567845-62-8 Formula $C_{11}H_{14}N_4O_3 \cdot HCl$ Mol. weight 250,26*36,46 g/mol	HAA9215.0000		please inquire
			

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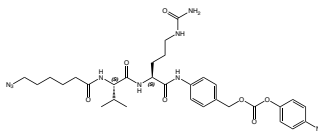
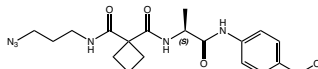
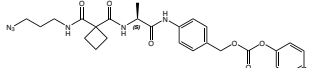
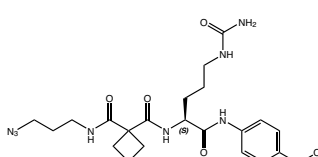
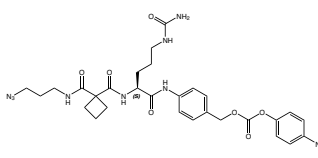
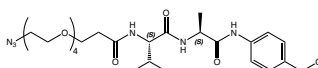
## References:

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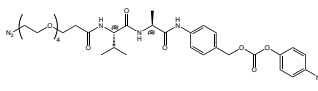
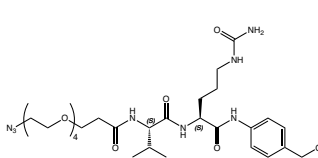
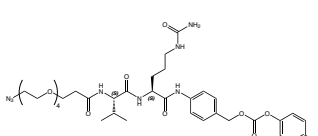
## Azido-ADC Linker

		Product code	Packing unit	Price
<b>ADC1290 6-Azidohexanoyl-Val-Ala-PAB</b> 6-azidohexanoyl-valyl-alanyl-(4-aminobenzyl alcohol) Formula $C_{21}H_{32}N_6O_4$ Mol. weight 432,52 g/mol		ADC1290.0100	100 mg	€ 325,00
		ADC1290.0250	250 mg	€ 650,00
<b>ADC1300 6-Azidohexanoyl-Val-Ala-PAB-PNP</b> 6-azidohexanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{28}H_{35}N_7O_8$ Mol. weight 597,62 g/mol		ADC1300.0100	100 mg	€ 375,00
		ADC1300.0250	250 mg	€ 750,00
<b>ADC1120 6-Azidohexanoyl-Val-Cit-PAB</b> 6-azidohexanoyl-valyl-citrullyl-(4-aminobenzyl alcohol) CAS-No. 1613321-02-0 Formula $C_{26}H_{38}N_8O_5$ Mol. weight 518,61 g/mol		ADC1120.0100	100 mg	€ 325,00
		ADC1120.0250	250 mg	€ 650,00



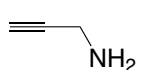
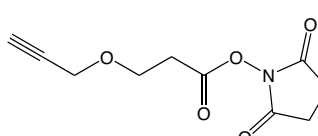
		Product code	Packing unit	Price
<b>ADC1130 6-Azidohexanoyl-Val-Cit-PAB-PNP</b> 6-azidohexanoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate CAS-No. 1613321-01-9 Formula $C_{31}H_{41}N_9O_9$ Mol. weight 683,71 g/mol		ADC1130.0100	100 mg	€ 375,00
		ADC1130.0250	250 mg	€ 750,00
<b>ADC1580 Azido-cyclobutane-1,1-dicarboxamide-Ala-PAB</b> 3-azidopropyl-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl alcohol) Formula $C_{19}H_{26}N_6O_4$ Mol. weight 402,45 g/mol		ADC1580.0000		please inquire
<b>ADC1590 Azido-cyclobutane-1,1-dicarboxamide-Ala-PAB-PNP</b> 3-azidopropyl-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{26}H_{29}N_7O_8$ Mol. weight 567,55 g/mol		ADC1590.0000		please inquire
<b>ADC1480 Azido-cyclobutane-1,1-dicarboxamide-Cit-PAB</b> 3-azidopropyl-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl alcohol) Formula $C_{22}H_{32}N_8O_5$ Mol. weight 488,54 g/mol		ADC1480.0000		please inquire
<b>ADC1490 Azido-cyclobutane-1,1-dicarboxamide-Cit-PAB-PNP</b> 3-azidopropyl-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{29}H_{35}N_9O_9$ Mol. weight 653,64 g/mol		ADC1490.0000		please inquire
<b>ADC1330 Azido-PEG(4)-Val-Ala-PAB</b> azido-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl alcohol) Formula $C_{26}H_{42}N_6O_8$ Mol. weight 566,65 g/mol		ADC1330.0100	100 mg	€ 450,00
		ADC1330.0250	250 mg	€ 900,00

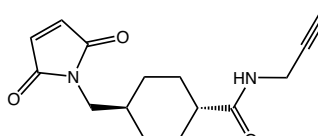
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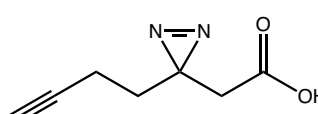
		Product code	Packing unit	Price	
<b>ADC1340</b>	<b>Azido-PEG(4)-Val-Ala-PAB-PNP</b> azido-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate		ADC1340.0100	100 mg	€ 500,00
			ADC1340.0250	250 mg	€ 1.000,00
Formula	C <sub>33</sub> H <sub>45</sub> N <sub>7</sub> O <sub>12</sub>				
Mol. weight	731,75 g/mol				
<b>ADC1160</b>	<b>Azido-PEG(4)-Val-Cit-PAB</b> azido-tetraethyleneglycol-propanoyl-valyl-citrullyl-(4-aminobenzyl alcohol)		ADC1160.0100	100 mg	€ 450,00
			ADC1160.0250	250 mg	€ 900,00
CAS-No.	2055024-64-9				
Formula	C <sub>29</sub> H <sub>48</sub> N <sub>8</sub> O <sub>9</sub>				
Mol. weight	652,74 g/mol				
<b>ADC1170</b>	<b>Azido-PEG(4)-Val-Cit-PAB-PNP</b> azido-tetraethyleneglycol-propanoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate		ADC1170.0100	100 mg	€ 500,00
			ADC1170.0250	250 mg	€ 1.000,00
CAS-No.	1869126-60-2				
Formula	C <sub>36</sub> H <sub>51</sub> N <sub>9</sub> O <sub>13</sub>				
Mol. weight	817,84 g/mol				

## 2.4. Alkyne Amino Acids and Related Derivatives

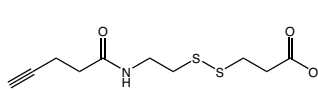
### Propargylating Reagents

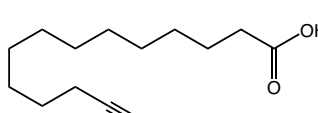
		Product code	Packing unit	Price	
<b>PEG2755</b>	<b>Propargyl amine</b> 		PEG2755.0005	5 g	€ 175,00
			PEG2755.0025	25 g	€ 350,00
CAS-No.	2450-71-7				
Formula	C <sub>3</sub> H <sub>5</sub> N				
Mol. weight	55,08 g/mol				
<b>PEG1935</b>	<b>Propargyl-NHS</b> 3-(Prop-2-ynoxy)propanoic acid succinimidyl ester		PEG1935.0100	100 mg	€ 200,00
			PEG1935.0001	1 g	€ 610,00
CAS-No.	1174157-65-3				
Formula	C <sub>10</sub> H <sub>11</sub> NO <sub>5</sub>				
Mol. weight	225,2 g/mol				

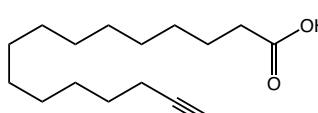
		Product code	Packing unit	Price
<b>MAA1100 Mal-AMCHC-N-Propargylamide</b> trans-4-[(2,5-dioxo-2,5-dihydro-1H-pyrrol-1-yl)methyl]-N-(prop-2-yn-1-yl)cyclohexane-1-carboxamide CAS-No. 2027476-42-0 Formula C <sub>15</sub> H <sub>18</sub> N <sub>2</sub> O <sub>3</sub> Mol. weight 274,32 g/mol		MAA1100.0250	250 mg	€ 120,00
		MAA1100.0500	500 mg	€ 216,00
		MAA1100.0001	1 g	€ 336,00
		MAA1100.0005	5 g	€ 1.200,00

<b>RL-3410 Propargyl-Photo-Propanoic acid</b> 2-(3-(but-3-ynyl)-3H-diazirin-3-yl)acetic acid CAS-No. 2049109-24-0 Formula C <sub>7</sub> H <sub>8</sub> N <sub>2</sub> O <sub>2</sub> Mol. weight 152,15 g/mol		RL-3410.0000		please inquire

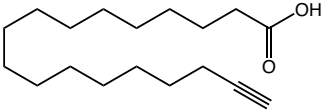
## Alkyne-Alkyl Acids

		Product code	Packing unit	Price
<b>RL-3330 Alkyne-SS-COOH</b> 3-((2-pent-4-ynamidoethyl)disulfanyl)propanoic acid CAS-No. 2279938-29-1 Formula C <sub>10</sub> H <sub>15</sub> NO <sub>3</sub> S <sub>2</sub> Mol. weight 261,36 g/mol		RL-3330.0000		please inquire

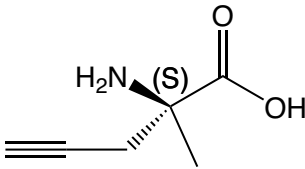
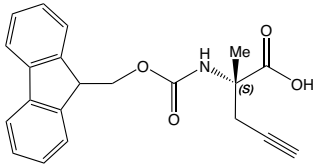
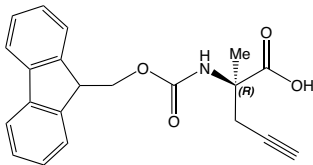
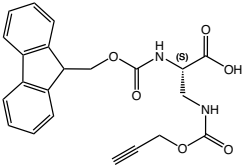
<b>RL-2055 Alkyne-myristic acid</b> 13-Tetradecynoic acid CAS-No. 82909-47-5 Formula C <sub>14</sub> H <sub>24</sub> O <sub>2</sub> Mol. weight 224,34 g/mol		RL-2055.0100	100 mg	€ 250,00
		RL-2055.0500	500 mg	€ 960,00
		RL-2055.1000	1 g	€ 1.600,00

<b>RL-2060 Alkyne-palmitic acid</b> 15-Hexadecynoic acid CAS-No. 99208-90-9 Formula C <sub>16</sub> H <sub>28</sub> O <sub>2</sub> Mol. weight 252,39 g/mol		RL-2060.0100	100 mg	€ 250,00
		RL-2060.0500	500 mg	€ 960,00
		RL-2060.1000	1 g	€ 1.600,00

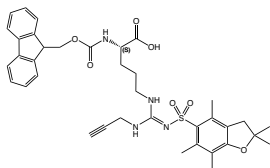
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		Product code	Packing unit	Price
<b>RL-2065</b>	<b>Alkyne-stearic acid</b>			
17-Octadecynoic acid		RL-2065.1000	1 g	€ 2.000,00
CAS-No.	34450-18-5			
Formula	C <sub>18</sub> H <sub>32</sub> O <sub>2</sub>			
Mol. weight	280,45 g/mol			

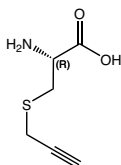
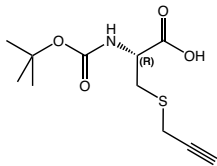
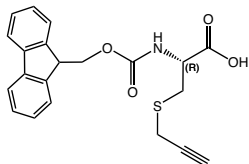
## Propargylalanine and Propionic Acid Derivatives

		Product code	Packing unit	Price
<b>HAA5510</b>	<b>H-alpha-Prg-D-Ala-OH</b>			
(S)-a-Propargylalanine (>98%, >98%ee)		HAA5510.0001	1 g	€ 750,00
CAS-No.	1231709-27-5	HAA5510.0005	5 g	€ 2.800,00
Formula	C <sub>6</sub> H <sub>9</sub> NO <sub>2</sub>			
Mol. weight	127,14 g/mol			
<b>FAA2080</b>	<b>Fmoc-alpha-Prg-D-Ala-OH</b>			
CAS-No.	1198791-58-0	FAA2080.0000		please inquire
Formula	C <sub>21</sub> H <sub>19</sub> NO <sub>4</sub>			
Mol. weight	349,38 g/mol			
				
<b>FAA2070</b>	<b>Fmoc-alpha-Prg-L-Ala-OH</b>			
N-alpha-(9-Fluorenylmethyloxycarbonyl)-alpha-propargyl-L-alanine, solvate with 20 to 50% MTBE (98%, 98%ee)		FAA2070.0000		please inquire
CAS-No.	1198791-65-9			
Formula	C <sub>21</sub> H <sub>19</sub> NO <sub>4</sub>			
Mol. weight	349,38 g/mol			
<b>FAA4230</b>	<b>Fmoc-L-Dap(Poc)-OH</b>			
N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-beta-propargyloxycarbonyl-L-2,3-diaminopropionic acid		FAA4230.0500	500 mg	€ 99,00
CAS-No.	2250437-44-4	FAA4230.0001	1 g	€ 154,00
Formula	C <sub>27</sub> H <sub>20</sub> N <sub>2</sub> O <sub>6</sub>	FAA4230.0005	5 g	€ 550,00
Mol. weight	408,41 g/mol	FAA4230.0025	25 g	€ 2.200,00

## Alkyne-Arginine

		Product code	Packing unit	Price
<b>FAA7400 Fmoc-L-Arg(Propargyl,Pbf)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-N'-(2,2,4,6,7-pentamethyldihydrobenzofuran)-N''-propargyl-5-sulfonyl-L-arginine Formula $C_{37}H_{42}N_4O_7S$ Mol. weight 686,82 g/mol		FAA7400.0250	250 mg	€ 275,00
		FAA7400.1000	1 g	€ 900,00

## Propargylcysteine

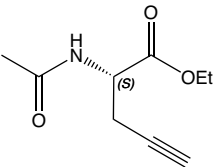
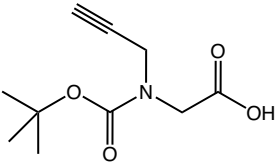
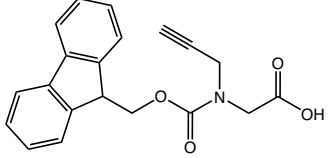
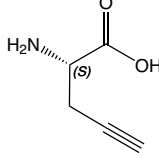
		Product code	Packing unit	Price
<b>HAA2350 H-L-Cys(Propargyl)-OH*HCl</b> S-Propargyl-L-cysteine hydrochloride CAS-No. 3262-64-4 net Formula $C_6H_9NO_2S \cdot HCl$ Mol. weight 159,21*36,45 g/mol		HAA2350.0000		please inquire
<b>BAA2250 Boc-L-Cys(Propargyl)-OH*DCHA</b> N-alpha-t-Butyloxycarbonyl-S-propargyl-L-cysteine dicyclohexylamine CAS-No. 1260119-25-2 net Formula $C_{11}H_{17}NO_4S \cdot C_{12}H_{23}N$ Mol. weight 259,32*181,32 g/mol		BAA2250.0000		please inquire
<b>FAA3810 Fmoc-L-Cys(Propargyl)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-S-propargyl-L-cysteine CAS-No. 1354752-76-3 Formula $C_{21}H_{19}NO_4S$ Mol. weight 381,44 g/mol		FAA3810.0001	1 g	€ 250,00
		FAA3810.0005	5 g	€ 1.000,00

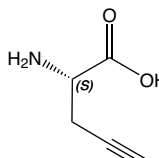
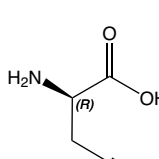
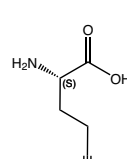
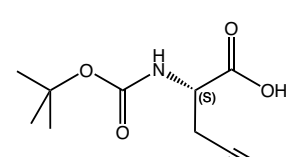
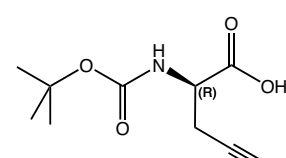
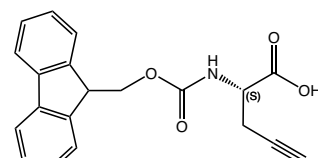
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## References:

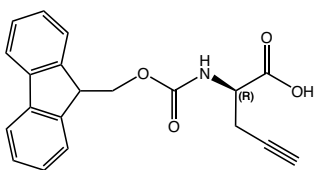
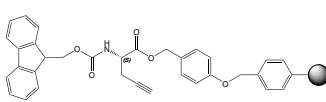
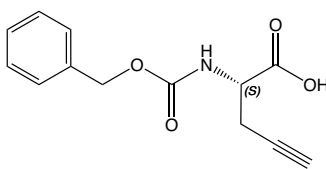
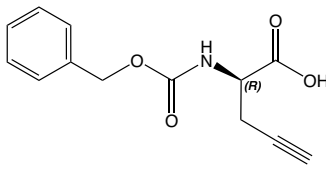
- Photoinduced addition of glycosyl thiols to alkynyl peptides: use of free-radical thiol-yne coupling for post-translational double-glycosylation of peptides; M. Lo Conte, S. Pacifico, A. Chambery, A. Marra and A. Dondoni; *J Org Chem* 2010; **75**: 4644-7. <https://doi.org/10.1021/jo1008178>
- C. Vala, F. Chretien, E. Balentova, S. Lamande-Langle and Y. Chapleur; *Tetrahedron Lett.* 2011; **52**: 17.

## Propargylglycine

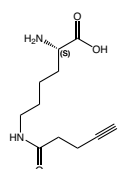
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<b>AAA1937 Ac-L-Pra-OEt</b> N-alpha-Acetyl-L-propargylglycine ethyl ester Formula $C_9H_{13}NO_3$ Mol. weight 183,2 g/mol		AAA1937.0001	1 g	€ 240,00
		AAA1937.0005	5 g	€ 675,00
<b>BAA3230 Boc-N-(propargyl)-glycine</b> N-alpha-t-Butyloxycarbonyl-N-alpha-propargyl-glycine CAS-No. 158979-29-4 Formula $C_{10}H_{12}NO_4$ Mol. weight 213,23 g/mol		BAA3230.0000		please inquire
<b>FAA4950 Fmoc-N-(propargyl)-glycine</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-alpha-propargyl-glycine CAS-No. 1033622-38-6 Formula $C_{20}H_{17}NO_4$ Mol. weight 335,35 g/mol		FAA4950.0000		please inquire
<b>HAA7151 H-L-Pra-OH</b> L-Propargylglycine CAS-No. 23235-01-0 Formula $C_5H_7NO_2$ Mol. weight 113,11 g/mol		HAA7151.0001	1 g	€ 250,00
		HAA7151.0005	5 g	€ 950,00

		Product code	Packing unit	Price
<b>HAA7150 H-L-Pra-OH*HCl</b> L-Propargylglycine hydrochloride CAS-No. 23235-01-0net Formula $C_5H_7NO_2 \cdot HCl$ Mol. weight 113,11*36,45 g/mol		HAA7150.0001	1 g	€ 225,00
		HAA7150.0005	5 g	€ 800,00
<b>HAA6490 H-D-Pra-OH*HCl</b> D-Propargylglycine hydrochloride CAS-No. 23235-03-2 Formula $C_5H_8NO_2 \cdot HCl$ Mol. weight 113,11*36,45 g/mol		HAA6490.0000		please inquire
<b>HAA3470 H-L-HPra-OH*HCl</b> L-Homopropargylglycine hydrochloride CAS-No. 942518-19-6 Formula $C_6H_9NO_2 \cdot HCl$ Mol. weight 127,14 g/mol		HAA3470.0000		please inquire
<b>BAA1434 Boc-L-Pra-OH*DCHA</b> N-alpha-(t-Butyloxycarbonyl)-L-propargylglycine dicyclohexylamine CAS-No. 63039-49-6 Formula $C_{10}H_{15}NO_4 \cdot C_{12}H_{23}N$ Mol. weight 213,23*181,32 g/mol		BAA1434.0001	1 g	€ 290,00
		BAA1434.0005	5 g	€ 650,00
<b>BAA1377 Boc-D-Pra-OH*DCHA</b> N-alpha-t-Butyloxycarbonyl-D-propargylglycine dicyclohexylamine CAS-No. 63039-47-4 Formula $C_{10}H_{15}NO_4 \cdot C_{12}H_{23}N$ Mol. weight 213,23*181,32 g/mol		BAA1377.0001	1 g	€ 175,00
		BAA1377.0005	5 g	€ 550,00
<b>FAA1589 Fmoc-L-Pra-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-propargylglycine CAS-No. 198561-07-8 Formula $C_{20}H_{17}NO_4$ Mol. weight 335,35 g/mol		FAA1589.0001	1 g	€ 110,00
		FAA1589.0005	5 g	€ 475,00
		FAA1589.0025	25 g	€ 2.250,00

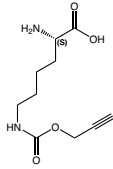
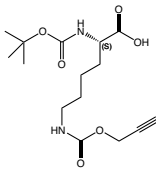
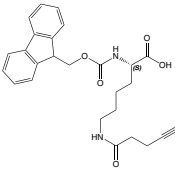
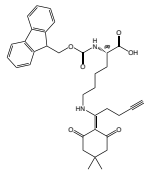
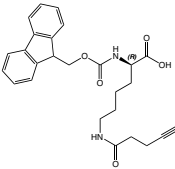
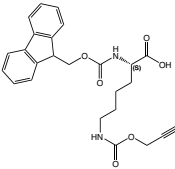
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		Product code	Packing unit	Price
<b>FAA1690 Fmoc-D-Pra-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-D-propargylglycine CAS-No. 220497-98-3 Formula $C_{20}H_{17}NO_4$ Mol. weight 335,36 g/mol		FAA1690.0001	1 g	€ 135,00
		FAA1690.0005	5 g	€ 575,00
		FAA1690.0025	25 g	€ 2.400,00
<b>WAA6025 Fmoc-L-Pra-Wang Resin</b> Fmoc-L-Propargylglycine-Wang Resin		WAA6025.0001	1 g	€ 175,00
		WAA6025.0005	5 g	€ 600,00
<b>ZAA1240 Z-L-Pra-OH</b> N-alpha-Benzylloxycarbonyl-L-propargylglycine Formula $C_{13}H_{13}NO_4$ Mol. weight 246,96 g/mol		ZAA1240.0001	1 g	€ 250,00
		ZAA1240.0005	5 g	€ 750,00
<b>ZAA1210 Z-D-Pra-OH*DCHA</b> N-alpha-Benzylloxycarbonyl-D-propargylglycine dicyclohexylamine Formula $C_{13}H_{13}NO_4 \cdot C_{12}H_{23}N$ Mol. weight 246,96*181,32 g/mol		ZAA1210.0001	1 g	€ 220,00
		ZAA1210.0005	5 g	€ 650,00

## Propargyllysine

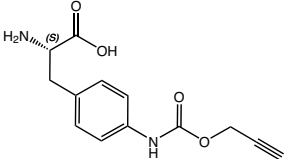
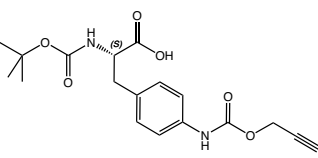
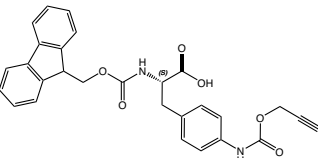
		Product code	Packing unit	Price
<b>HAA2085 H-L-Lys(Pentynoyl)-OH</b> (S)-2-Amino-6-(pent-4-ynamido)hexanoic acid Formula $C_{11}H_{18}N_2O_3 \cdot HCl$ Mol. weight 226,27 *36.5 g/mol		HAA2085.0001	1 g	€ 425,00
		HAA2085.0005	5 g	€ 775,00
		HAA2085.0025	25 g	€ 1.475,00



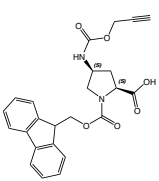
		Product code	Packing unit	Price	
<b>HAA2090 H-L-Lys(Poc)-OH*HCl</b> (S)-Amino-6-((prop-2-ynyloxy)carbonylamino)hexanoic acid hydrochloride CAS-No. 1428330-91-9 Formula $C_{10}H_{16}N_2O_4 \cdot HCl$ Mol. weight 228,25*36,45 g/mol		HAA2090.0250	250 mg	€ 70,00	
		HAA2090.0500	500 mg	€ 126,00	
		HAA2090.0001	1 g	€ 196,00	
		HAA2090.0005	5 g	€ 700,00	
		HAA2090.0025	25 g	€ 2.800,00	
<b>BAA1960 Boc-L-Lys(Poc)-OH</b> (S)-2-(t-Butyloxycarbonylamino)-6-((prop-2-ynyloxy)carbonylamino)hexanoic acid Formula $C_{15}H_{24}N_2O_6$ Mol. weight 328,36 g/mol		BAA1960.0500	500 mg	€ 108,00	
		BAA1960.0001	1 g	€ 168,00	
		BAA1960.0005	5 g	€ 600,00	
		BAA1960.0025	25 g	€ 2.400,00	
<b>FAA4175 Fmoc-L-Lys(pentynoyl)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-epsilon-(4-pentynoyl)-L-lysine CAS-No. 1159531-18-6 Formula $C_{26}H_{28}N_2O_5$ Mol. weight 448,51 g/mol		FAA4175.0001	1 g	€ 125,00	
		FAA4175.0005	5 g	€ 400,00	
		FAA4175.0025	25 g	€ 1.600,00	
<b>FAA8115 Fmoc-L-Lys(Pentynoyl-DIM)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-epsilon-[1-(4,4-dimethyl-2,6-dioxocyclohexylidene)pent-4-yn-1-yl]-L-lysine CAS-No. 2408993-33-7 Formula $C_{34}H_{38}N_2O_6$ Mol. weight 570,69 g/mol		FAA8115.0250	250 mg	€ 180,00	
		FAA8115.0500	500 mg	€ 324,00	
		FAA8115.0001	1 g	€ 504,00	
		FAA8115.0005	5 g	€ 1.800,00	
<b>FAA8135 Fmoc-D-Lys(pentynoyl)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-epsilon-(4-pentynoyl)-D-lysine Formula $C_{26}H_{28}N_2O_5$ Mol. weight 448,51 g/mol		FAA8135.0500	500 mg	€ 99,00	
		FAA8135.0001	1 g	€ 154,00	
		FAA8135.0005	5 g	€ 550,00	
		FAA8135.0025	25 g	€ 2.200,00	
<b>FAA3150 Fmoc-L-Lys(Pryoc)-OH</b> (S)-2-((9-Fluorenylmethyloxy)amino)-6-((prop-2-ynyloxy)carbonylamino)hexanoic acid CAS-No. 1584133-25-4 Formula $C_{25}H_{26}N_2O_6$ Mol. weight 450,48 g/mol		FAA3150.0500	500 mg	€ 108,00	
		FAA3150.0001	1 g	€ 168,00	
		FAA3150.0005	5 g	€ 600,00	
		FAA3150.0025	25 g	€ 2.400,00	

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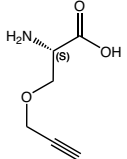
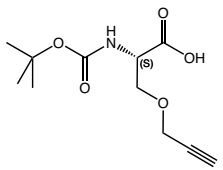
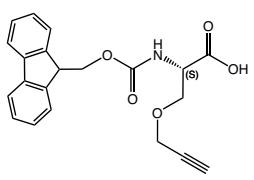
## Propargylphenylalanine

		Product code	Packing unit	Price
<b>HAA4970 H-L-Phe(4-NH-Poc)-OH*HCl</b> 4-(Propargyloxycarbonyl)amino-L-phenylalanine hydrochloride Formula $C_{13}H_{14}N_2O_4 \cdot HCl$ Mol. weight 262,26*36,45 g/mol		HAA4970.0250	250 mg	€ 80,00
		HAA4970.0500	500 mg	€ 144,00
		HAA4970.0001	1 g	€ 224,00
		HAA4970.0005	5 g	€ 800,00
		HAA4970.0025	25 g	€ 3.200,00
<b>BAA3980 Boc-L-Phe(4-NH-Poc)-OH</b> N-alpha-t-Butyloxycarbonyl-4-(propargyloxycarbonyl)amino-L-phenylalanine Formula $C_{18}H_{22}N_2O_6$ Mol. weight 362,38 g/mol		BAA3980.0500	500 mg	€ 126,00
		BAA3980.0001	1 g	€ 196,00
		BAA3980.0005	5 g	€ 700,00
		BAA3980.0025	25 g	€ 2.800,00
		<b>FAA7720 Fmoc-L-Phe(4-NH-Poc)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-propargyloxycarbonylamino-L-phenylalanine Formula $C_{28}H_{24}N_2O_6$ Mol. weight 484,5 g/mol		FAA7720.0500
FAA7720.0001	1 g			€ 168,00
FAA7720.0005	5 g			€ 600,00
FAA7720.0025	25 g			€ 2.400,00

## Propargylproline

		Product code	Packing unit	Price
<b>FAA7130 Fmoc-L-Pro(4-NHPoc)-OH (2S,4S)</b> (2S,4S)-1-(9-Fluorenylmethyloxycarbonyl)-4-(propargyloxycarbonyl)amino-pyrrolidine-2-carboxylic acid CAS-No. 2451202-17-6 Formula $C_{24}H_{22}N_2O_6$ Mol. weight 434,44 g/mol		FAA7130.0500	500 mg	€ 145,00
		FAA7130.1000	1 g	€ 220,00
		FAA7130.5000	5 g	€ 800,00
		FAA7130.9025	25 g	€ 3.600,00

## Propargylserine

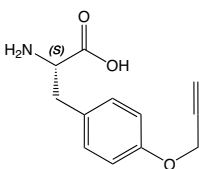
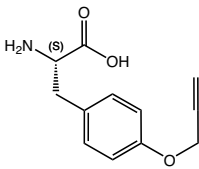
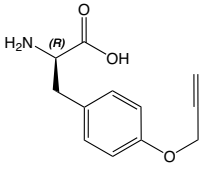
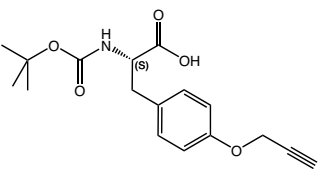
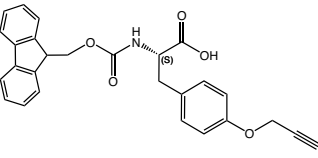
		Product code	Packing unit	Price
<b>HAA2355 H-L-Ser(Propargyl)-OH*HCl</b> O-Propargyl-L-serine hydrochloride CAS-No. 1379150-93-2 Formula $C_6H_9NO_3 \cdot HCl$ Mol. weight 143,14*36,45 g/mol		HAA2355.0001	1 g	€ 200,00
		HAA2355.0005	5 g	€ 700,00
<b>BAA2260 Boc-L-Ser(Propargyl)-OH*DCHA</b> N-alpha-t-Butyloxycarbonyl-O-propargyl-L-serine dicyclohexylamine CAS-No. 145205-94-3 Formula $C_{11}H_{17}NO_5 \cdot C_{12}H_{23}N$ Mol. weight 243,26*181,32 g/mol		BAA2260.0001	1 g	€ 200,00
		BAA2260.0005	5 g	€ 700,00
		BAA2260.0025	25 g	€ 2.700,00
<b>FAA3820 Fmoc-L-Ser(Propargyl)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-O-propargyl-L-serine CAS-No. 1354752-75-2 Formula $C_{21}H_{19}NO_5$ Mol. weight 365,38 g/mol		FAA3820.0001	1 g	€ 200,00
		FAA3820.0005	5 g	€ 700,00
		FAA3820.0025	25 g	€ 2.700,00

### References:

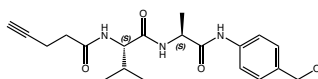
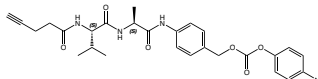
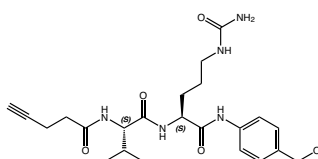
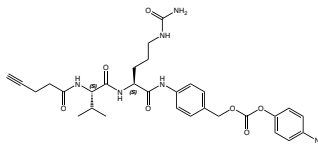
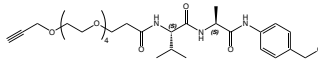
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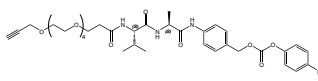
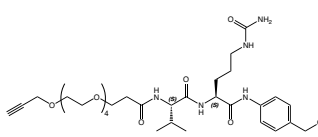
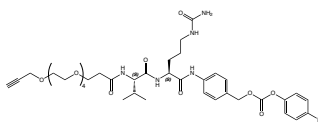
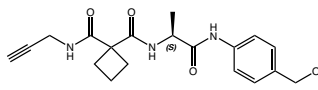
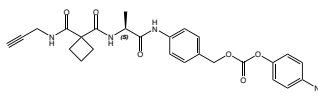
## Propargyltyrosine

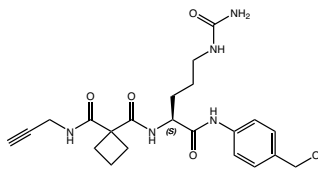
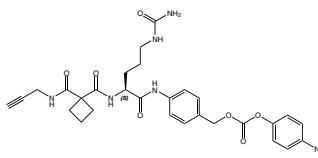
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<b>HAA1970</b> <b>H-L-Tyr(Propargyl)-OH</b> O-Propargyl-L-tyrosine hydrochloride CAS-No.        610794-20-2 Formula $C_{12}H_{13}NO_3$ Mol. weight     219,24 g/mol		HAA1970.0001	1 g	€ 250,00
		HAA1970.0005	5 g	€ 1.200,00
<b>HAA1971</b> <b>H-L-Tyr(Propargyl)-OH*HCl</b> O-Propargyl-L-tyrosine hydrochloride CAS-No.        610794-20-2 net Formula $C_{12}H_{13}NO_3 \cdot HCl$ Mol. weight     219,24*36,45 g/mol		HAA1971.0001	1 g	€ 250,00
		HAA1971.0005	5 g	€ 900,00
<b>HAA2020</b> <b>H-D-Tyr(Propargyl)-OH</b> O-Propargyl-D-tyrosine CAS-No.        1170674-20-0 Formula $C_{12}H_{13}NO_3$ Mol. weight     219,24 g/mol		HAA2020.0000		please inquire
<b>BAA2265</b> <b>Boc-L-Tyr(Propargyl)-OH*DCHA</b> N-alpha-t-Butyloxycarbonyl-O-propargyl-L-tyrosine dicyclohexylamine CAS-No.        340732-79-8 Formula $C_{17}H_{21}NO_5$ Mol. weight     319,35 g/mol		BAA2265.0001	1 g	€ 145,00
		BAA2265.0005	5 g	€ 500,00
		BAA2265.0025	25 g	€ 2.000,00
<b>FAA3830</b> <b>Fmoc-L-Tyr(Propargyl)-OH</b> N-alpha-(9-Fluorenylmethyloxycarbonyl)-O-propargyl-L-tyrosine CAS-No.        1204595-05-0 Formula $C_{27}H_{23}NO_5$ Mol. weight     441,48 g/mol		FAA3830.0001	1 g	€ 225,00
		FAA3830.0005	5 g	€ 850,00
		FAA3830.0025	25 g	€ 3.400,00

## Alkyne-ADC Linker

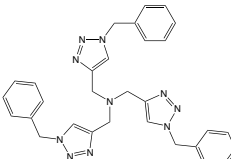
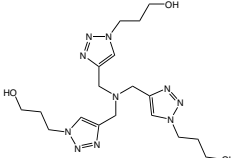
		Product code	Packing unit	Price
<b>ADC1310</b> <b>4-Pentynoyl-Val-Ala-PAB</b> 4-pentynoyl-valyl-alanyl-(4-aminobenzyl alcohol)		ADC1310.0100	100 mg	€ 325,00
		ADC1310.0250	250 mg	€ 650,00
CAS-No.            1956294-75-9 Formula            C <sub>20</sub> H <sub>27</sub> N <sub>3</sub> O <sub>4</sub> Mol. weight        373,45 g/mol				
<b>ADC1320</b> <b>4-Pentynoyl-Val-Ala-PAB-PNP</b> 4-pentynoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate		ADC1320.0100	100 mg	€ 375,00
		ADC1320.0250	250 mg	€ 750,00
CAS-No.            1956294-76-0 Formula            C <sub>27</sub> H <sub>30</sub> N <sub>4</sub> O <sub>8</sub> Mol. weight        538,55 g/mol				
<b>ADC1140</b> <b>4-Pentynoyl-Val-Cit-PAB</b> 4-pentynoyl-valyl-citrullyl-(4-aminobenzyl alcohol)		ADC1140.0100	100 mg	€ 325,00
		ADC1140.0250	250 mg	€ 650,00
Formula            C <sub>23</sub> H <sub>33</sub> N <sub>5</sub> O <sub>5</sub> Mol. weight        459,54 g/mol				
<b>ADC1150</b> <b>4-Pentynoyl-Val-Cit-PAB-PNP</b> 4-pentynoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate		ADC1150.0100	100 mg	€ 375,00
		ADC1150.0250	250 mg	€ 750,00
Formula            C <sub>30</sub> H <sub>36</sub> N <sub>6</sub> O <sub>9</sub> Mol. weight        624,64 g/mol				
<b>ADC1350</b> <b>Alkyne-PEG(4)-Val-Ala-PAB</b> propargyl-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl alcohol)		ADC1350.0100	100 mg	€ 450,00
		ADC1350.0250	250 mg	€ 900,00
Formula            C <sub>29</sub> H <sub>45</sub> N <sub>3</sub> O <sub>9</sub> Mol. weight        579,68 g/mol				

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		Product code	Packing unit	Price
<b>ADC1360 Alkyne-PEG(4)-Val-Ala-PAB-PNP</b> propargyl-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{36}H_{48}N_4O_{13}$ Mol. weight 744,79 g/mol		ADC1360.0100	100 mg	€ 500,00
		ADC1360.0250	250 mg	€ 1.000,00
<b>ADC1180 Alkyne-PEG(4)-Val-Cit-PAB</b> propargyl-tetraethyleneglycol-propanoyl-valyl-citrullyl-(4-aminobenzyl alcohol) Formula $C_{32}H_{51}N_5O_{10}$ Mol. weight 665,77 g/mol		ADC1180.0100	100 mg	€ 450,00
		ADC1180.0250	250 mg	€ 900,00
<b>ADC1190 Alkyne-PEG(4)-Val-Cit-PAB-PNP</b> propargyl-tetraethyleneglycol-propanoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{39}H_{54}N_5O_{14}$ Mol. weight 830,88 g/mol		ADC1190.0100	100 mg	€ 500,00
		ADC1190.0250	250 mg	€ 1.000,00
<b>ADC1600 Propargyl-cyclobutane-1,1-dicarboxamide-Ala-PAB</b> propargyl-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl alcohol) Formula $C_{19}H_{23}N_3O_4$ Mol. weight 357,40 g/mol		ADC1600.0000		please inquire
<b>ADC1610 Propargyl-cyclobutane-1,1-dicarboxamide-Ala-PAB-PNP</b> propargyl-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{26}H_{26}N_4O_8$ Mol. weight 522,51 g/mol		ADC1610.0000		please inquire

	Product code	Packing unit	Price
<b>ADC1500 Propargyl-cyclobutane-1,1-dicarboxamide-Cit-PAB</b> propargyl-cyclobutane-1,1-dicarboxamide-citru- lyl-(4-aminobenzyl alcohol) Formula $C_{22}H_{29}N_5O_5$ Mol. weight 443,50 g/mol	ADC1500.0000		please inquire
			
<b>ADC1510 Propargyl-cyclobutane-1,1-dicarboxamide-Cit-PAB-PNP</b> propargyl-cyclobutane-1,1-dicarboxamide-citru- lyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{29}H_{32}N_6O_9$ Mol. weight 608,60 g/mol	ADC1510.0000		please inquire
			

## Auxiliary Reagents

	Product code	Packing unit	Price
<b>RL-2010 TBTA</b> Tris[(1-benzyl-1H-1,2,3-triazol-4-yl)methyl]amine CAS-No. 510758-28-8 Formula $C_{30}H_{30}N_{10}$ Mol. weight 530,63 g/mol	RL-2010.0250 RL-2010.1000 RL-2010.5000	250 mg 1 g 5 g	€ 125,00 € 375,00 € 1.500,00
			
<b>RL-2210 THPTA</b> Tris(3-hydroxypropyltriazolylmethyl)amine CAS-No. 760952-88-3 Formula $C_{18}H_{30}N_{10}O_3$ Mol. weight 434,51 g/mol	RL-2210.0250 RL-2210.0001 RL-2210.0005	250 mg 1 g 5 g	€ 175,00 € 475,00 € 1.875,00
			

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### 3. Spermines and Amines for Click Chemistry

Polyamines are aliphatic cations with multiple functions in cell proliferation and differentiation and are essential for normal cell growth and development in eukaryotes. These molecules carry positive charges at their primary and secondary amino groups at physiological pH. Consequently, polyamines bind to various anionic macromolecules including DNA, RNA, acidic phospholipids, and certain proteins. These polycationic alkylamines are involved in various critical cellular functions, such as maintaining chromatin structure, regulating ion-channels, maintaining membrane stability, modulating protein synthesis, and scavenging free radicals. Polyamines also serve as substrates for transglutaminase reactions and for the synthesis of the translational regulator hypusine.

Crucial parts of the biological function of polyamines are the regulation of gene expression by altering DNA structure, the modulation of protein synthesis by binding to RNA, and the modulation of signal transduction pathways. The binding of polyamines to both RNA and DNA leads to conformational changes of those nucleic acids. Polyamines cause the conformational transition of DNA from the B form to the Z form and also cause bending of DNA. Both structural alterations are known to influence transcription. Close to 80% of all polyamines in the cell are associated with RNA, while spermine in particular has been shown to stabilize tRNA structures. Binding of polyamines to RNA causes structural changes that increase the efficiency of protein synthesis.

Polyamines are also known to modulate DNA-protein interactions, e.g. by enhancing the binding of specific gene-regulatory proteins to certain regulatory sequences termed response elements. The polyamine spermine has been reported to facilitate the binding of estrogen receptor and nuclear factor  $\kappa$ B (NF- $\kappa$ B) to their respective response elements at 100 to 500  $\mu$ M concentrations. Polyamines are also involved in modulating ligand-receptor interactions, for example N-methyl-D-aspartate (NMDA) receptors, which are important for the excitatory synaptic transmission in the brain and spinal cord.

Moreover, polyamines have been implicated as important molecules in virus-host interactions since many viruses utilize and manipulate polyamines for their own replication. Those pathogens depend on the presence of polyamines for numerous aspects of their replication cycles, such as DNA and RNA polymerization, genome packaging, and viral protein translation. Certain viruses even appear to stimulate polyamine synthesis upon infection, a fact that underlines the importance of this class of molecules for the viral life cycle.

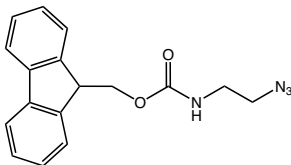
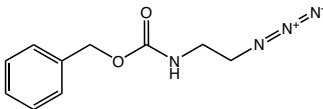
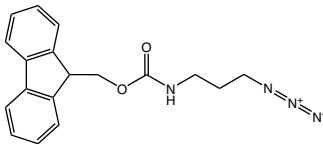
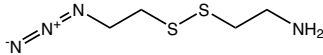
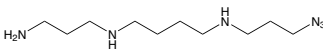
The polyamine metabolic pathway and thus polyamine levels are strictly regulated in cells. However, dysregulation of polyamine metabolism is a frequently observed event in cancer. For example, elevated levels of polyamines have been associated with breast, colon, prostate, and skin cancers. Consequently, polyamine synthesis, metabolism, uptake, and function may be promising targets for cancer therapy.

#### References:

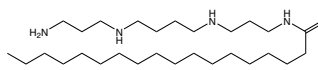
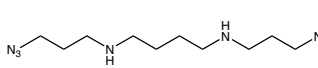
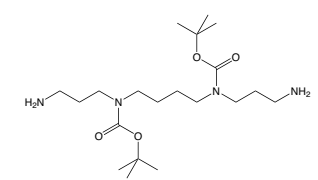
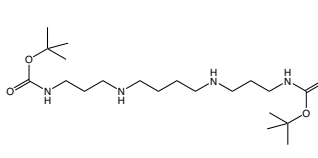
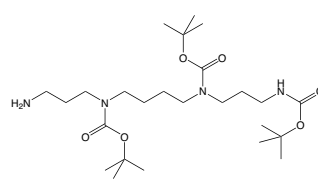
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- *Targeting polyamine metabolism for cancer therapy and prevention*; T. R. Murray-Stewart, P. M. Woster and R. A. Casero, Jr.; **Biochem J** 2016; **473**: 2937-53. <https://doi.org/10.1042/BCJ20160383>

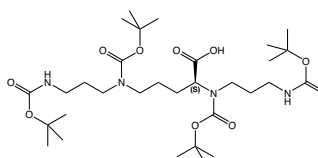
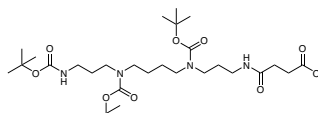
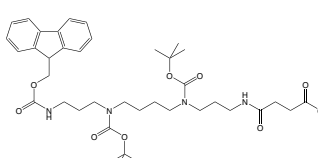


- *Polyamine catabolism in carcinogenesis: potential targets for chemotherapy and chemoprevention*; V. Battaglia, C. DeStefano Shields, T. Murray-Stewart and R. A. Casero, Jr.; **Amino Acids** 2014; **46**: 511-9. <https://doi.org/10.1007/s00726-013-1529-6>
- *Targeting polyamine metabolism and function in cancer and other hyperproliferative diseases*; R. A. Casero, Jr. and L. J. Marton; **Nat Rev Drug Discov** 2007; **6**: 373-90. <https://doi.org/10.1038/nrd2243>

		Product code	Packing unit	Price
<b>FNN1020 Fmoc-EDA-N<sub>3</sub></b> 1-[(9-Fluorenylmethyloxycarbonyl)amino]-2-azidoethane CAS-No. 432507-62-5 Formula C <sub>17</sub> H <sub>16</sub> N <sub>4</sub> O <sub>2</sub> Mol. weight 308,33 g/mol		FNN1020.0001	1 g	€ 100,00
		FNN1020.0005	5 g	€ 350,00
		FNN1020.0025	25 g	€ 1.400,00
<b>ZNN1050 Z-EDA-N<sub>3</sub></b> N1-Azido-N2-benzyloxycarbonyl-ethylenediamine CAS-No. 146552-66-1 Formula C <sub>10</sub> H <sub>12</sub> N <sub>4</sub> O <sub>2</sub> Mol. weight 220,23 g/mol		ZNN1050.0001	1 g	€ 100,00
		ZNN1050.0005	5 g	€ 350,00
		ZNN1050.0025	25 g	€ 1.400,00
<b>FNN1030 Fmoc-DAP-N<sub>3</sub></b> 1-[(9-Fluorenylmethyloxycarbonyl)amino]-3-azidopropane CAS-No. 1021422-85-4 Formula C <sub>18</sub> H <sub>18</sub> N <sub>4</sub> O <sub>2</sub> Mol. weight 322,36 g/mol		FNN1030.0001	1 g	€ 125,00
		FNN1030.0005	5 g	€ 400,00
		FNN1030.0025	25 g	€ 1.600,00
<b>HNN1090 N<sub>3</sub>-Cystamine*HCl</b> Azido-cystamine hydrochloride CAS-No. 1807512-40-8 net Formula C <sub>4</sub> H <sub>10</sub> N <sub>4</sub> S <sub>2</sub> *HCl Mol. weight 178,28*36,45 g/mol		HNN1090.0100	100 mg	€ 90,00
		HNN1090.0250	250 mg	€ 150,00
		HNN1090.0500	500 mg	€ 280,00
		HNN1090.0001	1 g	€ 420,00
		HNN1090.0005	5 g	€ 1.500,00
<b>SNN1170 Spermine(HHHN<sub>3</sub>)*3HCl</b> N1-(3-Aminopropyl)-N4-(3-azidopropyl)butane-1,4-diamine trihydrochloride CAS-No. 1823475-98-4 Formula C <sub>10</sub> H <sub>24</sub> N <sub>6</sub> *3HCl Mol. weight 228,34*109,38 g/mol		SNN1170.0100	100 mg	€ 192,00
		SNN1170.0250	250 mg	€ 320,00
		SNN1170.0500	500 mg	€ 576,00
		SNN1170.1000	1 g	€ 896,00
		SNN1170.5000	5 g	€ 3.200,00

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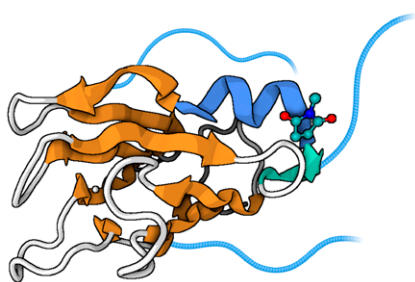
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<b>SNN1130 Spermine(HHHStea)*3HCl</b> N1-Stearoyl-1,5,10,14-tetra-aza-quatrodecane trihydrochloride CAS-No. 273935-54-9net Formula $C_{28}H_{60}N_4O \cdot 3HCl$ Mol. weight 468,82*109,35 g/mol		SNN1130.0100	100 mg	€ 240,00
		SNN1130.0250	250 mg	€ 400,00
		SNN1130.0500	500 mg	€ 720,00
		SNN1130.0001	1 g	€ 1.120,00
		SNN1130.0005	5 g	€ 4.000,00
<b>SNN1210 Spermine(N<sub>3</sub>HHN<sub>3</sub>)*2TsOH</b> N1-(3-Aminopropyl)-N4-(3-azidopropyl)butane-1,4-diamine bistosylate CAS-No. 2250433-79-3 net Formula $C_{10}H_{22}N_8 \cdot C_{14}H_{16}O_6S_2$ Mol. weight 254,34*344,40 g/mol		SNN1210.0250	250 mg	€ 100,00
		SNN1210.0500	500 mg	€ 180,00
		SNN1210.0001	1 g	€ 280,00
		SNN1210.0005	5 g	€ 1.000,00
<b>SNN1080 Spermine(HBBH)</b> N2,N3-Bis-(t-butyloxycarbonyl)-1,5,10,14-tetra-aza-quatrodecane CAS-No. 177213-61-5 Formula $C_{20}H_{42}N_4O_4$ Mol. weight 402,58 g/mol		SNN1080.9100	100 mg	€ 96,00
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		SNN1080.0500	500 mg	€ 320,00
		SNN1080.0001	1 g	€ 480,00
		SNN1080.0005	5 g	€ 1.600,00
<b>SNN1200 Spermine(BHHB)</b> N1,N4-Bis-(t-butyloxycarbonyl)-1,5,10,14-tetra-aza-tetradecane CAS-No. 140652-55-7 Formula $C_{20}H_{42}N_4O_4$ Mol. weight 402,57 g/mol		SNN1200.0250	250 mg	€ 80,00
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		SNN1200.1000	1 g	€ 224,00
		SNN1200.5000	5 g	€ 800,00
		SNN1200.0025	25 g	€ 3.200,00
<b>SNN1040 Spermine(HBBB)</b> N2,N3,N4-Tris-(t-butyloxycarbonyl)-1,5,10,14-tetra-aza-quatrodecane CAS-No. 114459-62-0 Formula $C_{25}H_{50}N_4O_6$ Mol. weight 502,7 g/mol		SNN1040.0100	100 mg	€ 133,00
		SNN1040.0250	250 mg	€ 228,00
		SNN1040.0500	500 mg	€ 380,00
		SNN1040.0001	1 g	€ 570,00
		SNN1040.0005	5 g	€ 1.900,00

		Product code	Packing unit	Price
<b>SNN1190 Spermine(BBBB-CO<sub>2</sub>H) (S)</b> (S)-N1,N5,N10,N14-Tetrakis-(t-butyloxycarbonyl)-1,5,10,14-tetraazatetradecan-9-carboxylic acid CAS-No. 119798-08-2 Formula C <sub>31</sub> H <sub>58</sub> N <sub>4</sub> O <sub>10</sub> Mol. weight 646,81 g/mol		SNN1190.0100	100 mg	€ 330,00
		SNN1190.0001	1 g	€ 990,00
<b>SNN1220 Spermine(BBBSuc)</b> N1,N5,N10-triBoc-N14-succinoyl Spermine CAS-No. 1247874-32-3 Formula C <sub>29</sub> H <sub>54</sub> N <sub>4</sub> O <sub>9</sub> Mol. weight 602,77 g/mol		SNN1220.0100	100 mg	€ 138,00
		SNN1220.0250	250 mg	€ 230,00
		SNN1220.0500	500 mg	€ 414,00
		SNN1220.1000	1 g	€ 644,00
		SNN1220.5000	5 g	€ 2.300,00
<b>SNN1140 Spermine(FBBSuc-OH)</b> N2,N3-Bis-(t-butyloxycarbonyl)-N1-(9-fluorenylmethoxycarbonyl)-1,5,10,14-tetra-aza-quatradecan-N4-succinamic acid CAS-No. 1263046-90-7 Formula C <sub>39</sub> H <sub>56</sub> N <sub>4</sub> O <sub>9</sub> Mol. weight 724,9 g/mol		SNN1140.0100	100 mg	€ 240,00
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# 4. Click Reagents for Drug Delivery

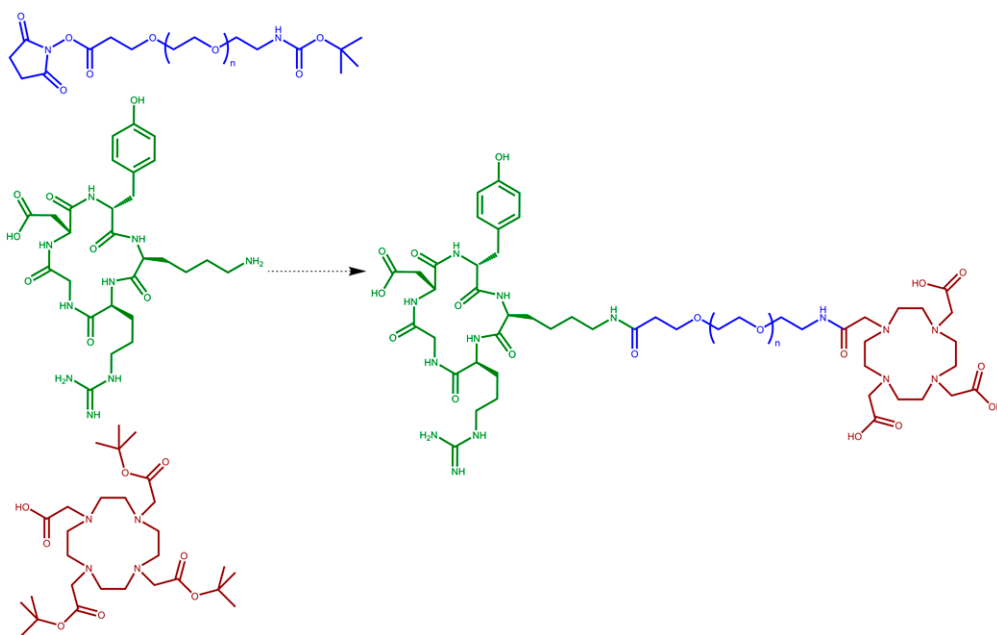
## 4.1. Principles of Polymer Therapeutics

Peptides, proteins, and other biomolecules have a high potential as drugs due to their usually high specificity and efficacy. However, they often show poor pharmacokinetic properties, with their low stability under physiological conditions being a major factor. Since synthetic biomolecules are similar to endogenous molecules found in the human body, they are quickly degraded by enzymes and cleared from the system. Especially peptides and small proteins are susceptible to renal clearance. Additionally, the immunogenic responses and side effects elicited by many drugs, in particular protein drugs, are exacerbated by their hydrophobicity. Conjugation to biocompatible polymers, such as PEG (poly(ethylene glycol)), PGA (poly(glutamic acid)) or POX (Poly(2-oxazoline)), increases aqueous solubility of a drug and often drastically enhances its pharmacokinetics at both the whole organism and subcellular level



**Fig. 9:** PEGylation increases the hydrodynamic radius and aqueous solubility of proteins (example: PEGylated plastocyanin, adapted from Cattani et al., Nat Chem 2015).

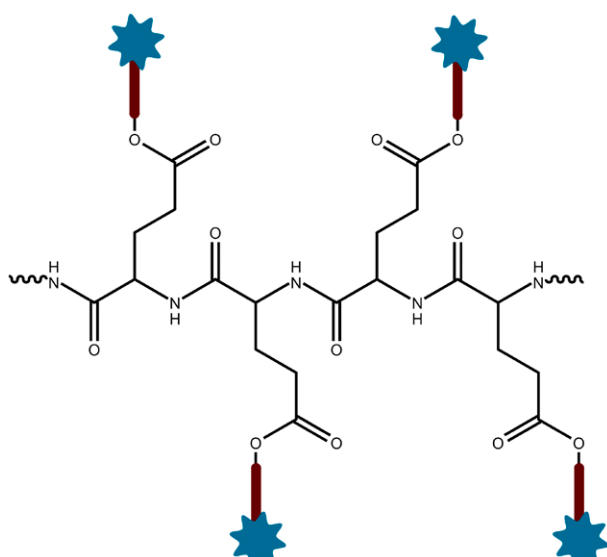
This may significantly improve therapeutic outcomes by increasing drug circulation times. Moreover, Polymer Therapeutics (PT) allow for combination therapies based on the co-transport of multiple APIs to certain tissues or subcellular locations. By using bi- or multifunctional polymers, a linkage between two compounds can be formed or multivalent conjugates generated.



**Fig. 10:** Synthesis of a PEGylated RGD-DOTA conjugate for PET imaging (adapted from Chen et al., J. Nucl. Med. 2004).

The main advantage of proteins, antibodies, siRNA, mRNA and other biomolecules when applied as drugs is their high specificity in combination with their low side effects, as they usually only interact with their dedicated target. A current focus is the study of targeted drug delivery systems for the controlled delivery and/or release of therapeutic agents. To this end, a biocompatible polymeric carrier is covalently linked to an active agent and a targeting moiety. This recognition part can be a peptide or protein that specifically binds to a certain cellular receptor, or an antibody against a specific antigen on the cell surface. Especially in the context of antibody-drug-conjugates, the introduction of a PEG moiety can be very beneficial for pharmacokinetics by attenuating the frequently hydrophobic nature of payload molecules. After internalization of the whole conjugate, the active part (e.g. a nucleic acid or toxin) is released by e.g. variations in pH, temperature, or enzyme concentration. Consequently, the active agent is enabled to exert its function (e.g. the inhibition of a certain enzyme or the initiation of apoptosis) at a high local drug concentration, further increasing drug efficacy. If the active agent and/or the targeting entity are tailored to certain characteristics of an individual or a group of individuals (e.g. specific cancer cell antigens), this approach opens the door to individualized therapies (“personalized medicine”).

To enlarge the field of Polymer Therapeutics to new classes of drug molecules, there is a constant search for new types of polymers. One interesting group are homopolymers of amino acids. Typical examples are polylysine and poly- $\alpha$ -glutamic acid (PGA) - polymers that do not exist in nature, but which show good physiological properties due to their similarity to natural proteins. In particular, poly(glutamic acid) has been identified as suitable carrier system.



**Fig. 11: Multivalent presentation of a drug on poly- $\alpha$ -(glutamic acid).**

PGA shows the ability to conjugate with partners on its N- and C-termini, analogous to the alpha and omega derivatization of a PEG – poly(ethylene glycol). Additionally, the glutamic acid side chains may be used for further decoration of the polymer. Therefore, a multivalent presentation of a specific molecule along the polymer chain is possible, which is especially interesting for small molecules (Fig. 11). It is theoretically also possible to PEGylate a small molecule. However, inactivation of the small drug molecule is often the consequence. PGA is hence an ideal carrier for low molecular weight APIs.

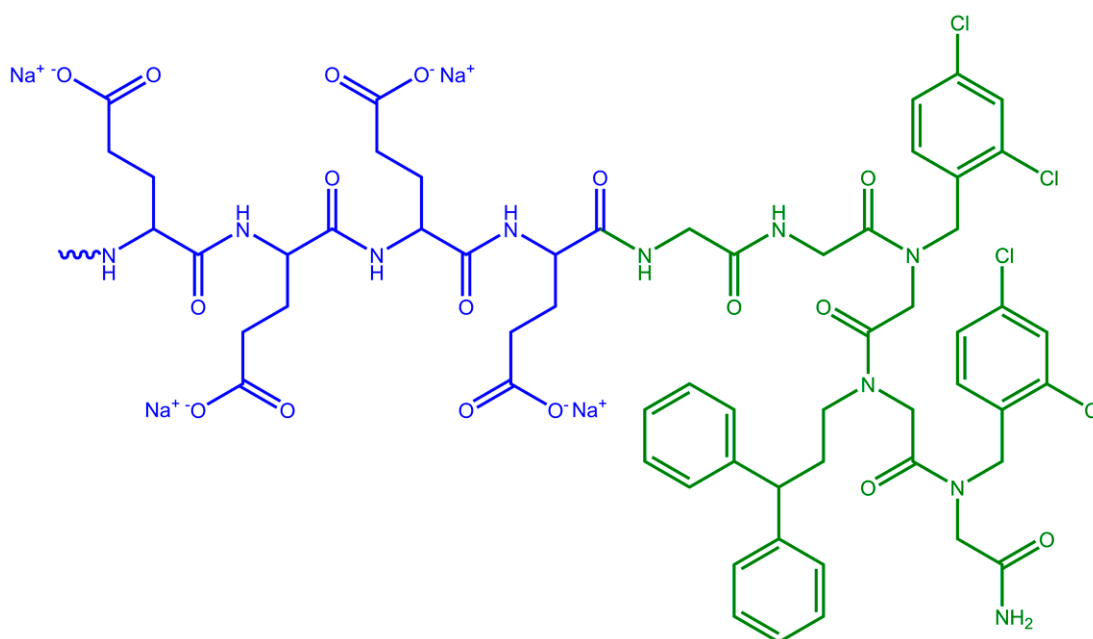


Fig. 12: A pentapeptide (green) conjugated to poly- $\alpha$  (glutamic acid) (blue).

## 4.2. PEGylation Improves Drug Delivery and Pharmacokinetics

Small drug molecules, but also large biomolecules like antibodies suffer from rapid clearance, causing a sharp decrease in plasma concentration of the drug as it is removed from the body. Consequently, drug administration has to be repeated within relatively short time intervals in order to keep its plasma concentration over a certain threshold. Otherwise, immunogenic reactions may be triggered.

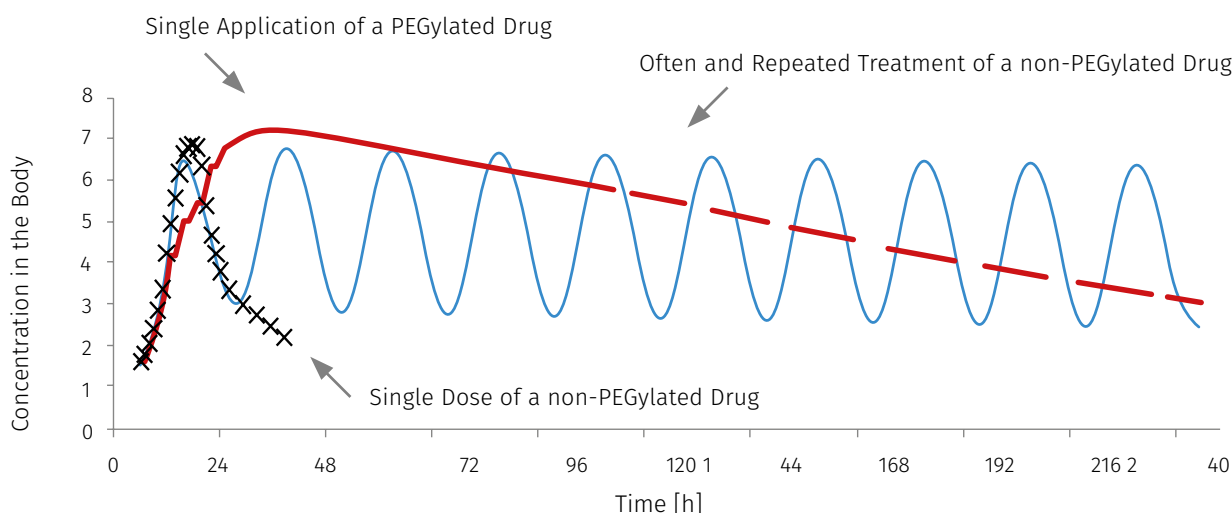
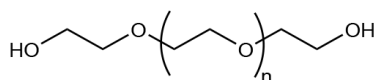


Fig. 13: Pharmacokinetic properties of a PEGylated drug in comparison to a non-PEGylated drug.

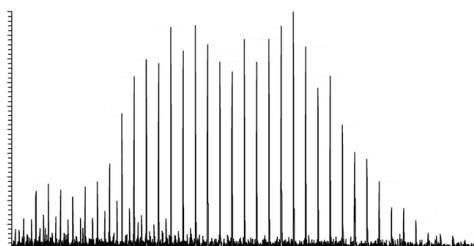
PEGylated drugs show decreased rates of renal clearance and reduced immunogenicity. Consequently, plasma half-life of the drug is significantly increased, extending the time intervals between applications of the drug over the course of the treatment. This is due to the following mechanisms:

## 1) Preventing Degradation and Reducing Immunogenicity:

PEG chains cover the surface of a biopharmaceutical and thus effectively shield it from recognition by the immune system. This PEG layer has characteristics that are rather similar to a solvent, preventing uptake by cells of the retinal endothelial system (macrophage system). Therefore, recognition by the immune system (antibodies, proteases, and other degradation enzymes) is significantly attenuated. The drug stays intact and is not degraded or metabolized during its presence in and journey through the body.



Poly(ethylene glycol) is a polymeric linear structure with repeating polyethylene oxide units.



Mass spectrum of a polyethylene glycol showing the typical signals with a difference of  $m/z = 44$

$$\mathcal{D} = \frac{M_w^\circ}{M_n^\circ} \geq 1 \text{ with } M_w^\circ = \frac{\sum N_x M_x^2}{\sum N_x M_x} \text{ and } M_n^\circ = \frac{\sum N_x M_x}{\sum N_x}$$

Whenever there is a distribution of molecular weights, the weight average  $M_w^\circ$  is always greater than the number average  $M_n^\circ$  and the polydispersity  $\mathcal{D}$  is greater than 1.

*Fig. 14: Composition of poly(ethylene glycols), typical mass spectrum of a polydisperse PEG, and formula for the polydispersity  $\mathcal{D}$ .*

## 2) Preventing Excretion:

PEG is very hygroscopic by nature and surrounded by a large solvation sphere of water. Thus, the overall hydrodynamic radius of a biopharmaceutical may be increased by PEGylation by up to an order of magnitude, to a size larger than the diameter of the glomerular capillaries (6 to 12 nm). Consequently, a PEGylated drug can no longer be excreted through the kidneys, and pharmacologic half-life is significantly extended.

### Chemical/Physical Properties and Quality Parameters of PEGs, Dispersity

Depending on whether a given PEG consists of a single molecular weight species (a defined number  $n$  of repeating units) or of a range of species with an average mass and a distribution of  $n$  around a mean value, PEG polymers are referred to as monodisperse or polydisperse, respectively. If the polymer is polydisperse, its mass spectrum will show a range of different molecular weights (Figure 14).

A measure of the distribution of molecular weights in a polymer is given by the Dispersity  $\mathcal{D}$ , which is defined as the ratio between the weight average molecular weight  $M_w$  and the number average molecular weight  $M_n$ . The weight average  $M_w$  does not "count" species just by their number but takes into account the total weight of each species and is therefore a much more realistic indicator of the gross mechanical properties of a polymer.

In case of a homogeneous PEG, which consists only of one polymer species with a defined chain length,  $M_w$  is equal to  $M_n$ , thus the dispersity  $\mathcal{D}$  equals 1 and the compound is referred to as monodisperse. Whenever there is a distribution of molecular weights, the weight average  $M_w$  is always greater than the number average  $M_n$ , and consequently the dispersity  $\mathcal{D}$  is greater than 1. The dispersity of PEGs typically used in PEGylations ranges between 1.05 and 1.50.

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However, whenever a PEGylated drug candidate needs to be approved by EMEA, FDA and other authorities, it is easier and faster if this compound is a defined species with a defined molecular weight. Therefore, the need for large but monodisperse PEGs is increasing. Iris Biotech now offers long monodisperse PEGs with 112 ethylene glycol units that combine a uniform molecular weight and a high oligomer purity with molecular weights of close to 5 kDa. Those PEGs are available at affordable costs and are scalable to commercial quantity.

## UHPLC/ELSD Signal

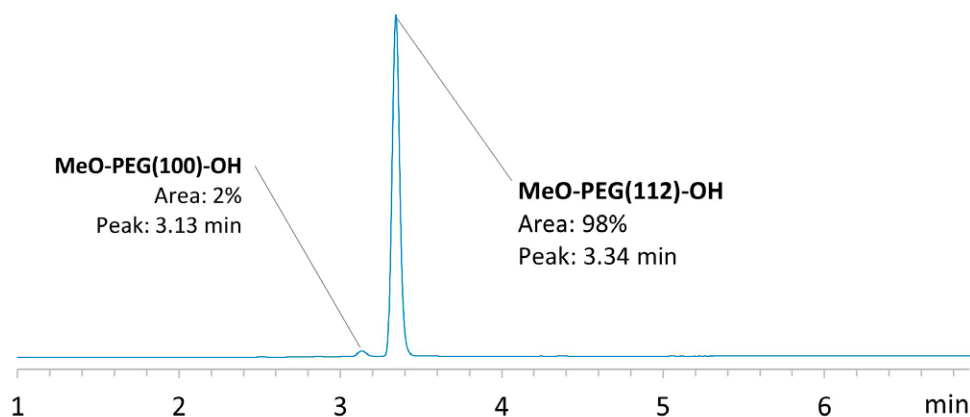


Fig. 15: Typical UHPLC spectrum of a monodisperse MeO-PEG(112)-OH.

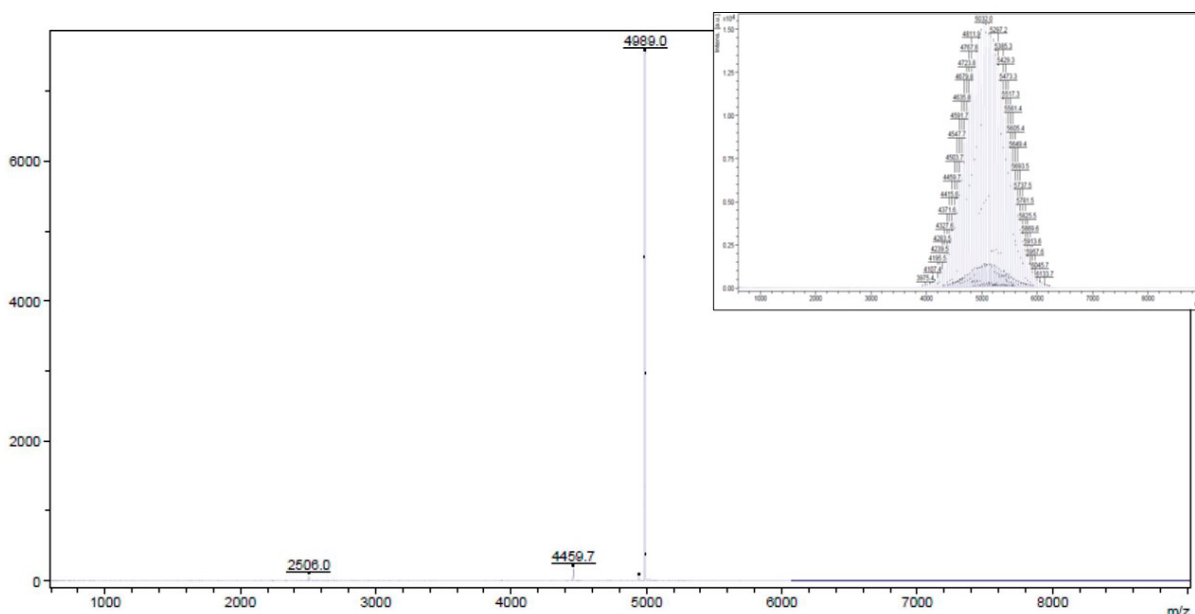
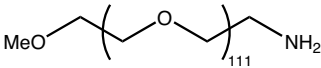
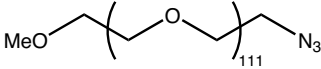
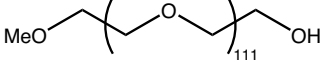
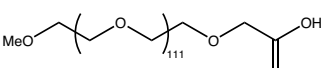
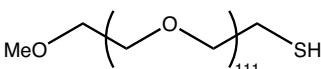


Fig. 16: MALDI-TOF MS spectrum of a monodisperse MeO-PEG(112)-OH;  $[\text{MeO-PEG}(112)\text{-OH}+\text{Na}]^+$  = 4989.0 (97%),  $[\text{MeO-PEG}(111)\text{-OH}+\text{Na}]^+$  = 4945.0 (0.8%),  $[\text{MeO-PEG}(100)\text{-OH}+\text{Na}]^+$  = 4459.7 (2.8%),  $[\text{MeO-PEG}(112)\text{-OH}+2\text{Na}]^{2+}$  = 2506.0 (1%); typical MALDI-TOF MS spectrum of a polydisperse PEG shown for comparison (upper right).



		Product code	Packing unit	Price
<b>PEG7930 MeO-PEG(112)-NH<sub>2</sub></b> alpha-Methoxy-omega-amino 112(ethylene glycol) CAS-No. 80506-64-5 Formula C <sub>225</sub> H <sub>453</sub> NO <sub>112</sub> Mol. weight 4964.94 g/mol		PEG7930.0100	100 mg	€ 450,00
		PEG7930.0200	200 mg	€ 650,00
		PEG7930.0500	500 mg	€ 1.275,00
		PEG7930.1000	1 g	€ 2.425,00
<b>PEG8020 MeO-PEG(112)-N<sub>3</sub></b> alpha-Methoxy-omega-azido 112(ethylene glycol) CAS-No. 89485-61-0 Formula C <sub>225</sub> H <sub>451</sub> N <sub>3</sub> O <sub>112</sub> Mol. weight 4990.94 g/mol		PEG8020.0100	100 mg	€ 450,00
		PEG8020.0200	200 mg	€ 650,00
		PEG8020.0500	500 mg	€ 1.275,00
		PEG8020.1000	1 g	€ 2.425,00
<b>PEG8070 MeO-PEG(111)-OH</b> alpha-Methoxy-111(ethylene glycol)-omega-alcohol Formula C <sub>225</sub> H <sub>452</sub> O <sub>113</sub> Mol. weight 4965,93 g/mol		PEG8070.0100	100 mg	€ 450,00
		PEG8070.0200	200 mg	€ 650,00
		PEG8070.0500	500 mg	€ 1.275,00
		PEG8070.1000	1 g	€ 2.425,00
<b>PEG8030 MeO-PEG(112)-COOH</b> alpha-Methoxy-112(ethylene glycol)-omega-acetic acid CAS-No. 102013-72-9 Formula C <sub>227</sub> H <sub>454</sub> O <sub>115</sub> Mol. weight 5023.96 g/mol		PEG8030.0100	100 mg	€ 450,00
		PEG8030.0200	200 mg	€ 650,00
		PEG8030.0500	500 mg	€ 1.275,00
		PEG8030.1000	1 g	€ 2.425,00
<b>PEG8040 MeO-PEG(112)-SH</b> alpha-Methoxy-omega-mercapto 112(ethylene glycol) CAS-No. 134874-49-0 Formula C <sub>225</sub> H <sub>452</sub> O <sub>112</sub> S Mol. weight 4981.99 g/mol		PEG8040.0100	100 mg	€ 450,00
		PEG8040.0200	200 mg	€ 650,00
		PEG8040.0500	500 mg	€ 1.275,00
		PEG8040.1000	1 g	€ 2.425,00

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## Summary of Chemical and Physical Properties of PEGs:

- Good solubility in BOTH hydrophilic AND hydrophobic solvents as water, toluene, methylene chloride, and many other organic solvents.
- Insoluble in diethyl ether, hexane, ethylene glycol.
- Insoluble in water at elevated temperature.
- The solubility is influenced by forming derivatives.
- Highly mobile in water with high exclusion volume; large hydrodynamic radius.
- Complex formation with metal cations.
- Can be used to precipitate proteins and nucleic acids.
- Form two-phase system with aqueous solutions of other polymers.
- Non-toxic and FDA approved for use in drug products.

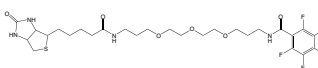
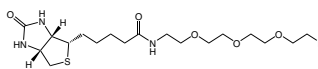
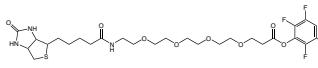
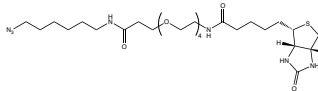
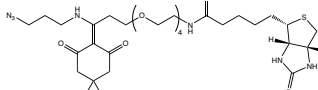
## PEGylating Biopharmaceuticals and Small Molecules has the Following Effects:

- Improves solubility of conjugated molecules.
- Renders proteins non-immunogenic and tolerogenic.
- Reduces the rate of renal clearance through the kidney and alters pharmacokinetics.
- Alters electroosmotic flow.
- Increases cell permeability.

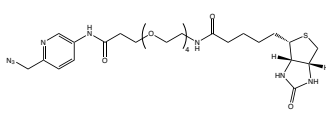
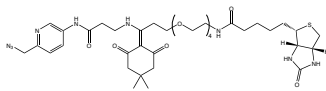
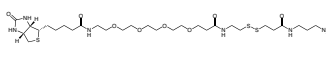
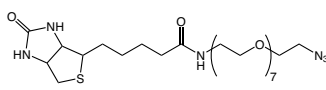
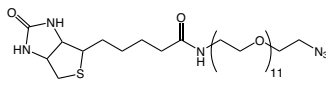
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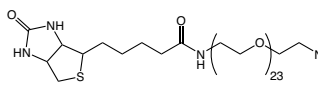
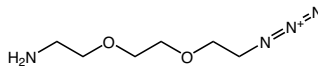
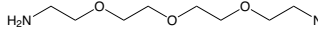
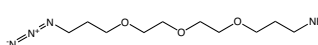
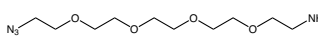
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### 4.3. Azido-PEG Derivatives for Click Chemistry

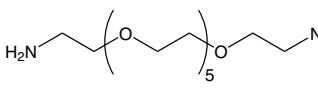
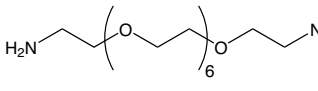
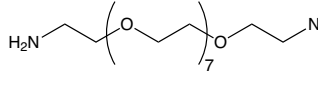
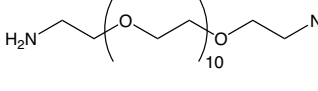
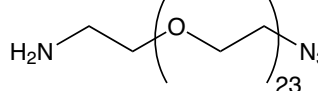
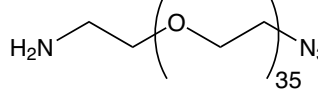
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<b>PEG2065 Biotin-TEG-ATFBA</b> Biotin-triethylenglycol-(p-azido-tetrafluorobenzamide) CAS-No. 1264662-85-2 Formula $C_{27}H_{37}F_4N_7O_6S$ Mol. weight 663,68 g/mol		PEG2065.0025	25 mg	€ 230,00
		PEG2065.0100	100 mg	€ 410,00
<b>PEG4940 Biotin-PEG(3)-N<sub>3</sub></b> 11-[D(+)-Biotinylamino]-1-azido-3,6,9-trioxadecane CAS-No. 875770-34-6 Formula $C_{18}H_{32}N_6O_5S$ Mol. weight 444,55 g/mol		PEG4940.0000		please inquire
<b>PEG2071 Biotin-TEG-TFP</b> Biotin-tetra(ethylene glycol)-2,3,5,6-tetrafluorophenyl ester Formula $C_{27}H_{37}F_4N_7O_8S$ Mol. weight 639.66 g/mol		PEG2071.0100	100 mg	€ 200,00
		PEG2071.1000	1 g	€ 780,00
<b>PEG7990 Biotin-PEG(4)-N<sub>3</sub></b> (3aS,4S,6aR)-4-(28-azido-5,21-dioxo-9,12,15,18-tetraoxa-6,22-diazaoctacosyl)tetrahydro-1H-thieno[3,4-d]imidazol-2(3H)-one CAS-No. 1006592-62-6 Formula $C_{27}H_{49}N_7O_7S$ Mol. weight 615,79 g/mol		PEG7990.0005	5 mg	€ 145,00
		PEG7990.0025	25 mg	€ 415,00
		PEG7990.0100	100 mg	€ 1.250,00
<b>PEG7960 Biotin-PEG(4)-Dde-N<sub>3</sub></b> N-(19-azido-15-(4,4-dimethyl-2,6-dioxoclohexylidene)-3,6,9,12-tetraoxa-16-azanonadecyl)-5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamide CAS-No. 1802907-93-2 Formula $C_{32}H_{53}N_7O_8S$ Mol. weight 695,87 g/mol		PEG7960.0010	10 mg	€ 250,00
		PEG7960.0025	25 mg	€ 415,00
		PEG7960.0100	100 mg	€ 1.250,00

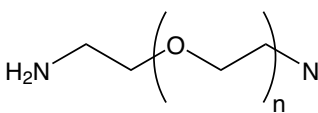
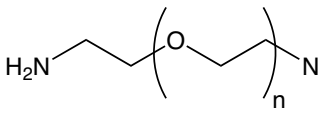
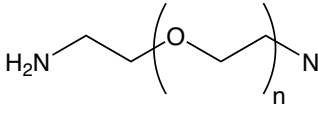
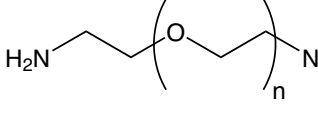
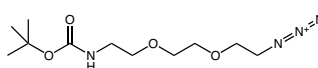
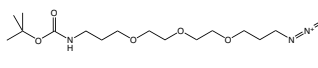
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	Product code	Packing unit	Price
<p><b>PEG8000 Biotin-PEG(4)-Picolyl-N<sub>3</sub></b></p> <p>(3aS,4S,6aR)-4-(1-(6-(azidomethyl)pyridin-3-ylamino)-1,17-dioxo-4,7,10,13-tetraoxa-16-azahenicosan-21-yl)tetrahydro-1H-thieno[3,4-d]imidazol-2(3H)-one</p> <p>CAS-No. 2222687-71-8 Formula C<sub>27</sub>H<sub>42</sub>N<sub>8</sub>O<sub>7</sub>S Mol. weight 622,74 g/mol</p> 	<p>PEG8000.0005</p> <p>PEG8000.0025</p> <p>PEG8000.0100</p>	<p>5 mg</p> <p>25 mg</p> <p>100 mg</p>	<p>€ 195,00</p> <p>€ 375,00</p> <p>€ 1.025,00</p>
<p><b>PEG7970 Biotin-PEG(4)-Dde-Picolyl-N<sub>3</sub></b></p> <p>N-(6-(azidomethyl)pyridin-3-yl)-15-(4,4-dimethyl-2,6-dioxocyclohexylidene)-1-(5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamido)-3,6,9,12-tetraoxa-16-azanona decan-19-amide</p> <p>CAS-No. 2055048-42-3 Formula C<sub>38</sub>H<sub>57</sub>N<sub>9</sub>O<sub>9</sub>S Mol. weight 815,98 g/mol</p> 	<p>PEG7970.0005</p> <p>PEG7970.0010</p> <p>PEG7970.0100</p>	<p>5 mg</p> <p>10 mg</p> <p>100 mg</p>	<p>€ 195,00</p> <p>€ 300,00</p> <p>€ 1.450,00</p>
<p><b>PEG8100 Biotin-PEG(4)-SS-Azide</b></p> <p>N-(2-(((3-(3-azidopropyl)amino)-3-oxopropyl)disulfaneyl)ethyl)-1-(5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamido)-3,6,9,12-tetraoxapentadecan-15-amide</p> <p>CAS-No. 1260247-52-6 Formula C<sub>29</sub>H<sub>52</sub>N<sub>8</sub>O<sub>8</sub>S<sub>3</sub> Mol. weight 736,96 g/mol</p> 	<p>PEG8100.0025</p> <p>PEG8100.0100</p> <p>PEG8100.0500</p>	<p>25 mg</p> <p>100 mg</p> <p>500 mg</p>	<p>€ 225,00</p> <p>€ 650,00</p> <p>€ 2.600,00</p>
<p><b>PEG4330 Biotin-dPEG™(7)-N<sub>3</sub></b></p> <p>alpha-Biotin-omega-azido hepta(ethylene glycol)</p> <p>CAS-No. 1334172-75-6 Formula C<sub>26</sub>H<sub>48</sub>N<sub>6</sub>O<sub>9</sub>S Mol. weight 620,76 g/mol</p> 	<p>PEG4330.0100</p> <p>PEG4330.1000</p>	<p>100 mg</p> <p>1 g</p>	<p>€ 320,00</p> <p>€ 1.660,00</p>
<p><b>PEG4340 Biotin-dPEG™(11)-N<sub>3</sub></b></p> <p>[2-(2-aminoethoxy)ethoxy]acetic acid tert-butyl ester*HCl</p> <p>CAS-No. 956494-20-5 Formula C<sub>34</sub>H<sub>66</sub>N<sub>6</sub>O<sub>13</sub>S Mol. weight 796,97 g/mol</p> 	<p>PEG4340.0100</p> <p>PEG4340.1000</p>	<p>100 mg</p> <p>1 g</p>	<p>€ 380,00</p> <p>€ 1.720,00</p>

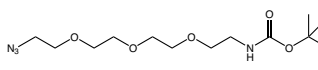
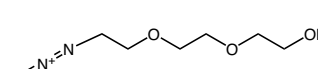
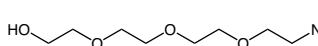
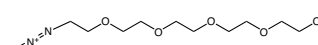
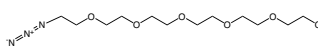
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<b>PEG4350 Biotin-dPEG™(23)-N<sub>3</sub></b> alpha-Biotin-omega-azido 23(ethylene glycol) CAS-No. 956494-20-5 Formula C <sub>58</sub> H <sub>112</sub> N <sub>6</sub> O <sub>25</sub> S Mol. weight 1325,6 g/mol		PEG4350.0100	100 mg	€ 430,00
		PEG4350.1000	1 g	€ 1.950,00
		Product code	Packing unit	Price
<b>PEG4980 H<sub>2</sub>N-PEG(2)-N<sub>3</sub>*TosOH</b> 2-[2-(2-Azidoethoxy)ethoxy]ethanaminium tosylat CAS-No. 2173092-98-1 Formula C <sub>7</sub> H <sub>14</sub> N <sub>4</sub> O <sub>2</sub> *C <sub>7</sub> H <sub>8</sub> O <sub>3</sub> S Mol. weight 174,20*172,20 g/mol		PEG4980.0001	1 g	€ 125,00
		PEG4980.0005	5 g	€ 450,00
		PEG4980.0025	25 g	€ 1.800,00
		Product code	Packing unit	Price
<b>PEG3060 H<sub>2</sub>N-PEG(3)-N<sub>3</sub></b> 1-Amino-11-azido-3,6,9-trioxaundecane CAS-No. 134179-38-7 Formula C <sub>8</sub> H <sub>18</sub> N <sub>4</sub> O <sub>3</sub> Mol. weight 218,25 g/mol		PEG3060.0001	1 g	€ 95,00
		PEG3060.0005	5 g	€ 375,00
		PEG3060.0025	25 g	€ 1.500,00
		Product code	Packing unit	Price
<b>BNN1150 N<sub>3</sub>-TOTA</b> 1-Azido-4,7,10-trioxa-13-tridecanamine CAS-No. 1162336-72-2 Formula C <sub>10</sub> H <sub>22</sub> N <sub>4</sub> O <sub>3</sub> Mol. weight 246,31 g/mol		BNN1150.0500	500 mg	€ 100,00
		BNN1150.0001	1 g	€ 150,00
		BNN1150.0005	5 g	€ 500,00
		BNN1150.0025	25 g	€ 2.000,00
		Product code	Packing unit	Price
<b>PEG5320 N<sub>3</sub>-PEG(4)-NH<sub>2</sub></b> 14-Azido-3,6,9,12-tetraoxatetradecan-1-amine CAS-No. 951671-92-4 Formula C <sub>10</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight 262,31 g/mol		PEG5320.0250	250 mg	€ 108,00
		PEG5320.0500	500 mg	€ 180,00
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		PEG5320.0005	5 g	€ 900,00
		PEG5320.0025	25 g	€ 3.600,00

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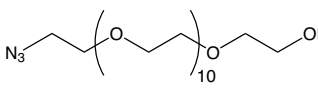
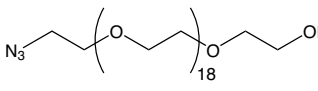
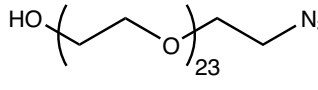
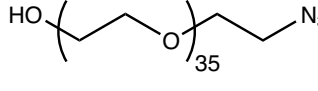
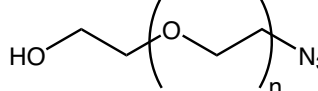
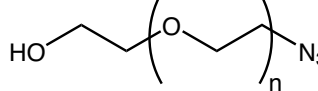
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<b>PEG1087</b> <b>H<sub>2</sub>N-PEG(6)-N<sub>3</sub></b> alpha-Amino-omega-azido hexa(ethylene glycol) CAS-No.    957486-82-7 Formula    C <sub>14</sub> H <sub>30</sub> N <sub>4</sub> O <sub>6</sub> Mol. weight    350,42 g/mol		PEG1087.0001	1 g	€ 320,00
		PEG1087.0005	5 g	€ 1.050,00
		PEG1087.0025	25 g	€ 3.230,00
<b>PEG2350</b> <b>H<sub>2</sub>N-PEG(7)-N<sub>3</sub></b> alpha-Amino-omega-azido hepta(ethylene glycol) CAS-No.    1333154-77-0 Formula    C <sub>16</sub> H <sub>34</sub> N <sub>4</sub> O <sub>7</sub> Mol. weight    394,46 g/mol		PEG2350.0100	100 mg	€ 320,00
		PEG2350.0001	1 g	€ 670,00
<b>PEG3050</b> <b>H<sub>2</sub>N-PEG(8)-N<sub>3</sub></b> alpha-Amino-omega-azido octa(ethylene glycol) CAS-No.    857891-82-8 Formula    C <sub>18</sub> H <sub>38</sub> N <sub>4</sub> O <sub>8</sub> Mol. weight    438,52 g/mol		PEG3050.0001	1 g	€ 320,00
		PEG3050.0005	5 g	€ 1.050,00
<b>PEG1081</b> <b>H<sub>2</sub>N-PEG(11)-N<sub>3</sub></b> alpha-Amino-omega-azido undecae(ethylene glycol) CAS-No.    1800414-71-4 Formula    C <sub>24</sub> H <sub>50</sub> N <sub>4</sub> O <sub>11</sub> Mol. weight    570,69 g/mol		PEG1081.0001	1 g	€ 375,00
		PEG1081.0005	5 g	€ 1.140,00
		PEG1081.0025	25 g	€ 3.770,00
<b>PEG3070</b> <b>H<sub>2</sub>N-PEG(23)-N<sub>3</sub></b> alpha-Azido-omega-amino 23(ethylene glycol) CAS-No.    2172677-19-7 Formula    C <sub>48</sub> H <sub>98</sub> N <sub>4</sub> O <sub>23</sub> Mol. weight    1099,3 g/mol		PEG3070.0100	100 mg	€ 430,00
		PEG3070.0001	1 g	€ 1.080,00
<b>PEG3080</b> <b>H<sub>2</sub>N-PEG(35)-N<sub>3</sub></b> alpha-Azido-omega-amino 35(ethylene glycol) CAS-No.    749244-38-0 Formula    C <sub>72</sub> H <sub>146</sub> N <sub>4</sub> O <sub>35</sub> Mol. weight    1627,94 g/mol		PEG3080.0100	100 mg	€ 490,00
		PEG3080.0001	1 g	€ 1.660,00

		Product code	Packing unit	Price
<b>PEG3020</b> <b>H<sub>2</sub>N-PEG-N<sub>3</sub> (20 kDa)</b> alpha-Amino-omega-azido poly(ethylene glycol) Mol. weight    20000 Da		PEG3020.0500	500 mg	€ 440,00
		PEG3020.0001	1 g	€ 730,00
<b>PEG3010</b> <b>H<sub>2</sub>N-PEG-N<sub>3</sub> (3 kDa)</b> alpha-Amino-omega-azido poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight    3000 Da		PEG3010.0500	500 mg	€ 410,00
		PEG3010.0001	1 g	€ 670,00
<b>PEG3030</b> <b>H<sub>2</sub>N-PEG-N<sub>3</sub> (5 kDa)</b> alpha-Amino-omega-azido poly(ethylene glycol) Mol. weight    5000 Da		PEG3030.0500	500 mg	€ 410,00
		PEG3030.0001	1 g	€ 670,00
<b>PEG3000</b> <b>H<sub>2</sub>N-PEG-N<sub>3</sub> (10 kDa)</b> alpha-Amino-omega-azido poly(ethylene glycol) Mol. weight    10000 Da		PEG3000.0500	500 mg	€ 440,00
		PEG3000.0001	1 g	€ 730,00
<b>PEG4960</b> <b>Boc-NH-PEG(2)-N<sub>3</sub></b> 1-(t-Butyloxycarbonyl-amino)-3,6-dioxa-8-octa- neazide CAS-No.        950683-55-3 Formula        C <sub>11</sub> H <sub>22</sub> N <sub>4</sub> O <sub>4</sub> Mol. weight    274,32 g/mol		PEG4960.0500	500 mg	€ 90,00
		PEG4960.0001	1 g	€ 135,00
		PEG4960.0005	5 g	€ 450,00
		PEG4960.0025	25 g	€ 1.800,00
<b>BNN1140</b> <b>Boc-TOTA-N<sub>3</sub></b> 1-(t-Butyloxycarbonyl-amino)-4,7,10-trioxa-13-tri- decanazide CAS-No.        1162070-33-8 Formula        C <sub>15</sub> H <sub>30</sub> N <sub>4</sub> O <sub>5</sub> Mol. weight    346,42 g/mol		BNN1140.0500	500 mg	€ 90,00
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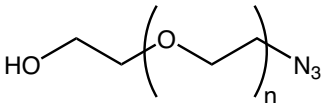
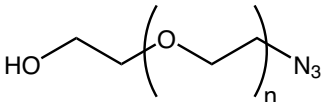
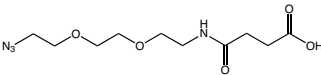
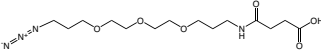
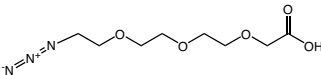
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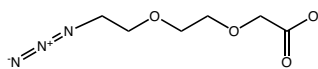
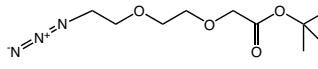
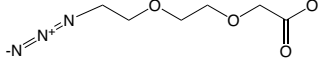
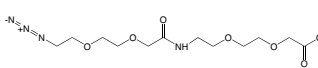
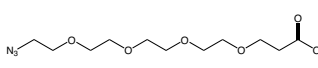
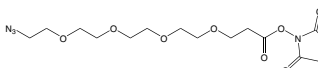
		Product code	Packing unit	Price
<b>PEG8160</b> <b>N<sub>3</sub>-PEG(3)-NH-Boc</b> t-Butyl N-(2-(2-(2-(2-azidoethoxy)ethoxy)ethoxy)ethyl)carbamate CAS-No.            642091-68-7 Formula            C <sub>13</sub> H <sub>26</sub> N <sub>4</sub> O <sub>5</sub> Mol. weight        318,37 g/mol		PEG8160.0001	1 g	€ 112,00
		PEG8160.0005	5 g	€ 400,00
		PEG8160.0025	25 g	€ 1.600,00
<b>PEG4900</b> <b>N<sub>3</sub>-EEEt-OH</b> 2-[2-(2-Azidoethoxy)ethoxy]ethanol CAS-No.            86520-52-7 Formula            C <sub>6</sub> H <sub>13</sub> N <sub>3</sub> O <sub>3</sub> Mol. weight        175,19 g/mol		PEG4900.0001	1 g	€ 125,00
		PEG4900.0005	5 g	€ 350,00
		PEG4900.0025	25 g	€ 1.400,00
<b>PEG3760</b> <b>N<sub>3</sub>-PEG(3)-OH</b> alpha-Azido-omega-hydroxy tetra(ethylene glycol) CAS-No.            86770-67-4 Formula            C <sub>6</sub> H <sub>17</sub> N <sub>3</sub> O <sub>4</sub> Mol. weight        219,24 g/mol		PEG3760.0500	500 mg	€ 90,00
		PEG3760.1000	1 g	€ 135,00
		PEG3760.5000	5 g	€ 450,00
		PEG3760.9025	25 g	€ 1.800,00
<b>PEG5300</b> <b>N<sub>3</sub>-PEG(4)-OH</b> 2-(2-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)ethoxy)ethoxy ethanol CAS-No.            86770-68-5 Formula            C <sub>10</sub> H <sub>21</sub> N <sub>3</sub> O <sub>5</sub> Mol. weight        263,29 g/mol		PEG5300.0500	500 mg	€ 140,00
		PEG5300.0001	1 g	€ 210,00
		PEG5300.0005	5 g	€ 700,00
		PEG5300.0025	25 g	€ 2.800,00
<b>PEG6720</b> <b>N<sub>3</sub>-PEG(5)-OH</b> 17-Azido-3,6,9,12,15-pentaoxaheptadecan-1-ol CAS-No.            86770-69-6 Formula            C <sub>12</sub> H <sub>25</sub> N <sub>3</sub> O <sub>6</sub> Mol. weight        307,34 g/mol		PEG6720.0500	500 mg	€ 120,00
		PEG6720.0001	1 g	€ 185,00
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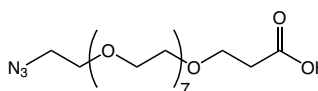
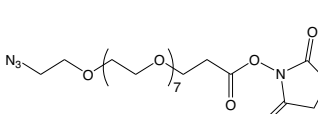
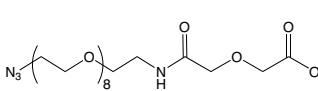
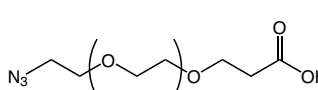
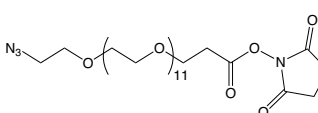
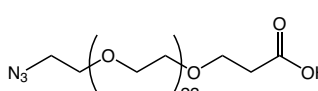
		Product code	Packing unit	Price
<b>PEG1390</b> <b>N<sub>3</sub>-PEG(12)-OH</b> 35-Azido-3,6,9,12,15,18,21,24,27,30,33-undeca-oxa-pentatriacontan-1-ol CAS-No.        73342-16-2 Formula         C <sub>24</sub> H <sub>49</sub> N <sub>3</sub> O <sub>12</sub> Mol. weight     571,66 g/mol		PEG1390.0100	100 mg	€ 350,00
		PEG1390.0001	1 g	€ 730,00
<b>PEG1220</b> <b>N<sub>3</sub>-PEG(20)-OH</b> alpha-Azido-omega-hydroxy icos(ethylene glycol) CAS-No.        1637297-21-2 Formula         C <sub>40</sub> H <sub>81</sub> N <sub>3</sub> O <sub>20</sub> Mol. weight     924,1 g/mol		PEG1220.0001	1 g	€ 340,00
		PEG1220.0005	5 g	€ 1.040,00
<b>PEG3770</b> <b>N<sub>3</sub>-dPEG™(24)-OH</b> alpha-Azido-omega-hydroxy 24(ethylene glycol) CAS-No.        73342-16-2 Formula         C <sub>48</sub> H <sub>97</sub> N <sub>3</sub> O <sub>24</sub> Mol. weight     1100,29 g/mol		PEG3770.0100	100 mg	€ 460,00
		PEG3770.1000	1 g	€ 1.020,00
<b>PEG3780</b> <b>N<sub>3</sub>-dPEG™(36)-OH</b> alpha-Azido-omega-hydroxy 36(ethylene glycol) CAS-No.        73342-16-2 Formula         C <sub>72</sub> H <sub>145</sub> N <sub>3</sub> O <sub>36</sub> Mol. weight     1628,92 g/mol		PEG3780.0100	100 mg	€ 490,00
		PEG3780.1000	1 g	€ 1.190,00
<b>PEG5350</b> <b>HO-PEG-N<sub>3</sub> (3 kDa)</b> alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight     3000 Da		PEG5350.0500	500 mg	€ 295,00
		PEG5350.0001	1 g	€ 525,00
<b>PEG5360</b> <b>HO-PEG-N<sub>3</sub> (5 kDa)</b> alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight     5000 Da		PEG5360.0500	500 mg	€ 295,00
		PEG5360.0001	1 g	€ 525,00

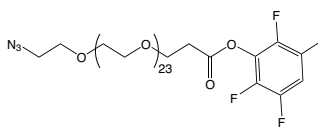
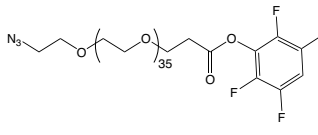
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		Product code	Packing unit	Price
<b>PEG5330 HO-PEG-N<sub>3</sub> (10 kDa)</b> alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight 10000 Da		PEG5330.0500	500 mg	€ 340,00
		PEG5330.0001	1 g	€ 565,00
<b>PEG5340 HO-PEG-N<sub>3</sub> (20 kDa)</b> alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight 20000 Da		PEG5340.0500	500 mg	€ 340,00
		PEG5340.0001	1 g	€ 565,00
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		Product code	Packing unit	Price
<b>PEG5290 N<sub>3</sub>-DOOA-Suc-OH</b> 4-(2-(2-(2-azidoethoxy)ethoxy)ethylamino)-4-oxobutanoic acid CAS-No. 1189096-56-7 Formula C <sub>10</sub> H <sub>18</sub> N <sub>4</sub> O <sub>5</sub> Mol. weight 274,27 g/mol		PEG5290.0500	500 mg	€ 150,00
		PEG5290.0001	1 g	€ 225,00
		PEG5290.0005	5 g	€ 750,00
		PEG5290.0025	25 g	€ 3.000,00
<b>PEG5170 N<sub>3</sub>-TOTA-Suc</b> 1-Azido-4,7,10-trioxa-13-tridecaneamine succinamic acid CAS-No. 1993176-74-1 Formula C <sub>14</sub> H <sub>26</sub> N <sub>4</sub> O <sub>6</sub> Mol. weight 346,38 g/mol		PEG5170.0500	500 mg	€ 150,00
		PEG5170.0001	1 g	€ 225,00
		PEG5170.0005	5 g	€ 750,00
		PEG5170.0025	25 g	€ 3.000,00
<b>PEG5400 N<sub>3</sub>-AEEEA*CHA</b> 11-Azido-3,6,9-trioxaundecanoic acid cyclohexylamine CAS-No. 172531-37-2 net Formula C <sub>6</sub> H <sub>15</sub> N <sub>3</sub> O <sub>5</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 233,22*99,17 g/mol		PEG5400.0500	500 mg	€ 130,50
		PEG5400.0001	1 g	€ 203,00
		PEG5400.0005	5 g	€ 725,00
		PEG5400.0025	25 g	€ 2.900,00

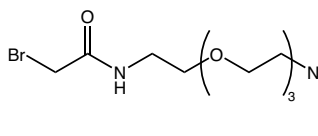
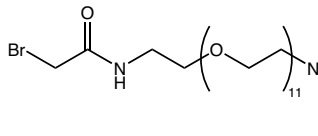
		Product code	Packing unit	Price
<b>PEG7950 N<sub>3</sub>-AEEA-OK</b> Potassium 8-azido-3,6-dioxaoctanoate CAS-No. 882518-90-3 net Formula C <sub>6</sub> H <sub>10</sub> KN <sub>3</sub> O <sub>4</sub> Mol. weight 39,10*188,16 g/mol		PEG7950.0500	500 mg	€ 108,00
		PEG7950.1000	1 g	€ 168,00
		PEG7950.5000	5 g	€ 600,00
		PEG7950.9025	25 g	€ 2.400,00
<b>PEG5390 N<sub>3</sub>-O2Oc-OtBu</b> 8-Azido-3,6-dioxaoctanoic acid t-butyl ester CAS-No. 251564-45-1 Formula C <sub>10</sub> H <sub>19</sub> N <sub>3</sub> O <sub>4</sub> Mol. weight 245,28 g/mol		PEG5390.0500	500 mg	€ 150,00
		PEG5390.0001	1 g	€ 225,00
		PEG5390.0005	5 g	€ 750,00
		PEG5390.0025	25 g	€ 3.000,00
<b>PEG2780 N<sub>3</sub>-O2Oc-OH*CHA</b> [2-(2-azidoethoxy)ethoxy]acetic acid cyclohexylamine salt CAS-No. 2098500-94-6 Formula C <sub>6</sub> H <sub>11</sub> N <sub>3</sub> O <sub>4</sub> *C <sub>6</sub> H <sub>13</sub> N Mol. weight 189,17*99,17 g/mol		PEG2780.0500	500 mg	€ 81,00
		PEG2780.0001	1 g	€ 126,00
		PEG2780.0005	5 g	€ 450,00
		PEG2780.0025	25 g	€ 1.800,00
<b>PEG2790 N<sub>3</sub>-O2Oc-O2Oc-OH</b> 8-(8-Azido-3,6-dioxaoctanoylamido)-3,6-dioxaoctanoic acid CAS-No. 1254054-60-8 Formula C <sub>12</sub> H <sub>22</sub> N <sub>4</sub> O <sub>7</sub> Mol. weight 334,33 g/mol		PEG2790.0250	250 mg	€ 75,00
		PEG2790.0500	500 mg	€ 135,00
		PEG2790.0001	1 g	€ 210,00
		PEG2790.0005	5 g	€ 750,00
<b>PEG2345 N<sub>3</sub>-PEG(4)-COOH</b> 15-Azido-4,7,10,13-tetraoxa-pentadecanoic acid CAS-No. 1257063-35-6 Formula C <sub>11</sub> H <sub>21</sub> N <sub>3</sub> O <sub>6</sub> Mol. weight 291,3 g/mol		PEG2345.0100	100 mg	€ 85,00
		PEG2345.0250	250 mg	€ 150,00
		PEG2345.0001	1 g	€ 450,00
		PEG2345.0005	5 g	€ 1.800,00
<b>PEG1400 N<sub>3</sub>-PEG(4)-NHS</b> 15-Azido-4,7,10,13-tetraoxa-pentadecanoic acid succinimidyl ester CAS-No. 944251-24-5 Formula C <sub>15</sub> H <sub>26</sub> N <sub>4</sub> O <sub>8</sub> Mol. weight 388,37 g/mol		PEG1400.0100	100 mg	€ 290,00
		PEG1400.0001	1 g	€ 670,00

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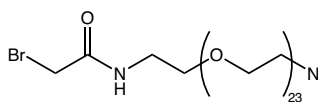
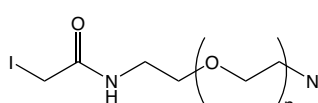
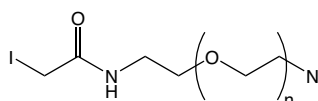
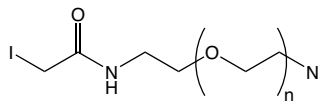
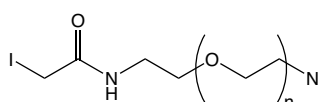
		Product code	Packing unit	Price
<b>PEG4170</b> <b>N<sub>3</sub>-PEG(8)-COOH</b> alpha-Azido-omega-(propionic acid) octa(ethylene glycol)		PEG4170.0100	100 mg	€ 350,00
		PEG4170.1000	1 g	€ 760,00
CAS-No.            1214319-92-2 Formula            C <sub>19</sub> H <sub>37</sub> N <sub>3</sub> O <sub>10</sub> Mol. weight        467,51 g/mol				
<b>PEG1405</b> <b>N<sub>3</sub>-PEG(8)-NHS</b> 1-Azido-3,6,9,12,15,18,21,24-octaoxaheptacosan-27-oic acid succinimidyl ester		PEG1405.0100	100 mg	€ 320,00
		PEG1405.0001	1 g	€ 840,00
CAS-No.            1204834-00-3 Formula            C <sub>23</sub> H <sub>40</sub> N <sub>4</sub> O <sub>12</sub> Mol. weight        564,58 g/mol				
<b>PEG2015</b> <b>N<sub>3</sub>-PEG(9)-COOH</b> O-(2-Azidoethyl)-O-[2-(diglycolyl-amino)ethyl] heptaethylene glycol		PEG2015.0001	1 g	€ 410,00
		PEG2015.0005	5 g	€ 1.300,00
CAS-No.            846549-37-9 Formula            C <sub>22</sub> H <sub>42</sub> N <sub>4</sub> O <sub>12</sub> Mol. weight        554,59 g/mol				
<b>PEG4180</b> <b>N<sub>3</sub>-PEG(12)-COOH</b> alpha-Azido-omega-(propionic acid) dodeca(ethylene glycol)		PEG4180.0100	100 mg	€ 380,00
		PEG4180.1000	1 g	€ 960,00
CAS-No.            1167575-20-3 Formula            C <sub>27</sub> H <sub>53</sub> N <sub>3</sub> O <sub>14</sub> Mol. weight        643,72 g/mol				
<b>PEG1395</b> <b>N<sub>3</sub>-PEG(12)-NHS</b> 1-Azido-3,6,9,12,15,18,21,24,27,30,33,36-dodecaoxanonatriacontan-39-oic acid succinimidyl ester		PEG1395.0100	100 mg	€ 350,00
		PEG1395.0001	1 g	€ 960,00
CAS-No.            1108750-59-9 Formula            C <sub>31</sub> H <sub>56</sub> N <sub>4</sub> O <sub>16</sub> Mol. weight        740,79 g/mol				
<b>PEG4190</b> <b>N<sub>3</sub>-dPEG™(24)-COOH</b> alpha-Azido-omega-(propionic acid) 24(ethylene glycol)		PEG4190.0100	100 mg	€ 410,00
		PEG4190.1000	1 g	€ 1.190,00
CAS-No.            1167575-20-3 Formula            C <sub>51</sub> H <sub>101</sub> N <sub>3</sub> O <sub>26</sub> Mol. weight        1172,35 g/mol				

		Product code	Packing unit	Price
<b>PEG7650 N<sub>3</sub>-dPEG™(24)-TFP</b> alpha-Azido-omega-(2,3,5,6-tetrafluorophenyl propionate) 24(ethylene glycol) Formula C <sub>57</sub> H <sub>101</sub> F <sub>4</sub> N <sub>3</sub> O <sub>26</sub> Mol. weight 1320,41 g/mol		PEG7650.0100	100 mg	€ 410,00
		PEG7650.0001	1 g	€ 1.690,00
<b>PEG7660 N<sub>3</sub>-dPEG™(36)-TFP</b> alpha-Azido-omega-(2,3,5,6-tetrafluorophenyl propionate) 36(ethylene glycol) Formula C <sub>81</sub> H <sub>149</sub> F <sub>4</sub> N <sub>3</sub> O <sub>38</sub> Mol. weight 1849,04 g/mol		PEG7660.0100	100 mg	€ 490,00
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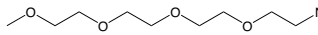
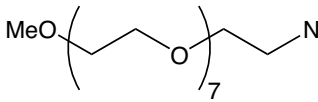
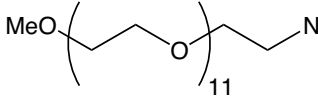
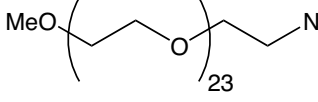
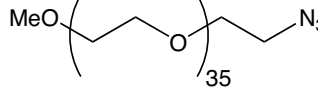
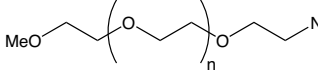
Whenever free thiol groups (e.g. from Cysteine) are used for conjugation, maleimides are typically the reaction partner of choice. However, maleimides also react with other functional groups, for example -COOH, -OH or -NH<sub>2</sub> which may lead to the formation of unwanted impurities. The iodo group reacts more specifically with thiols, resulting in much cleaner conjugates.

		Product code	Packing unit	Price
<b>PEG7190 Bromoacetamido-PEG(3)-N<sub>3</sub></b> Bromoacetamido-tri(ethylene glycol)-azide CAS-No. 940005-81-2 Formula C <sub>10</sub> H <sub>19</sub> BrN <sub>4</sub> O <sub>4</sub> Mol. weight 339,19 g/mol		PEG7190.0100	100 mg	€ 380,00
		PEG7190.0001	1 g	€ 780,00
<b>PEG7200 Bromoacetamido-PEG(11)-N<sub>3</sub></b> Bromoacetamido-undeca(ethylene glycol)-azide Formula C <sub>26</sub> H <sub>51</sub> BrN <sub>4</sub> O <sub>12</sub> Mol. weight 691,61 g/mol		PEG7200.0100	100 mg	€ 490,00
		PEG7200.0001	1 g	€ 1.660,00

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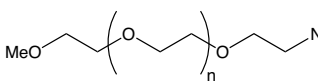
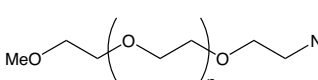
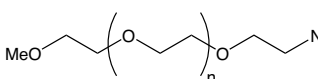
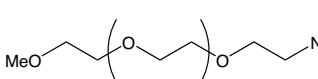
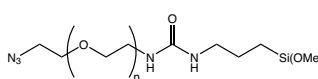
		Product code	Packing unit	Price
<b>PEG7210</b> <b>Bromoacetamido-PEG(23)-N<sub>3</sub></b> Bromoacetamido-23(ethylene glycol)-azide Formula        C <sub>50</sub> H <sub>99</sub> BrN <sub>4</sub> O <sub>24</sub> Mol. weight    1220,24 g/mol		PEG7210.0100	100 mg	€ 550,00
		PEG7210.0001	1 g	€ 1.720,00
<b>PEG3130</b> <b>I-PEG-N<sub>3</sub> (10 kDa)</b> alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 10000 Dalton) Mol. weight    10000 Da		PEG3130.0100	100 mg	€ 270,00
		PEG3130.0500	500 mg	€ 730,00
<b>PEG3140</b> <b>I-PEG-N<sub>3</sub> (20 kDa)</b> alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 20000 Dalton) Mol. weight    20000 Da		PEG3140.0100	100 mg	€ 270,00
		PEG3140.0500	500 mg	€ 730,00
<b>PEG3150</b> <b>I-PEG-N<sub>3</sub> (3 kDa)</b> alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight    3000 Da		PEG3150.0100	100 mg	€ 250,00
		PEG3150.0500	500 mg	€ 700,00
<b>PEG3160</b> <b>I-PEG-N<sub>3</sub> (5 kDa)</b> alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 5000 Dalton) Mol. weight    5000 Da		PEG3160.0100	100 mg	€ 250,00
		PEG3160.0500	500 mg	€ 700,00

→ *Quantitative reactivity profiling predicts functional cysteines in proteomes*; E. Weerapana, C. Wang, G. M. Simon, F. Richter, S. Khare, M. B. Dillon, D. A. Bachovchin, K. Mowen, D. Baker and B. F. Cravatt; **Nature** 2010; **468**: 790-5.  
<https://doi.org/10.1038/nature09472>

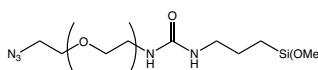
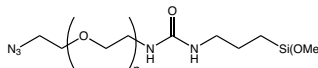
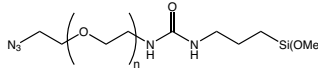
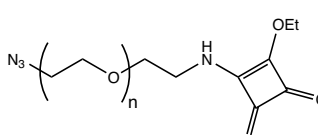
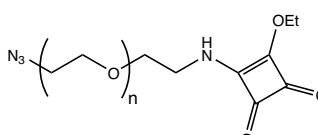
			Product code	Packing unit	Price
<b>PEG1690</b> <b>MeO-dPEG(4)-N<sub>3</sub></b> 13-Azido-2,5,8,11-tetraoxa-tridecane CAS-No.        606130-90-9 Formula        C <sub>9</sub> H <sub>19</sub> N <sub>3</sub> O <sub>4</sub> Mol. weight    233,26 g/mol		PEG1690.0100	100 mg	€ 230,00	
		PEG1690.0001	1 g	€ 640,00	
<b>PEG1705</b> <b>MeO-PEG(8)-N<sub>3</sub></b> 2,5,8,11,14,17,20,23-Octaoxapentacosan-25-amine Formula        C <sub>17</sub> H <sub>35</sub> N <sub>3</sub> O <sub>8</sub> Mol. weight    409,48 g/mol		PEG1705.0100	100 mg	€ 290,00	
		PEG1705.0001	1 g	€ 730,00	
<b>PEG1660</b> <b>MeO-PEG(12)-N<sub>3</sub></b> 37-Azido-2,5,8,11,14,17,20,23,26,29,32,35-dodecaoxaheptatriacontane CAS-No.        89485-61-0 Formula        C <sub>25</sub> H <sub>51</sub> N <sub>3</sub> O <sub>12</sub> Mol. weight    585,69 g/mol		PEG1660.0100	100 mg	€ 350,00	
		PEG1660.0001	1 g	€ 840,00	
<b>PEG1710</b> <b>MeO-PEG(24)-N<sub>3</sub></b> alpha-Methoxy-omega-azido-24(ethylene glycol) CAS-No.        89485-61-0 Formula        C <sub>49</sub> H <sub>99</sub> N <sub>3</sub> O <sub>24</sub> Mol. weight    1114,34 g/mol		PEG1710.0100	100 mg	€ 410,00	
		PEG1710.0001	1 g	€ 1.020,00	
<b>PEG3430</b> <b>MeO-dPEG™(36)-N<sub>3</sub></b> alpha-Methoxy-omega-azido-36(ethylene glycol) CAS-No.        89485-61-0 Formula        C <sub>73</sub> H <sub>147</sub> N <sub>3</sub> O <sub>36</sub> Mol. weight    1642,95 g/mol		PEG3430.0100	100 mg	€ 430,00	
		PEG3430.1000	1 g	€ 1.190,00	
<b>PEG1219</b> <b>MeO-PEG-N<sub>3</sub> (750 Da)</b> alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight    750 Da		PEG1219.0500	500 mg	€ 250,00	
		PEG1219.0001	1 g	€ 440,00	

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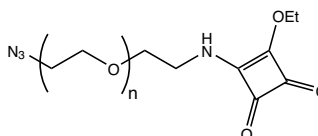
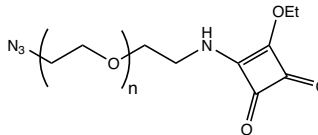
# Everything for Click Chemistry

		Product code	Packing unit	Price
<b>PEG1225 MeO-PEG-N<sub>3</sub> (2 kDa)</b> alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 2000 Da		PEG1225.0500	500 mg	€ 130,00
		PEG1225.0001	1 g	€ 220,00
<b>PEG2040 MeO-PEG-N<sub>3</sub> (5 kDa)</b> alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 5000 Da		PEG2040.0500	500 mg	€ 130,00
		PEG2040.0001	1 g	€ 220,00
<b>PEG2045 MeO-PEG-N<sub>3</sub> (10 kDa)</b> alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 10000 Da		PEG2045.0500	500 mg	€ 160,00
		PEG2045.0001	1 g	€ 250,00
<b>PEG2050 MeO-PEG-N<sub>3</sub> (20 kDa)</b> alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 20000 Da		PEG2050.0500	500 mg	€ 160,00
		PEG2050.0001	1 g	€ 250,00
		Product code	Packing unit	Price
<b>PEG4830 Azido-PEG-Si(OMe)<sub>3</sub> (3 kDa)</b> alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 3.000 Dalton) Mol. weight 3000 Da		PEG4830.0500	500 mg	€ 560,00
		PEG4830.1000	1 g	€ 1.000,00

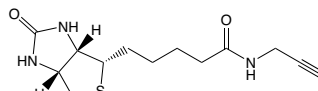
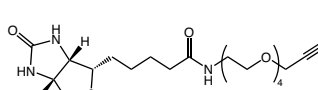
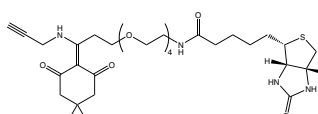


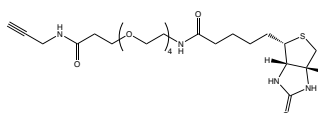
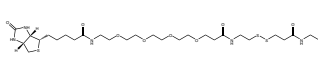
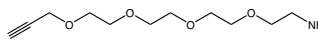
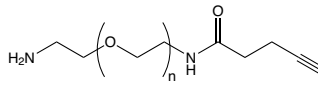
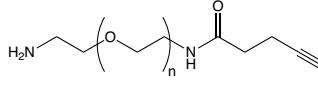
	Product code	Packing unit	Price
<b>PEG4835 Azido-PEG-Si(OMe)<sub>3</sub> (5 kDa)</b> alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 5.000 Dalton) Mol. weight 5000 Da 	PEG4835.0500	500 mg	€ 560,00
	PEG4835.1000	1 g	€ 1.000,00
<b>PEG4840 Azido-PEG-Si(OMe)<sub>3</sub> (10 kDa)</b> alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 10.000 Dalton) Mol. weight 10000 Da 	PEG4840.0500	500 mg	€ 560,00
	PEG4840.1000	1 g	€ 1.000,00
<b>PEG4845 Azido-PEG-Si(OMe)<sub>3</sub> (20 kDa)</b> alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 20.000 Dalton) Mol. weight 20000 Da 	PEG4845.0500	500 mg	€ 560,00
	PEG4845.1000	1 g	€ 1.000,00
<b>PEG6655 N<sub>3</sub>-PEG-SQA (3 kDa)</b> alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight 3000 Da 	PEG6655.0500	500 mg	€ 555,00
	PEG6655.0001	1 g	€ 995,00
<b>PEG6660 N<sub>3</sub>-PEG-SQA (5 kDa)</b> alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 5000 Dalton) Mol. weight 5000 Da 	PEG6660.0500	500 mg	€ 555,00
	PEG6660.0001	1 g	€ 995,00

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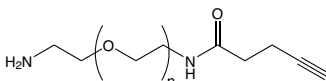
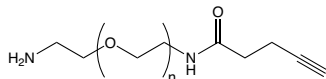
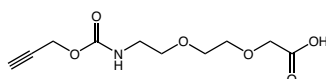
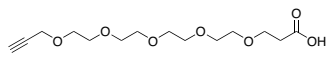
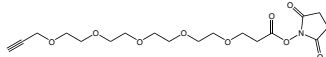
		Product code	Packing unit	Price
<b>PEG6645 N<sub>3</sub>-PEG-SQA (10 kDa)</b> alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 10000 Dalton) Mol. weight 10000 Da		PEG6645.0500	500 mg	€ 595,00
		PEG6645.0001	1 g	€ 1.095,00
<b>PEG6650 N<sub>3</sub>-PEG-SQA (20 kDa)</b> alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 20000 Dalton) Mol. weight 20000 Da		PEG6650.0500	500 mg	€ 595,00
		PEG6650.0001	1 g	€ 1.095,00

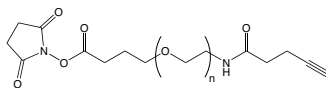
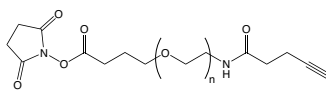
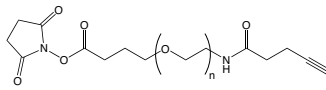
## 4.4. Alkyne-PEG Derivatives for Click Chemistry

		Product code	Packing unit	Price
<b>RL-3490 Biotin-Propargylamide</b> Biotinyl-N-propargylamide CAS-No. 773888-45-2 Formula C <sub>13</sub> H <sub>19</sub> N <sub>3</sub> O <sub>2</sub> S Mol. weight 281,37 g/mol		RL-3490.0250	250 mg	€ 100,00
		RL-3490.0500	500 mg	€ 180,00
		RL-3490.1000	1 g	€ 280,00
		RL-3490.5000	5 g	€ 1.000,00
<b>PEG4950 Biotin-PEG(4)-alkyne</b> 15-[D(+)-Biotinylamino]-4,7,10,13-tetraoxapentadec-1-yne CAS-No. 1262681-31-1 Formula C <sub>21</sub> H <sub>35</sub> N <sub>3</sub> O <sub>6</sub> S Mol. weight 457,58 g/mol		PEG4950.0100	100 mg	€ 175,00
		PEG4950.0250	250 mg	€ 350,00
		PEG4950.0001	1 g	€ 1.150,00
<b>PEG7980 Biotin-PEG(4)-Dde-Alkyne</b> N-(15-(4,4-dimethyl-2,6-dioxocyclohexylidene)-3,6,9,12-tetraoxa-16-azanonadec-18-ynyl)-5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamide CAS-No. 1802908-00-4 Formula C <sub>32</sub> H <sub>50</sub> N <sub>4</sub> O <sub>8</sub> S Mol. weight 650,83 g/mol		PEG7980.0010	10 mg	€ 250,00
		PEG7980.0025	25 mg	€ 415,00
		PEG7980.0100	100 mg	€ 1.250,00

		Product code	Packing unit	Price
<b>PEG8010 Biotin-PEG(4)-Alkyne</b> (3aS,4S,6aR)-4-(5,21-dioxo-8,11,14,17-tetraoxa-4,20-diazapentacos-1-yn-25-yl)tetrahydro-1H-thieno[3,4-d]imidazol-2(3H)-one CAS-No. 1006592-45-5 Formula C <sub>28</sub> H <sub>46</sub> N <sub>4</sub> O <sub>7</sub> S Mol. weight 528,66 g/mol		PEG8010.0005	5 mg	€ 145,00
		PEG8010.0025	25 mg	€ 415,00
		PEG8010.0100	100 mg	€ 1.250,00
<b>PEG8110 Biotin-PEG(4)-SS-Alkyne</b> N-(2-((3-oxo-3-(prop-2-ynylamino)propyl)disulfanyl)ethyl)-1-(5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl)pentanamido)-3,6,9,12-tetraoxapentadecan-15-amide CAS-No. 1260247-54-8 Formula C <sub>29</sub> H <sub>49</sub> N <sub>5</sub> O <sub>8</sub> S <sub>3</sub> Mol. weight 691,92 g/mol		PEG8110.0025	25 mg	€ 225,00
		PEG8110.0100	100 mg	€ 650,00
		PEG8110.0500	500 mg	€ 2.600,00
		Product code	Packing unit	Price
<b>PEG5430 Alkyne-PEG(4)-NH<sub>2</sub></b> Alkyne-PEG(4)-amine CAS-No. 1013921-36-2 Formula C <sub>11</sub> H <sub>21</sub> NO <sub>4</sub> Mol. weight 231,29 g/mol		PEG5430.0100	100 mg	€ 290,00
		PEG5430.1000	1 g	€ 880,00
<b>PEG2960 H<sub>2</sub>N-PEG-alkyne (3 kDa)</b> alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight 3000 Da		PEG2960.0500	500 mg	€ 410,00
		PEG2960.0001	1 g	€ 670,00
<b>PEG2980 H<sub>2</sub>N-PEG-alkyne (5 kDa)</b> alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight 5000 Da		PEG2980.0500	500 mg	€ 410,00
		PEG2980.0001	1 g	€ 670,00

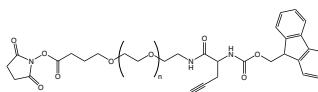
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		Product code	Packing unit	Price
<b>PEG2950</b> <b>H<sub>2</sub>N-PEG-alkyne (10 kDa)</b> alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight    10000 Da		PEG2950.0500	500 mg	€ 440,00
		PEG2950.0001	1 g	€ 730,00
<b>PEG2970</b> <b>H<sub>2</sub>N-PEG-alkyne (20 kDa)</b> alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight    20000 Da		PEG2970.0500	500 mg	€ 440,00
		PEG2970.0001	1 g	€ 730,00
		Product code	Packing unit	Price
<b>PAA1050</b> <b>Popc-O2Oc-OH*DCHA</b> 8-(Propargyloxy carbonyl-amino)-3,6-dioxaoctanoic acid dicyclohexylamine Formula            C <sub>10</sub> H <sub>15</sub> NO <sub>6</sub> *C <sub>12</sub> H <sub>23</sub> N Mol. weight        245,23*181,32 g/mol		PAA1050.0500	500 mg	€ 108,00
		PAA1050.0001	1 g	€ 168,00
		PAA1050.0005	5 g	€ 600,00
		PAA1050.0025	25 g	€ 2.400,00
<b>PEG8170</b> <b>Propargyl-PEG(5)-COOH</b> 4,7,10,13,16-pentaoxanonadec-18-ynoic acid CAS-No.            1245823-51-1 Formula            C <sub>14</sub> H <sub>24</sub> O <sub>7</sub> Mol. weight        304,34 g/mol		PEG8170.0250	250 mg	€ 150,00
		PEG8170.1000	1 g	€ 450,00
		PEG8170.5000	5 g	€ 1.800,00
<b>PEG5410</b> <b>Alkyne-PEG(4)-NHS</b> Alkyne-PEG(4)-succinimidyl ester CAS-No.            1393330-40-9 Formula            C <sub>18</sub> H <sub>27</sub> NO <sub>9</sub> Mol. weight        401,41 g/mol		PEG5410.0025	25 mg	€ 170,00
		PEG5410.0100	100 mg	€ 290,00
		PEG5410.1000	1 g	€ 880,00

		Product code	Packing unit	Price
<b>PEG2860 NHS-PEG-alkyne (3 kDa)</b> alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 3000 Da		PEG2860.0500	500 mg	€ 410,00
		PEG2860.0001	1 g	€ 670,00
<b>PEG2880 NHS-PEG-alkyne (5 kDa)</b> alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 5000 Da		PEG2880.0500	500 mg	€ 410,00
		PEG2880.0001	1 g	€ 670,00
<b>PEG2850 NHS-PEG-alkyne (10 kDa)</b> alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 10000 Da		PEG2850.0500	500 mg	€ 440,00
		PEG2850.0001	1 g	€ 730,00
<b>PEG2870 NHS-PEG-alkyne (20 kDa)</b> alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 20000 Da		PEG2870.0500	500 mg	€ 440,00
		PEG2870.0001	1 g	€ 730,00
<b>PEG2910 NHS-PEG(NH-Boc)-alkyne (3 kDa)</b> alpha-Succinimidyl ester-omega-(N-t-Butyloxy-carbonyl-L-propargyl-glycyl) poly(ethylene glycol) Mol. weight 3000 Da		PEG2910.0500	500 mg	€ 550,00
		PEG2910.0001	1 g	€ 970,00

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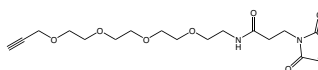
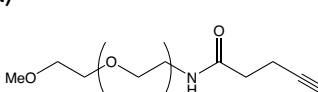
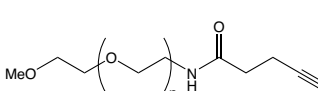
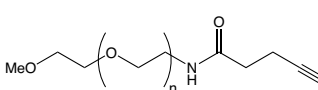
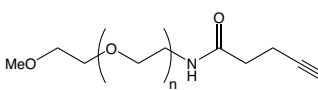
		Product code	Packing unit	Price
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		PEG2930.0001	1 g	€ 970,00
Mol. weight	5000 Da			
<b>PEG2900 NHS-PEG(NH-Boc)-alkyne (10 kDa)</b> alpha-Succinimidyl ester-omega-(N-t-Butyloxy-carbonyl-L-propargyl-glyciny) poly(ethylene glycol)		PEG2900.0500	500 mg	€ 610,00
		PEG2900.0001	1 g	€ 1.040,00
Mol. weight	10000 Da			
<b>PEG2920 NHS-PEG(NH-Boc)-alkyne (20 kDa)</b> alpha-Succinimidyl ester-omega-(N-t-Butyloxy-carbonyl-L-propargyl-glyciny) poly(ethylene glycol)		PEG2920.0500	500 mg	€ 610,00
		PEG2920.0001	1 g	€ 1.040,00
Mol. weight	20000 Da			
<b>PEG2915 NHS-PEG(NH-Fmoc)-alkyne (3 kDa)</b> alpha-Succinimidyl ester-omega-(N-(9-Fluorenylmethyloxycarbonyl)-L-propargyl-glyciny) poly(ethylene glycol)		PEG2915.0500	0,5 g	€ 550,00
		PEG2915.0001	1 g	€ 970,00
Mol. weight	3000 Da			
<b>PEG2935 NHS-PEG(NH-Fmoc)-alkyne (5 kDa)</b> alpha-Succinimidyl ester-omega-(N-(9-Fluorenylmethyloxycarbonyl)-L-propargyl-glyciny) poly(ethylene glycol)		PEG2935.0500	0,5 g	€ 550,00
		PEG2935.0001	1 g	€ 970,00
Mol. weight	5000 Da			
<b>PEG2905 NHS-PEG(NH-Fmoc)-alkyne (10 kDa)</b> alpha-Succinimidyl ester-omega-(N-(9-Fluorenylmethyloxycarbonyl)-L-propargyl-glyciny) poly(ethylene glycol)		PEG2905.0500	0,5 g	€ 610,00
		PEG2905.0001	1 g	€ 1.040,00
Mol. weight	10000 Da			

	Product code	Packing unit	Price
<b>PEG2925 NHS-PEG(NH-Fmoc)-alkyne (20 kDa)</b> alpha-Succinimidyl ester-omega-(N-(9-Fluorenylmethyloxycarbonyl)-L-propargyl-glycyl) poly(ethylene glycol) Mol. weight 20000 Da 	PEG2925.0500	0,5 g	€ 610,00
	PEG2925.0001	1 g	€ 1.040,00

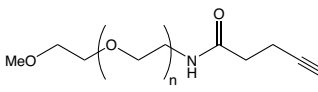
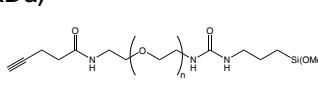
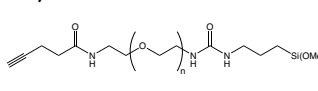
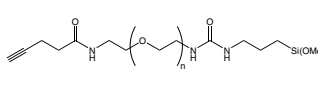
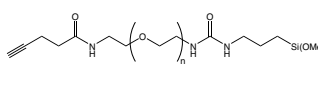
Maleimides are frequently used for conjugation to free thiol groups (e.g. from Cysteine). However, maleimides also react with other functional groups such as OH or NH<sub>2</sub>, potentially leading to the formation of impurities. The iodo group reacts more specifically with thiols, resulting in much cleaner conjugates.

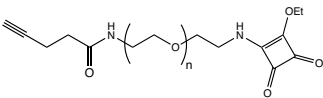
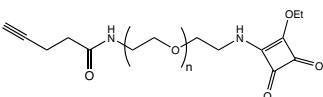
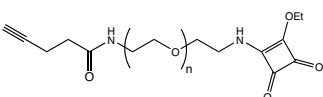
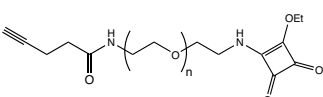
	Product code	Packing unit	Price
<b>PEG3110 I-PEG-alkyne (3 kDa)</b> alpha-Iodo-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight 3000 Da 	PEG3110.0100	100 mg	€ 250,00
	PEG3110.0500	500 mg	€ 700,00
<b>PEG3120 I-PEG-alkyne (5 kDa)</b> alpha-Iodo-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 5000 Dalton) Mol. weight 5000 Da 	PEG3120.0100	100 mg	€ 250,00
	PEG3120.0500	500 mg	€ 700,00
<b>PEG3090 I-PEG-alkyne (10 kDa)</b> alpha-Iodo-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 10000 Dalton) Mol. weight 10000 Da 	PEG3090.0100	100 mg	€ 270,00
	PEG3090.0500	500 mg	€ 730,00
<b>PEG3100 I-PEG-alkyne (20 kDa)</b> alpha-Iodo-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 20000 Dalton) Mol. weight 20000 Da 	PEG3100.0100	100 mg	€ 270,00
	PEG3100.0500	500 mg	€ 730,00

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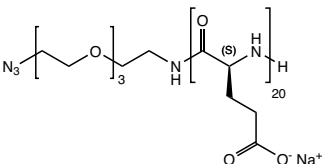
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<b>PEG5440</b>	<b>Alkyne-PEG(4)-mal</b>			
Alkyne-PEG(4)-maleimide				
CAS-No.	1609651-90-2	PEG5440.0025	25 mg	€ 170,00
Formula	C <sub>18</sub> H <sub>26</sub> N <sub>2</sub> O <sub>7</sub>	PEG5440.0100	100 mg	€ 290,00
Mol. weight	382,41 g/mol	PEG5440.1000	1 g	€ 880,00
				
		Product code	Packing unit	Price
<b>PEG2840</b>	<b>MeO-PEG-alkyne (750 Da)</b>			
alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 750 Dalton)				
CAS-No.	1993176-75-2	PEG2840.0500	500 mg	€ 250,00
Mol. weight	750 Da	PEG2840.0001	1 g	€ 440,00
				
		Product code	Packing unit	Price
<b>PEG2810</b>	<b>MeO-PEG-alkyne (2 kDa)</b>			
alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 2000 Dalton)				
Mol. weight	2000 Da	PEG2810.0500	500 mg	€ 130,00
		PEG2810.0001	1 g	€ 220,00
				
		Product code	Packing unit	Price
<b>PEG2830</b>	<b>MeO-PEG-alkyne (5 kDa)</b>			
alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 5000 Dalton)				
Mol. weight	5000 Da	PEG2830.0500	500 mg	€ 130,00
		PEG2830.0001	1 g	€ 220,00
				
		Product code	Packing unit	Price
<b>PEG2800</b>	<b>MeO-PEG-alkyne (10 kDa)</b>			
alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 10000 Dalton)				
Mol. weight	10000 Da	PEG2800.0500	500 mg	€ 160,00
		PEG2800.0001	1 g	€ 250,00
				

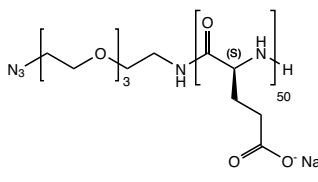
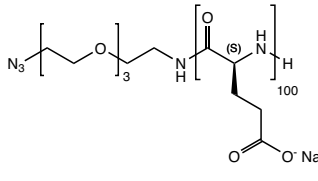
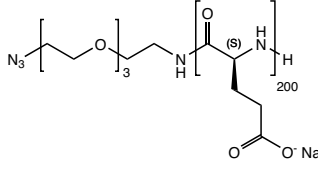
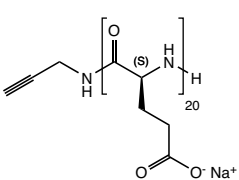
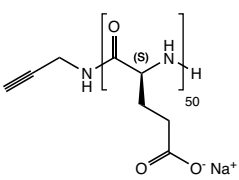


		Product code	Packing unit	Price
<b>PEG2820 MeO-PEG-alkyne (20 kDa)</b> alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 20000 Dalton) Mol. weight 20000 Da		PEG2820.0500	500 mg	€ 160,00
		PEG2820.0001	1 g	€ 250,00
<hr/>				
		Product code	Packing unit	Price
<b>PEG4810 Alkyne-PEG-Si(OMe)<sub>3</sub> (3 kDa)</b> alpha-Propargylacetamido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 3.000 Dalton) Mol. weight 3000 Da		PEG4810.0500	500 mg	€ 560,00
		PEG4810.1000	1 g	€ 1.000,00
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<b>PEG4815 Alkyne-PEG-Si(OMe)<sub>3</sub> (5 kDa)</b> alpha-Propargylacetamido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 5.000 Dalton) Mol. weight 5000 Da		PEG4815.0500	500 mg	€ 560,00
		PEG4815.1000	1 g	€ 1.000,00
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<b>PEG4820 Alkyne-PEG-Si(OMe)<sub>3</sub> (10 kDa)</b> alpha-Propargylacetamido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 10.000 Dalton) Mol. weight 10000 Da		PEG4820.0500	500 mg	€ 560,00
		PEG4820.1000	1 g	€ 1.000,00
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<b>PEG4825 Alkyne-PEG-Si(OMe)<sub>3</sub> (20 kDa)</b> alpha-Propargylacetamido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 20.000 Dalton) Mol. weight 20000 Da		PEG4825.0500	500 mg	€ 560,00
		PEG4825.1000	1 g	€ 1.000,00

		Product code	Packing unit	Price
<b>PEG6570 Alkynyl-PEG-SQA (3 kDa)</b> alpha-Pentynyl-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight 3000 Da		PEG6570.0500	500 mg	€ 555,00
		PEG6570.0001	1 g	€ 995,00
<b>PEG6575 Alkynyl-PEG-SQA (5 kDa)</b> alpha-Pentynyl-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 5000 Dalton) Mol. weight 5000 Da		PEG6575.0500	500 mg	€ 555,00
		PEG6575.0001	1 g	€ 995,00
<b>PEG6560 Alkynyl-PEG-SQA (10 kDa)</b> alpha-Pentynyl-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 10000 Dalton) Mol. weight 10000 Da		PEG6560.0500	500 mg	€ 595,00
		PEG6560.0001	1 g	€ 1.095,00
<b>PEG6565 Alkynyl-PEG-SQA (20 kDa)</b> alpha-Pentynyl-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 20000 Dalton) Mol. weight 20000 Da		PEG6565.0500	500 mg	€ 595,00
		PEG6565.0001	1 g	€ 1.095,00

## 4.5. Poly(Amino Acids) for Click Chemistry

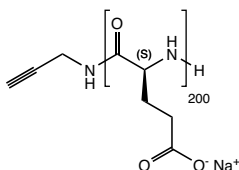
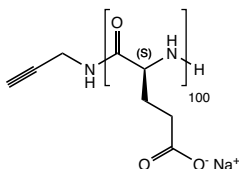
		Product code	Packing unit	Price
<b>PGA1125 N<sub>3</sub>-PGA(20)</b> Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 3000Da) Mol. weight 3000 Da		PGA1125.0000		please inquire

		Product code	Packing unit	Price
<b>PGA1130 N<sub>3</sub>-PGA(50)</b> Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 7500Da) Mol. weight 7500 Da		PGA1130.0000		please inquire
<b>PGA1135 N<sub>3</sub>-PGA(100)</b> Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 15000Da) Mol. weight 15000 Da		PGA1135.0000		please inquire
<b>PGA1140 N<sub>3</sub>-PGA(200)</b> Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 30000Da) Mol. weight 30000 Da		PGA1140.0000		please inquire
		Product code	Packing unit	Price
<b>PGA1085 Prg-PGA(20)</b> Propargyl-poly(L-glutamic acid) sodium salt (MW 3000Da) Mol. weight 3000 Da		PGA1085.0000		please inquire
<b>PGA1090 Prg-PGA(50)</b> Propargyl-poly(L-glutamic acid) sodium salt (MW 7500Da) Mol. weight 7500 Da		PGA1090.0000		please inquire

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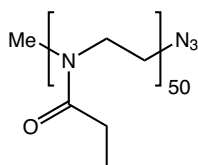
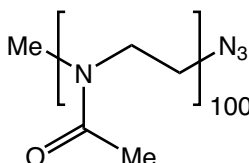
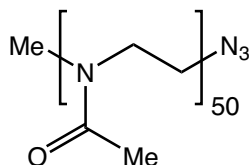
# Everything for Click Chemistry

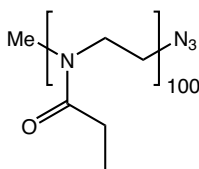
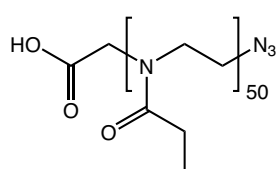
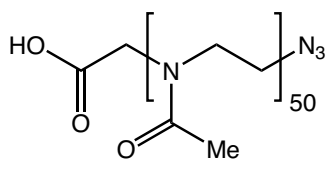
		Product code	Packing unit	Price
<b>PGA1095</b>	<b>Prg-PGA(100)</b>	PGA1095.0000		please inquire
Propargyl-poly(L-glutamic acid) sodium salt (MW 15000Da)				
Mol. weight	15000 Da			
<b>PGA1100</b>	<b>Prg-PGA(200)</b>	PGA1100.0000		please inquire
Propargyl-poly(L-glutamic acid) sodium salt (MW 30200Da)				
Mol. weight	30200 Da			



## 4.6. Poly(2-Oxazolines) for Click Chemistry

		Product code	Packing unit	Price
<b>POX1200</b>	<b>Me-PMeOx(50)-N<sub>3</sub></b>	POX1200.0250 POX1200.0001 POX1200.0005	250 mg 1 g 5 g	€ 275,00 € 750,00 € 3.000,00
alpha-Methyl-poly(2-methyl-2-oxazoline)-omega-azide (n=50)				
CAS-No.	26375-28-0			
Formula	CH <sub>3</sub> (C <sub>4</sub> H <sub>7</sub> NO) <sub>50</sub> N <sub>3</sub>			
Mol. weight	4300 Da			
<b>POX1210</b>	<b>Me-PMeOx(100)-N<sub>3</sub></b>	POX1210.0250 POX1210.0001 POX1210.0005	250 mg 1 g 5 g	€ 275,00 € 750,00 € 3.000,00
alpha-Methyl-poly(2-methyl-2-oxazoline)-omega-azide (n=100)				
CAS-No.	26375-28-0			
Formula	CH <sub>3</sub> (C <sub>4</sub> H <sub>7</sub> NO) <sub>100</sub> N <sub>3</sub>			
Mol. weight	8500 Da			
<b>POX2200</b>	<b>Me-PEtOx(50)-N<sub>3</sub></b>	POX2200.0250 POX2200.0001 POX2200.0005	250 mg 1 g 5 g	€ 250,00 € 650,00 € 2.750,00
alpha-Methyl-poly(2-ethyl-2-oxazoline)-omega-azide (n=50)				
CAS-No.	25805-17-8			
Formula	CH <sub>3</sub> (C <sub>5</sub> H <sub>9</sub> NO) <sub>50</sub> N <sub>3</sub>			
Mol. weight	5000 Da			



		Product code	Packing unit	Price
<b>POX2210 Me-PEtOx(100)-N<sub>3</sub></b> alpha-Methyl-poly(2-ethyl-2-oxazoline)-omega-azide (n=100) CAS-No. 25805-17-8 Formula CH <sub>3</sub> (C <sub>5</sub> H <sub>9</sub> NO) <sub>100</sub> N <sub>3</sub> Mol. weight 5000 Da		POX2210.0250	250 mg	€ 250,00
		POX2210.0001	1 g	€ 650,00
		POX2210.0005	5 g	€ 2.750,00
<b>POX2250 HOOC-PEtOx(50)-N<sub>3</sub></b> alpha-Carboxymethyl-poly(2-ethyl-2-oxazoline)-omega-azide (n=50) CAS-No. 25805-17-8 Formula HOCOCH <sub>2</sub> (C <sub>5</sub> H <sub>9</sub> NO) <sub>50</sub> N <sub>3</sub> Mol. weight 5000 Da		POX2250.0000		please inquire
<b>POX1250 HOOC-PMeOx(50)-N<sub>3</sub></b> alpha-Carboxymethyl-poly(2-methyl-2-oxazoline)-omega-azide (n=50) CAS-No. 26375-28-0 Formula HOCOCH <sub>2</sub> (C <sub>4</sub> H <sub>7</sub> NO) <sub>50</sub> N <sub>3</sub> Mol. weight 4300 Da		POX1250.0000		please inquire



**We also offer custom-made Poly(Amino Acids) and Poly(2-Oxazolines)!**

**Contact our Custom Synthesis Service:**



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## 5. Click Chemistry Tools for Proteomics

### 5.1. Indocyanine Green Dyes for Click Chemistry

Indocyanine Green (ICG) dye, a material approved by the FDA for various applications, is a powerful tool for imaging in live cells and tissues.

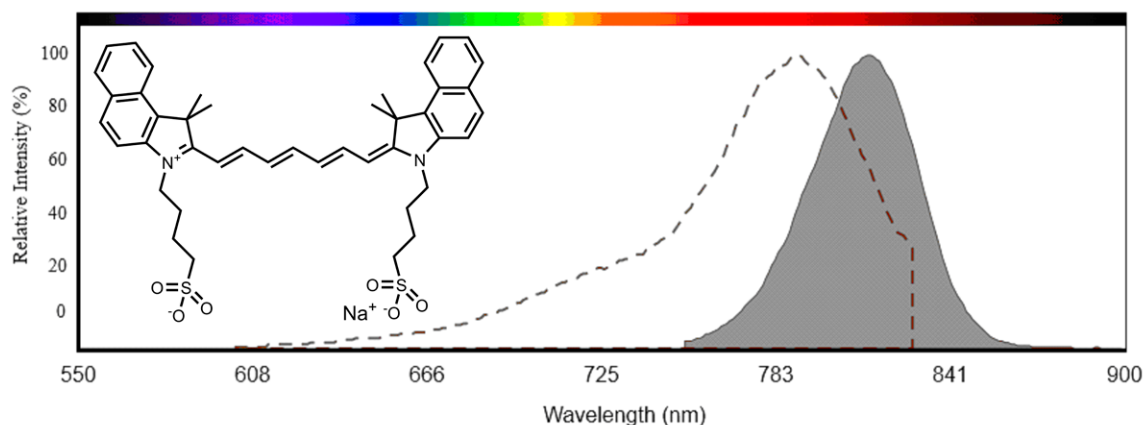


Fig. 17: Absorption and emission spectra of Indocyanine Green.

ICG exhibits an absorption maximum in the near infrared region (NIR) at ca. 800 nm with a slight absorption in the visible range, resulting in a low auto-fluorescence. The emission maximum is at 810 nm. This absorption/emission profile allows for tissue-penetrating excitation without causing tissue damage. Consequently, ICG has found use in fields as diverse as angiography, detection of solid tumours and fluorescence image-guided surgery.

Iris Biotech offers a series of ICG dyes functionalized with various clickable moieties, such as tetrazine, alkyne, azide or DBCO. Moreover, we offer ICG equipped with different popular functional groups for conjugation, e.g. maleimide, 2-Cyanobenzothiazole (CBT), and NHS.

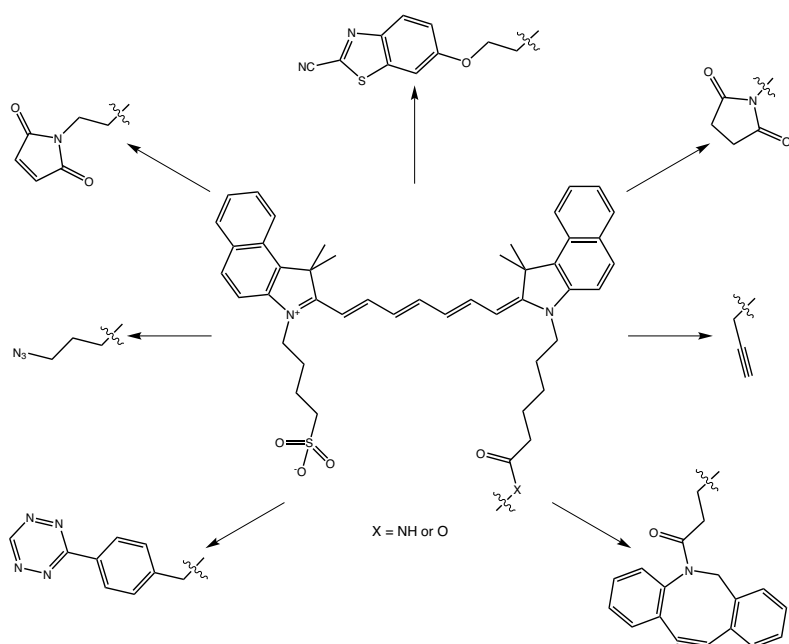
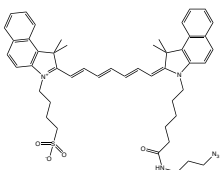
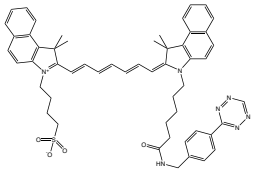
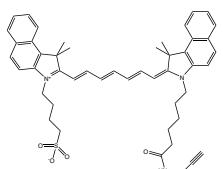
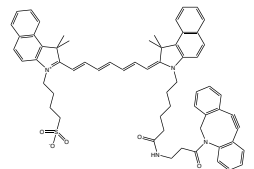


Fig. 18: Functional groups available for conjugation of Indocyanine Green.

## ICG

		Product code	Packing unit	Price
<b>RL-2840</b> <b>ICG-azide</b> Indocyanine green azide Formula $C_{48}H_{56}N_6O_4S$ Mol. weight     813,06 g/mol		RL-2840.0005	5 mg	€ 200,00
		RL-2840.0025	25 mg	€ 800,00
<b>RL-2860</b> <b>ICG-Tz</b> Indocyanine green tetrazine Formula $C_{54}H_{57}N_7O_4S$ Mol. weight     900,14 g/mol		RL-2860.0025	25 mg	€ 1.200,00
<b>RL-2880</b> <b>ICG-alkyne</b> Indocyanine green alkyne CAS-No.        1622335-41-4 Formula $C_{48}H_{53}N_3O_4S$ Mol. weight     768,02 g/mol		RL-2880.0005	5 mg	€ 200,00
		RL-2880.0025	25 mg	€ 800,00
<b>RL-2870</b> <b>ICG-DBCO</b> Indocyanine green dibenzoazacyclooctyne Formula $C_{63}H_{64}N_4O_5S$ Mol. weight     989,27 g/mol		RL-2870.0005	5 mg	€ 300,00
		RL-2870.0025	25 mg	€ 1.200,00

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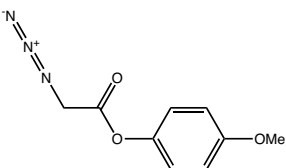
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## 5.2. Clickable Linkers for Selective Protein Labeling

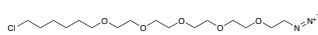
One way to selectively label a protein is to recombinantly express a modified version containing a sequence that selectively reacts with a specific linker type. Two examples of this approach are the His-Tag Acylation and the HaloTag®.

In the His-Tag Acylation approach, a N-terminal GlyHis6 tag attached to a protein of interest selectively reacts with a 4-methoxyphenyl ester, generating an acylated N-terminus. While 4-methoxyphenyl esters are too unreactive to undergo acylation with any other primary amine, a proximal imidazole in the GlyHis6 sequence acts as a catalyst to facilitate selective acylation of the N-terminal glycine.

		Product code	Packing unit	Price
<b>RL-3010</b>	<b>N<sub>3</sub>Ac-OPhOMe</b>			
4-Methoxyphenyl 2-azidoacetate		RL-3010.0250	250 mg	€ 225,00
CAS-No.	2546513-31-7	RL-3010.1000	1 g	€ 625,00
Formula	C <sub>9</sub> H <sub>9</sub> N <sub>3</sub> O <sub>3</sub>	RL-3010.5000	5 g	€ 2.500,00
Mol. weight	207,19 g/mol			

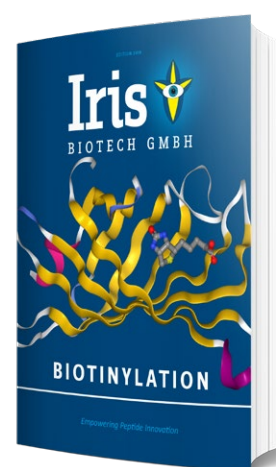
The HaloTag® is a protein tag whose sequence can easily be fused to a gene coding for a protein of interest. Functionally, it is a haloalkane dehalogenase that binds and forms covalent bonds to specific halogenated ligands. Those ligands are composed of two parts: a chloroalkane linker that forms the bond with HaloTag® protein, and a functional group or affinity handle. A HaloTag®-containing fusion protein is thus able to selectively label itself with an appropriate haloalkane dehalogenase ligand.



	Product code	Packing unit	Price
<b>RL-3640</b> <b>Halo-PEG(5)-azide</b> 1-azido-21-chloro-3,6,9,12,15-pentaoxahenicosane  CAS-No.        1261238-21-4 Formula         C <sub>16</sub> H <sub>32</sub> ClN <sub>3</sub> O <sub>5</sub> Mol. weight     381,90 g/mol	RL-3640.0000		please inquire



For clickable biotinylation reagents,  
 please refer to our booklet "Biotinylation".



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## 6. Carbohydrates for Click Chemistry

Glycoconjugates, i.e. glycans linked to proteins or lipids, are an essential part of all living organisms. In higher organisms, but also in lower eukaryotes and some bacteria and archaea, many proteins are posttranslationally modified by linking oligosaccharides to amino acid side chains, forming glycoproteins. Glycosylation is the most complex posttranslational modification and can be observed on membrane proteins, secreted proteins and peptides, or proteins in the cytosol and nucleus.

Glycoconjugates display a multitude of biological effects from protein folding and stabilization, to cell surface interaction through molecular recognition motifs for cell-cell communication, and structural support and protection.

Abnormal glycosylation patterns can be observed in pathological conditions such as neurodegenerative diseases or tumor growth and metastasis. Moreover, glycosylation patterns play a decisive role in the infection pathways of and the immune response against many pathogens, further underlining the importance of this type of modification.

Synthetic glycoconjugates are interesting targets for the investigation of immunogenicity, infection pathways or structure activity relationships, and for the development of novel drugs and vaccines. Carbohydrates functionalized for Click chemistry provide mild and selective access to such glycoconjugates.

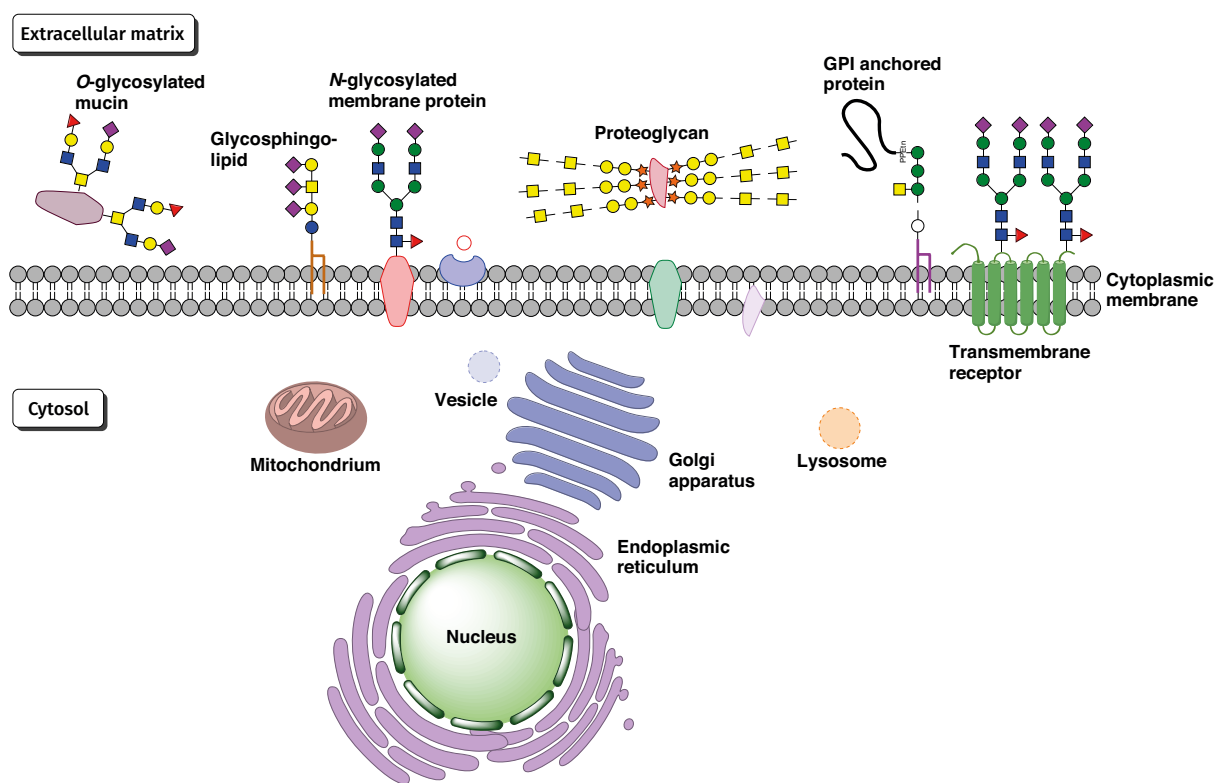
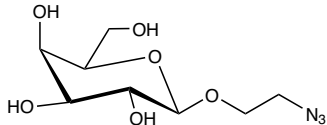
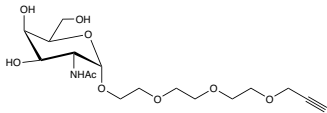
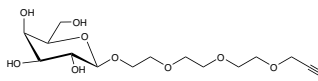


Fig. 19: Simplified representation of a eukaryotic cell and its cell surface glycans.

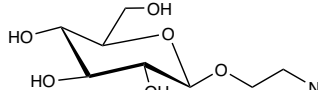
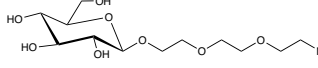
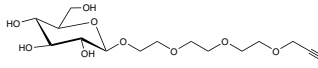
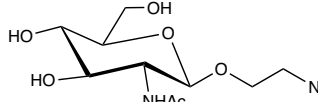
## 6.1. Galactose Derivatives

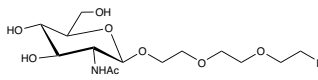
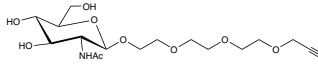
		Product code	Packing unit	Price
<b>GBB1445</b> <b>alpha-GalNAc-N<sub>3</sub></b> 1-O-(2-Azidoethoxy)-2-acetamido-2deoxy-alpha-D-galactopyranoside Formula            C <sub>10</sub> H <sub>18</sub> N <sub>4</sub> O <sub>6</sub> Mol. weight        290,27 g/mol		GBB1445.0050	50 mg	€ 675,00
		GBB1445.0100	100 mg	€ 950,00
		GBB1445.0250	250 mg	€ 1.900,00
		GBB1445.0500	500 mg	€ 2.950,00
<b>GBB1370</b> <b>alpha-GalNAc-TEG-N<sub>3</sub></b> 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-2-acetamido-2deoxy-alpha-D-galactopyranoside CAS-No.            882873-70-3 Formula            C <sub>14</sub> H <sub>26</sub> N <sub>4</sub> O <sub>8</sub> Mol. weight        378,38 g/mol		GBB1370.0000		please inquire
<b>GBB1430</b> <b>beta-Gal-Et-N<sub>3</sub></b> 1-(2-Azidoethoxy)-beta-D-galactopyranose Formula            C <sub>8</sub> H <sub>15</sub> N <sub>3</sub> O <sub>6</sub> Mol. weight        249,22 g/mol		GBB1430.0100	100 mg	€ 475,00
		GBB1430.0250	250 mg	€ 800,00
		GBB1430.0500	500 mg	€ 1.200,00
		GBB1430.1000	1 g	€ 1.750,00
<b>GBB1380</b> <b>beta-Gal-TEG-N<sub>3</sub></b> 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-beta-D-galactopyranoside Formula            C <sub>12</sub> H <sub>23</sub> N <sub>3</sub> O <sub>8</sub> Mol. weight        337,33 g/mol		GBB1380.0100	100 mg	€ 1.000,00
		GBB1380.0250	250 mg	€ 2.000,00
<b>GBB1375</b> <b>alpha-GalNAc-TEG-Alkyne</b> 1-O-(2-(2-(2-(Prop-2-ynyl)oxy)ethoxy)ethoxy)-2-acetamido-2deoxy-alpha-D-galactopyranoside Formula            C <sub>17</sub> H <sub>29</sub> NO <sub>9</sub> Mol. weight        391,41 g/mol		GBB1375.0100	100 mg	€ 900,00
		GBB1375.0250	250 mg	€ 1.850,00
		GBB1375.0500	500 mg	€ 3.150,00
		GBB1375.1000	1 g	€ 5.250,00

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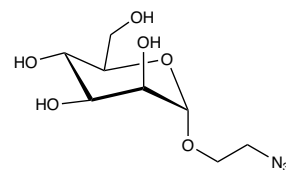
	Product code	Packing unit	Price
<p><b>GBB1385 beta-Gal-TEG-Alkyne</b></p> <p>1-O-(2-(2-(2-(Prop-2-ynoxy)ethoxy)ethoxy)ethoxy)-beta-D-galactopyranoside</p> <p>Formula <math>C_{15}H_{26}O_9</math></p> <p>Mol. weight 350,36 g/mol</p> 	GBB1385.0000		please inquire

## 6.2. Glucose Derivatives

	Product code	Packing unit	Price
<p><b>GBB1435 beta-Glc-N<sub>3</sub></b></p> <p>1-(2-Azidoethoxy)-beta-D-glucopyranose</p> <p>Formula <math>C_8H_{15}N_3O_6</math></p> <p>Mol. weight 249,22 g/mol</p> 	GBB1435.0000		please inquire
<p><b>GBB1390 beta-Glc-TEG-N<sub>3</sub></b></p> <p>1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-beta-D-glucopyranoside</p> <p>Formula <math>C_{12}H_{23}N_3O_8</math></p> <p>Mol. weight 337,33 g/mol</p> 	GBB1390.0000		please inquire
<p><b>GBB1395 beta-Glc-TEG-Alkyne</b></p> <p>1-O-(2-(2-(2-(Prop-2-ynoxy)ethoxy)ethoxy)ethoxy)-beta-D-glucopyranoside</p> <p>CAS-No. 1072903-76-4</p> <p>Formula <math>C_{15}H_{26}O_9</math></p> <p>Mol. weight 350,36 g/mol</p> 	GBB1395.0000		please inquire
<p><b>GBB1450 beta-GlcNAc-N<sub>3</sub></b></p> <p>1-(2-Azidoethoxy)-2-acetamido-2-deoxy-beta-D-galactopyranose</p> <p>Formula <math>C_{10}H_{18}N_4O_6</math></p> <p>Mol. weight 290,27 g/mol</p> 	GBB1450.0000		please inquire

		Product code	Packing unit	Price
<b>GBB1400 beta-GlcNAc-TEG-N<sub>3</sub></b> 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-2-acetamido-2-deoxy-beta-D-glucopyranoside Formula $C_{14}H_{26}N_4O_8$ Mol. weight 378,73 g/mol		GBB1400.0100	100 mg	€ 1.000,00
		GBB1400.0250	250 mg	€ 1.900,00
		GBB1400.0500	500 mg	€ 3.250,00
<b>GBB1405 beta-GlcNAc-TEG-Alkyne</b> 1-O-(2-(2-(2-(Prop-2-ynyl)oxy)ethoxy)ethoxy)ethoxy)-2-acetamido-2-deoxy-beta-D-glucopyranoside Formula $C_{17}H_{29}NO_9$ Mol. weight 391,41 g/mol		GBB1405.0250	250 mg	€ 1.850,00
		GBB1405.0500	500 mg	€ 3.150,00
		GBB1405.1000	1 g	€ 5.250,00

### 6.3. Mannose Derivatives

		Product code	Packing unit	Price
<b>GBB1440 alpha-Man-N<sub>3</sub></b> 1-(2-Azidoethoxy)-alpha-D-mannopyranose Formula $C_8H_{15}N_3O_6$ Mol. weight 249,22 g/mol		GBB1440.0100	100 mg	€ 550,00
		GBB1440.0250	250 mg	€ 800,00
		GBB1440.0500	500 mg	€ 1.400,00
		GBB1440.1000	1 g	€ 2.100,00
<b>GBB1420 alpha-Man-TEG-N<sub>3</sub></b> 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-alpha-D-mannopyranoside Formula $C_{12}H_{23}N_3O_8$ Mol. weight 337,33 g/mol		GBB1420.0100	100 mg	€ 950,00
		GBB1420.0250	250 mg	€ 1.575,00
<b>GBB1425 alpha-Man-TEG-Alkyne</b> 1-O-(2-(2-(2-(Prop-2-ynyl)oxy)ethoxy)ethoxy)ethoxy)-alpha-D-mannopyranoside Formula $C_{15}H_{26}O_9$ Mol. weight 350,36 g/mol		GBB1425.0100	100 mg	€ 750,00
		GBB1425.0250	250 mg	€ 1.350,00
		GBB1425.0500	500 mg	€ 1.900,00

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## 6.4. Lactose Derivatives

		Product code	Packing unit	Price
<b>GBB1455</b> <b>beta-Lac-EO-N<sub>3</sub></b> 2-Azidoethyl 4-O-beta-D-galactopyranosyl-beta-(1->4)-D-glucopyranoside Formula            C <sub>14</sub> H <sub>25</sub> N <sub>3</sub> O <sub>11</sub> Mol. weight        411,36 g/mol		GBB1455.0100	100 mg	€ 650,00
		GBB1455.0250	250 mg	€ 1.100,00
		GBB1455.0500	500 mg	€ 1.600,00
		GBB1455.1000	1 g	€ 2.600,00
<b>GBB1410</b> <b>beta-Lac-TEG-N<sub>3</sub></b> (2-(2-(2-Azidoethoxy)ethoxy)ethyl) 4-O-beta-D-galactopyranosyl-beta-(1->4)-D-glucopyranoside Formula            C <sub>18</sub> H <sub>33</sub> N <sub>3</sub> O <sub>13</sub> Mol. weight        499,47 g/mol		GBB1410.0000		please inquire
<b>GBB1415</b> <b>beta-Lac-TEG-Alkyne</b> 2-[2-[2-(2-propyn-1-yloxy)ethoxy]ethoxy]ethyl 4-O-beta-D-galactopyranosyl-beta-(1->4)-D-glucopyranoside Formula            C <sub>21</sub> H <sub>36</sub> O <sub>14</sub> Mol. weight        512,5 g/mol		GBB1415.0000		please inquire

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### 7. Code of Conduct

As business activity of Iris Biotech GmbH impacts people's lives and health, it must be operated in ethical and correct manner and act with integrity and responsibility. To ensure high ethical standards and fair business practices, Iris Biotech GmbH applies an integrated policy known as its Code of Conduct.

In 2001 Iris Biotech GmbH was founded just at the beginning of the Biotech movement and the first remarkable breakthrough of biotech pharma products. Although the biotech field is rather young compared to other industries we believe on long-term business, a good partnership between our business partners and Iris Biotech GmbH and a good reputation. It is our duty as well as our responsibility to maintain and to extend this over the next generations – based on the principles of an honourable and prudent tradesman which based upon the concept of honourable entrepreneurship.

This Code of Conduct has been developed following the “Voluntary Guidelines for Manufacturers of Fine Chemical Intermediates and Active Ingredients” issued by AIME (Agrochemical & Intermediates Manufacturers in Europe) and the requirements of some of our business associates.

Iris Biotech GmbH commits to hold this Code of Conduct and to include and apply its principles in the management system and the company policies.

#### Ethics

Iris Biotech GmbH undertakes business in an ethical manner and acts with integrity. All corruption, extortion and embezzlement are prohibited. We do not pay or accept bribes or participate in other illegal inducements in business or government relationships. We conduct our business in compliance with all applicable anti-trust laws. Employees are encouraged to report concerns or illegal activities in the workplace, without threat of reprisal, intimidation or harassment.

#### Labour

Iris Biotech GmbH is committed to uphold the human rights of workers and to treat them with dignity and respect. Child labour, workplace harassment, discrimination, and harsh and inhumane treatment are prohibited. Iris Biotech GmbH respects the rights of the employees to associate freely, join or not join labour unions, seek representation and join workers' councils. Employees are paid and their working timetable is established according to applicable wage and labour laws. Employees are able to communicate openly with management regarding working conditions without threat of reprisal, intimidation or harassment.

#### General Policies

Contracts and Secrecy Agreements are binding and the confidential information received is only used for intended purposes. Clear management and organizational structures exist to provide efficient normal working and to address problems quickly. Know-how is protected and intellectual property is respected.



## Health and Safety

Iris Biotech GmbH provides a safe and healthy working environment to the employees and protects them from overexposure to chemical and physical hazards. Products are produced, stored and shipped under the guidelines of the relevant chemical and safety legislation. Risks and emergency scenarios are identified and evaluated, and their possible impact is minimized by implementing emergency plans and written procedures. Safety information regarding hazardous materials is available to educate, train and protect workers from hazards. Preventive equipment and facilities maintenance is performed at suitable periods to reduce potential hazards. Employees are regularly trained in health and safety matters and are informed about product properties and risk classification when it is required.

## Environment

Iris Biotech GmbH operates in an environmentally responsible and efficient manner, minimizing adverse impacts on the environment. Waste streams are managed to ensure a safe handling, movement, storage, recycling and reuse, before and after being generated. Systems to prevent and mitigate accidental spills and releases to the environment are in place. All required environmental permits and licenses are obtained and their operational and reporting requirements are complied with.

## Production and Quality Management

A quality management system following the Good Distribution Practices (GDP rules) of Active Pharmaceutical Ingredients is established covering all the aspects of the worldwide distribution of products. Regular audits are performed to evaluate the efficiency and fulfilling of the quality system. Process controls to provide reproducible product quality are established. There are preventive maintenance procedures to ensure plant reliability and the lowest risk of failure. Staff is trained periodically about GMP and GDP rules. Procedures are established and installations are designed to avoid cross contamination. Batch and analytical records are kept for inspection and audit purposes for suitable periods according guidelines.

## Research and Development

Research and development staff education is appropriate to their functional activity and they are trained to develop, optimize and scale-up the processes. Intellectual property is respected and know-how protected. Development of manufacturing processes reflects the principles of the Green Chemistry according to the American Chemical Society Green Chemistry Institute. Animal testing is not used unless alternatives are not scientifically valid or accepted by regulators. If animal testing is carried out, animals are treated so that pain and stress are minimized.

# 8. Terms and Conditions of Sales

All orders placed by a buyer are accepted and all contracts are made subject to the terms which shall prevail and be effective notwithstanding any variations or additions contained in any order or other document submitted by the buyer. No modification of these terms shall be binding upon Iris Biotech GmbH unless made in writing by an authorised representative of Iris Biotech GmbH.

### Placing of Orders

Every order made by the buyer shall be deemed an offer by the buyer to purchase products from Iris Biotech GmbH and will not be binding on Iris Biotech GmbH until a duly authorised representative of Iris Biotech GmbH has accepted the offer made by the buyer. Iris Biotech GmbH may accept orders from commercial, educational or government organisations, but not from private individuals and Iris Biotech GmbH reserves the right to insist on a written order and/or references from the buyer before proceeding.

There is no minimum order value. At the time of acceptance of an order Iris Biotech GmbH will either arrange prompt despatch from stock or the manufacture/acquisition of material to satisfy the order. In the event of the latter Iris Biotech GmbH will indicate an estimated delivery date. In addition to all its other rights Iris Biotech GmbH reserves the right to refuse the subsequent cancellation of the order if Iris Biotech GmbH expects to deliver the product on or prior to the estimated delivery date. Time shall not be of the essence in respect of delivery of the products. If Iris Biotech GmbH is unable to deliver any products by reason of any circumstances beyond its reasonable control („Force Majeure“) then the period for delivery shall be extended by the time lost due to such Force Majeure. Details of Force Majeure will be forwarded by Iris Biotech GmbH to the buyer as soon as reasonably practicable.

### Prices, Quotations and Payments

Prices are subject to change. For the avoidance of doubt, the price advised by Iris Biotech GmbH at the time of the buyer placing the order shall supersede any previous price indications. The buyer must contact the local office of Iris Biotech GmbH before ordering if further information is required. Unless otherwise agreed by the buyer and Iris Biotech GmbH, the price shall be for delivery ex-works. In the event that the buyer requires delivery of the products otherwise than ex-works the buyer should contact the local office of Iris Biotech GmbH in order to detail its requirements. Iris Biotech GmbH shall, at its discretion, arrange the buyer's delivery requirements including, without limitation, transit insurance, the mode of transit (Iris Biotech GmbH reserves the right to vary the mode of transit if any regulations or other relevant considerations so require) and any special packaging requirements (including cylinders). For the avoidance of doubt all costs of delivery and packaging in accordance with the buyer's requests over and above that of delivery in standard packaging ex-works shall be for the buyer's account unless otherwise agreed by both parties. Incoterms 2010 shall apply. Any tax, duty or charge imposed by governmental authority or otherwise and any other applicable taxes, duties or charges shall be for the buyer's account. Iris Biotech GmbH may, on request and where possible, provide quotations for multiple packs or bulk quantities, and non-listed items. Irrespective of the type of request or means of response all quotations must be accepted by the buyer without condition and in writing before an order will be accepted by Iris Biotech GmbH. Unless agreed in writing on different terms, quotations are valid for 30 days from the date thereof. Payment terms are net 30 days from invoice date unless otherwise agreed in writing. Iris Biotech GmbH reserves the right to request advance payment at its discretion. For overseas transactions the buyer shall pay all the banking charges of Iris Biotech GmbH. The buyer shall not be entitled to withhold or set-off payment for the products for any reason whatsoever. Government/Corporate Visa and MasterCard (and other such credit cards) may be accepted on approved accounts for payment of the products. Personal credit cards are not acceptable. Failure to comply with the terms of payment of Iris Biotech GmbH shall constitute default without reminder. In these circumstances Iris Biotech GmbH may (without prejudice to any other of its rights under these terms) charge interest to accrue on a daily basis at the rate of 2% per month from the date upon which payment falls due to the actual date of payment (such interest shall be paid monthly). If the buyer shall fail to fulfil the payment terms

in respect of any invoice of Iris Biotech GmbH Iris Biotech GmbH may demand payment of all outstanding balances from the buyer whether due or not and/or cancel all outstanding orders and/or decline to make further deliveries or provision of services except upon receipt of cash or satisfactory securities. Until payment by the buyer in full of the price and any other monies due to Iris Biotech GmbH in respect of all other products or services supplied or agreed to be supplied by Iris Biotech GmbH to the buyer (including but without limitation any costs of delivery) the property in the products shall remain vested in Iris Biotech GmbH.

## Shipping, Packaging and Returns

The buyer shall inspect goods immediately on receipt and inform Iris Biotech GmbH of any shortage or damage within five days. Quality problems must be notified within ten days of receipt. Goods must not be returned without prior written authorisation of Iris Biotech GmbH. Iris Biotech GmbH shall at its sole discretion replace the defective products (or parts thereof) free of charge or refund the price (or proportionate price) to buyer. Opened or damaged containers cannot be returned by the buyer without the written prior agreement of Iris Biotech GmbH. In the case of agreed damaged containers which cannot be so returned, the buyer assumes responsibility for the safe disposal of such containers in accordance with all applicable laws.

## Product Quality, Specifications and Technical Information

Products are analysed in the Quality Control laboratories of Iris Biotech GmbH's production partners by methods and procedures which Iris Biotech GmbH considers appropriate. In the event of any dispute concerning reported discrepancies arising from the buyer's analytical results, determined by the buyer's own analytical procedures, Iris Biotech GmbH reserves the right to rely on the results of own analytical methods of Iris Biotech GmbH. Certificates of Analysis or Certificates of Conformity are available at the discretion of Iris Biotech GmbH for bulk orders but not normally for prepack orders. Iris Biotech GmbH reserves the right to make a charge for such certification. Specifications may change and reasonable variation from any value listed should not form the basis of a dispute. Any supply by Iris Biotech GmbH of bespoke or custom product for a buyer shall be to a specification agreed by both parties in writing. Technical information, provided orally, in writing, or by electronic means by or on behalf of Iris Biotech GmbH, including any descriptions, references, illustrations or diagrams in any catalogue or brochure, is provided for guidance purposes only and is subject to change.

## Safety

All chemicals should be handled only by competent, suitably trained persons, familiar with laboratory procedures and potential chemical hazards. The burden of safe use of the products of Iris Biotech GmbH vests in the buyer. The buyer assumes all responsibility for warning his employees, and any persons who might reasonably be expected to come into contact with the products, of all risks to person and property in any way connected with the products and for instructing them in their safe handling and use. The buyer also assumes the responsibility for the safe disposal of all products in accordance with all applicable laws.

## Uses, Warranties and Liabilities

All products of Iris Biotech GmbH are intended for laboratory research purposes and unless otherwise stated on product labels, in the catalogue and product information sheet of Iris Biotech GmbH or in other literature furnished to the buyer, are not to be used for any other purposes, including but not limited to use as or as components in drugs for human or animal use, medical devices, cosmetics, food additives, household chemicals, agricultural or horticultural products or pesticides. Iris Biotech GmbH offers no warranty regarding the fitness of any product for a particular purpose and shall not be responsible for any loss or damage whatsoever arising there from. No warranty or representation is given by Iris Biotech GmbH that the products do not infringe any letters patent, trademarks, registered designs or other industrial rights. The

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buyer further warrants to Iris Biotech GmbH that any use of the products in the United States of America shall not result in the products becoming adulterated or misbranded within the meaning of the Federal Food, Drug and Cosmetic Act (or such equivalent legislation in force in the buyer's jurisdiction) and shall not be materials which may not, under sections 404, 505 or 512 of the Act, be introduced into interstate commerce. The buyer acknowledges that, since the products of Iris Biotech GmbH are intended for research purposes, they may not be on the Toxic Substances Control Act 1976 („TSCA“) inventory. The buyer warrants that it shall ensure that the products are approved for use under the TSCA (or such other equivalent legislation in force in the buyer's jurisdiction), if applicable. The buyer shall be responsible for complying with any legislation or regulations governing the use of the products and their importation into the country of destination (for the avoidance of doubt to include, without limitation, the TSCA and all its amendments, all EINECS, ELINCS and NONS regulations). If any licence or consent of any government or other authority shall be required for the acquisition, carriage or use of the products by the buyer the buyer shall obtain the same at its own expense and if necessary produce evidence of the same to Iris Biotech GmbH on demand. Failure to do so shall not entitle the buyer to withhold or delay payment. Any additional expenses or charges incurred by Iris Biotech GmbH resulting from such failure shall be for the buyer's account. Save for death or personal injury caused by negligence of Iris Biotech GmbH, sole obligation of Iris Biotech GmbH and buyer's exclusive remedy with respect to the products proved to the satisfaction of Iris Biotech GmbH to be defective or products incorrectly supplied shall be to accept the return of said products to Iris Biotech GmbH for refund of the actual purchase price paid by the buyer (or proportionate part thereof), or replacement of the defective product (or part thereof) with alternative product. Iris Biotech GmbH shall have no liability to the buyer under or arising directly or indirectly out of or otherwise in connection with the supply of products by Iris Biotech GmbH to the buyer and/or their re-sale or use by the buyer or for any product, process or services of the buyer which in any way comprises the product in contract tort (including negligence or breach of statutory duty) or otherwise for pure economic loss, loss of profit, business, reputation, depletion of brand, contracts, revenues or anticipated savings or for any special indirect or consequential damage or loss of any nature except as may otherwise be expressly provided for in these terms. All implied warranties, terms and representations in respect of the products (whether implied by statute or otherwise) are excluded to the fullest extent permitted by law. The buyer shall indemnify Iris Biotech GmbH for and against any and all losses, damages and expenses, including legal fees and other costs of defending any action, that Iris Biotech GmbH may sustain or incur as a result of any act or omission by the buyer, its officers, agents or employees, its successors or assignees, its customers or all other third parties, whether direct or indirect, in connection with the use of any product. For the avoidance of doubt and in the event that Iris Biotech GmbH supplies bespoke or custom product to the buyer's design or specification, this indemnity shall extend to include any claim by a third party that the manufacture of the product for the buyer or the use of the product by the buyer infringes the intellectual property rights of any third party.

### General

Iris Biotech GmbH shall be entitled to assign or sub-contract all or any of its rights and obligations hereunder. The buyer shall not be entitled to assign, transfer, sub-contract or otherwise delegate any of its rights or obligations hereunder. Any delay or forbearance by Iris Biotech GmbH in exercising any right or remedy under these terms shall not constitute a waiver of such right or remedy. If any provision of these terms is held by any competent authority to be invalid or unenforceable in whole or in part the validity of the other provisions of these terms and the remainder of the provision in question shall not be affected. These terms shall be governed by German Law and the German Courts shall have exclusive jurisdiction for the hearing of any dispute between the parties save in relation to enforcement where the jurisdiction of the German Courts shall be non-exclusive.



# Empowering Peptide Innovation



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Biotech

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