Iris Biotech

Everything for CLICK CHEMISTRY

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Everything for Click Chemistry

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.

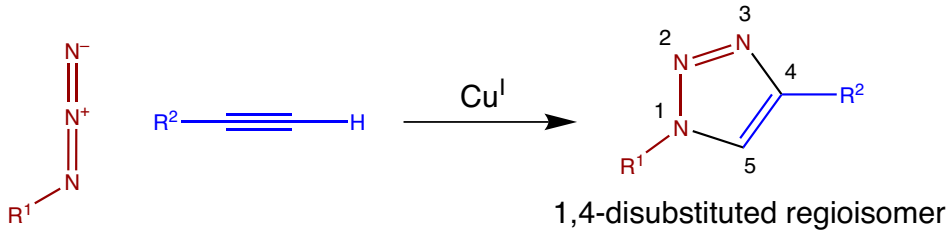

Fig. 1: The copper-catalyzed azide-alkyne cycloaddition affords the 1,4-disubstituted isomers.

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.

References:

- *A Stepwise Huisgen Cycloaddition Process: Copper(I)-Catalyzed Regioselective "Ligation" of Azides and Terminal Alkynes; V. V. Rostovtsev, L. G. Green, V. V. Fokin and K. B. Sharpless;* ***Angew. Chem. Int. Ed.*** *2002;* ***41:*** *2596-2599. https://doi.org/10.1002/1521-3773(20020715)41:14<2596::Aid-anie2596>3.0.Co;2-4*
- *Peptidotriazoles on solid phase: [1,2,3]-triazoles by regiospecific copper(i)-catalyzed 1,3-dipolar cycloadditions of terminal alkynes to azides; C. W. Tornoe, C. Christensen and M. Meldal;* ***J Org Chem*** *2002;* ***67:*** *3057-64. https://doi.org/10.1021/jo011148j*
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- *Polytriazoles as copper(I)-stabilizing ligands in catalysis; T. R. Chan, R. Hilgraf, K. B. Sharpless and V. V. Fokin;* ***Org Lett*** *2004;* ***6:*** *2853-5. https://doi.org/10.1021/ol0493094*
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- *Preparation of alumina supported copper nanoparticles and their application in the synthesis of 1,2,3-triazoles; M. L. Kantam, V. S. Jaya, B. Sreedhar, M. M. Rao and B. M. Choudary;* ***J. Mol. Catal. A Chem.*** *2006;* ***256:*** *273-277. https://doi.org/10.1016/j.molcata.2006.04.054*
- *A rapid and versatile method to label receptor ligands using „click" chemistry: Validation with the muscarinic M1 antagonist pirenzepine; D. Bonnet, B. Ilien, J. L. Galzi, S. Riche, C. Antheaune and M. Hibert;* ***Bioconjug Chem*** *2006;* ***17:*** *1618-23. https://doi.org/10.1021/bc060140j*
- *Alkyne-azide click reaction catalyzed by metallic copper under ultrasound; P. Cintas, A. Barge, S. Tagliapietra, L. Boffa and G. Cravotto;* ***Nat Protoc*** *2010;* ***5:*** *607-16. https://doi.org/10.1038/nprot.2010.1*
- *Synthesis of a DOTA--biotin conjugate for radionuclide chelation via Cu-free click chemistry; M. K. Schultz, S. G. Parameswarappa and F. C. Pigge;* ***Org Lett*** *2010;* ***12:*** *2398-401. https://doi.org/10.1021/ol100774p*
- *‚Click' cycloaddition catalysts: copper(I) and copper(II) tris(triazolylmethyl)amine complexes; P. S. Donnelly, S. D. Zanatta, S. C. Zammit, J. M. White and S. J. Williams;* ***Chem Commun (Camb)*** *2008: 2459-61. https://doi.org/10.1039/b719724a*
- *Click Chemistry and Radiochemistry: The First 10 Years; J. P. Meyer, P. Adumeau, J. S. Lewis and B. M. Zeglis;* ***Bioconjug Chem*** *2016;* ***27:*** *2791-2807. https://doi.org/10.1021/acs.bioconjchem.6b00561*

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.

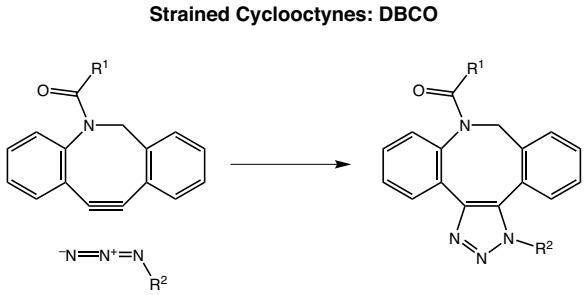


Fig. 2: Reaction of DBCO as an exemplary strained cyclooctyne with an azide.

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 σ-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.

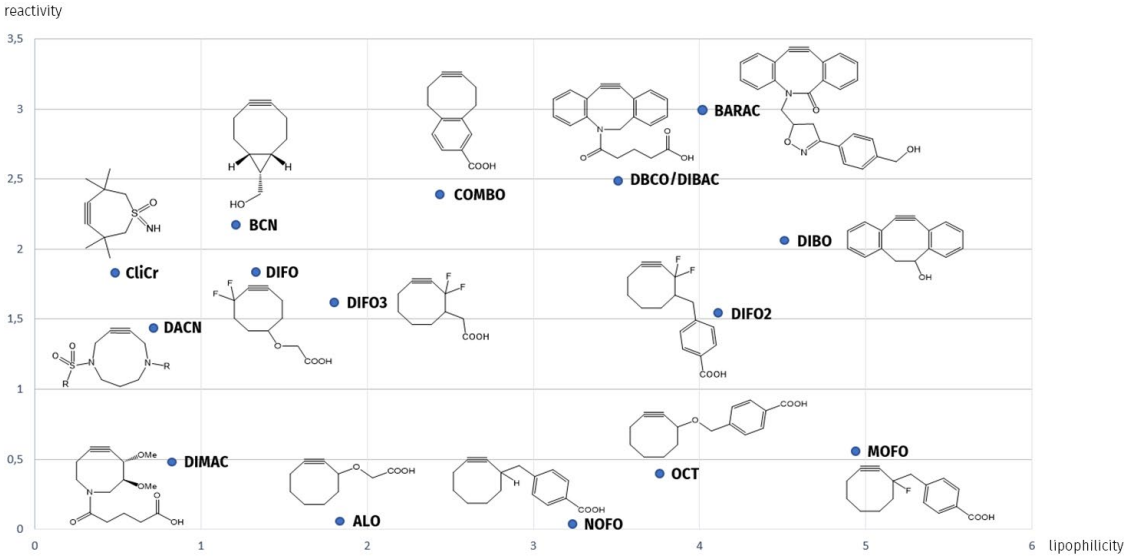
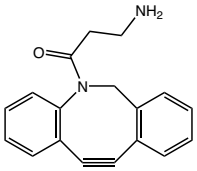
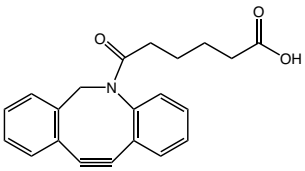
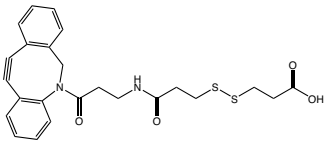
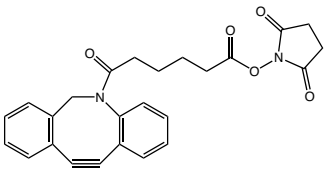
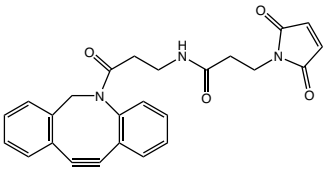


Fig. 3: Reaction rate constants for different strained cyclooctyne derivatives.

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.

		Product code	Packing unit	Price
RL-2120 DBCO-NH$_2$ Dibenzocyclooctyne-amine CAS-No. 1255942-06-3 Formula $C_{18}H_{16}N_2O$ Mol. weight 276,33 g/mol		RL-2120.0025 RL-2120.0100 RL-2120.0250 RL-2120.1000	25 mg 100 mg 250 mg 1 g	€ 190,00 € 250,00 € 600,00 € 900,00
RL-2430 DBCO-COOH Dibenzoazacyclooctyne-carboxylic acid CAS-No. 1425485-72-8 Formula $C_{21}H_{19}NO_3$ Mol. weight 333,38 g/mol		RL-2430.0025 RL-2430.0100 RL-2430.0500	25 mg 100 mg 500 mg	€ 190,00 € 350,00 € 1.660,00
RL-3340 DBCO-SS-COOH 3-((3-(3-(azadibenzocyclooctyn-1-yl)-3-oxopropyl-amino)-3-oxopropyl)disulfanyl)propanoic acid Formula $C_{24}H_{24}N_2O_4S_2$ Mol. weight 468,59 g/mol		RL-3340.0000		please inquire
RL-2440 DBCO-NHS Dibenzoazacyclooctyne-carboxylic acid succinimidyl ester CAS-No. 1384870-47-6 Formula $C_{25}H_{22}N_2O_5$ Mol. weight 430,45 g/mol		RL-2440.0100 RL-2440.1000	100 mg 1 g	€ 350,00 € 1.660,00
RL-2490 DBCO-mal Dibenzoazacyclooctyne-maleimide CAS-No. 1395786-30-7 Formula $C_{25}H_{21}N_3O_4$ Mol. weight 427,45 g/mol		RL-2490.0025 RL-2490.0100 RL-2490.1000	25 mg 100 mg 1 g	€ 190,00 € 410,00 € 2.070,00

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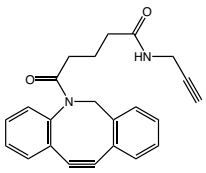
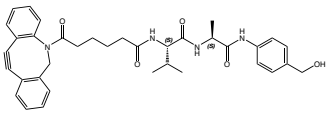
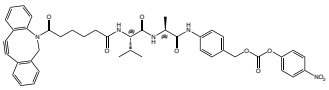
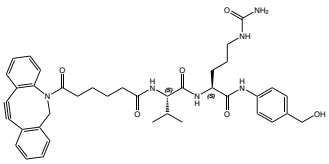
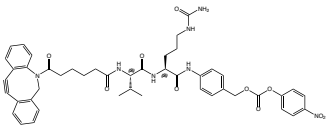
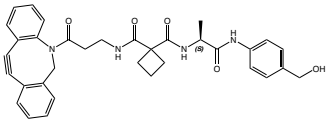
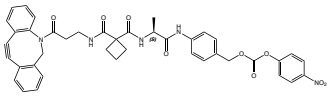
		Product code	Packing unit	Price
RL-2740 DBCO-C5-Alkyne N-(5-oxo-5-(prop-2-ynyloxy)pentanoyl)-dibenzoazacyclooctyne Formula $C_{23}H_{20}N_2O_2$ Mol. weight 356,42 g/mol		RL-2740.0000		please inquire
ADC1420 DBCO-C6-Val-Ala-PAB 6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-alanyl-(4-aminobenzyl alcohol) Formula $C_{36}H_{40}N_4O_5$ Mol. weight 608,73 g/mol		ADC1420.0100 ADC1420.0250	100 mg 250 mg	€ 450,00 € 900,00
ADC1430 DBCO-C6-Val-Ala-PAB-PNP 6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{43}H_{43}N_5O_9$ Mol. weight 773,83 g/mol		ADC1430.0100 ADC1430.0250	100 mg 250 mg	€ 500,00 € 1.000,00
ADC1250 DBCO-C6-Val-Cit-PAB 6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-citrullyl-(4-aminobenzyl alcohol) Formula $C_{39}H_{46}N_6O_6$ Mol. weight 694,82 g/mol		ADC1250.0025 ADC1250.0100 ADC1250.0250	25 mg 100 mg 250 mg	€ 225,00 € 600,00 € 1.200,00
ADC1260 DBCO-C6-Val-Cit-PAB-PNP 6-dibenzoazacyclooctyne-6-oxohexanoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{46}H_{49}N_7O_{10}$ Mol. weight 859,92 g/mol		ADC1260.0025 ADC1260.0100 ADC1260.0250	25 mg 100 mg 250 mg	€ 300,00 € 900,00 € 1.800,00
ADC1620 DBCO-cyclobutane-1,1-dicarboxamide-Ala-PAB dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl alcohol) Formula $C_{34}H_{34}N_4O_5$ Mol. weight 578,66 g/mol		ADC1620.0000		please inquire

	Product code	Packing unit	Price

ADC1630 DBCO-cyclobutane-1,1-dicarboxamide-Ala-PAB-PNP

dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate

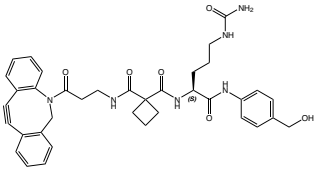


Formula $C_{41}H_{37}N_5O_9$
Mol. weight 743,76 g/mol

ADC1630.0000 — please inquire

ADC1520 DBCO-cyclobutane-1,1-dicarboxamide-Cit-PAB

dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl alcohol)

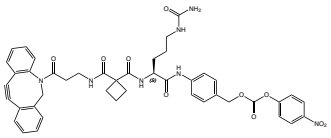


Formula $C_{37}H_{40}N_6O_6$
Mol. weight 664,75 g/mol

ADC1520.0000 — please inquire

ADC1530 DBCO-cyclobutane-1,1-dicarboxamide-Cit-PAB-PNP

dibenzoazacyclooctyne-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate

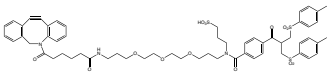


Formula $C_{44}H_{43}N_7O_{10}$
Mol. weight 829,85 g/mol

ADC1530.0000 — please inquire

RL-2480 DBCO-PEG(3)-BisSulfonThiol-Linker

Dibenzoazacyclooctyne-PEG(3)-BisSulfon-Thiol-Linker

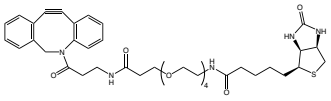


Formula $C_{59}H_{69}N_3O_{14}S_3$
Mol. weight 1140,39 g/mol

RL-2480.0010	10 mg	€ 230,00
RL-2480.0025	25 mg	€ 350,00
RL-2480.0100	100 mg	€ 1.120,00

RL-2520 DBCO-PEG(4)-Biotin

Dibenzoazacyclooctyne-tetra(ethylene glycol)-biotin

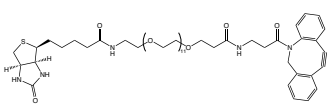


CAS-No. 1255942-07-4
Formula $C_{39}H_{51}N_5O_8S$
Mol. weight 749,92 g/mol

RL-2520.0010	10 mg	€ 230,00
RL-2520.0025	25 mg	€ 390,00
RL-2520.0100	100 mg	€ 1.120,00

PEG6820 Biotin-PEG(12)-DBCO

Biotinyl-dodeca(ethylene glycol)-amido-dibenzoazacyclooctyne



Formula $C_{55}H_{83}N_5O_{16}S$
Mol. weight 1102,34 g/mol

PEG6820.0010	10 mg	€ 310,00
PEG6820.0025	25 mg	€ 490,00
PEG6820.0100	100 mg	€ 1.540,00

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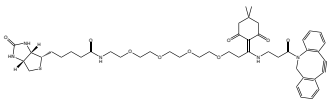
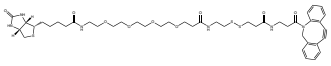
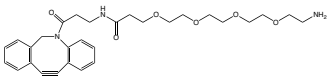
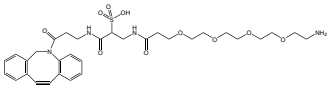
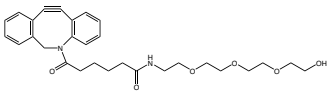
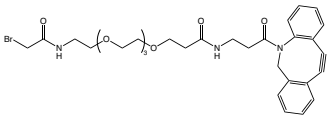
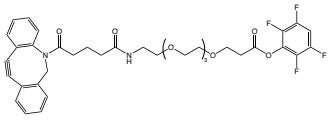
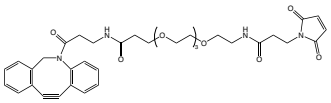
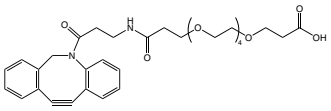
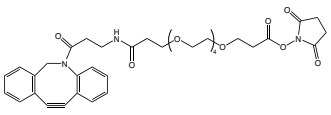
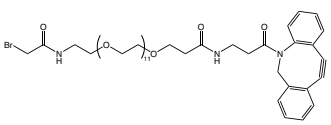
		Product code	Packing unit	Price
PEG8140	**Biotin-PEG(4)-Dde-DBCO**			
N-(15-(4,4-dimethyl-2,6-dioxocyclohexylidene)-19-oxo-19-(azadibenzocyclooctyn-1-yl)-3,6,9,12-tetraoxa-16-azanonadecyl)-5-((3aS,4S,6aR)-2-oxohexahydro-1H-thieno[3,4-d]imidazol-4-yl) pentanamide		PEG8140.0000		please inquire
CAS-No. 1807512-43-1 Formula $C_{47}H_{61}N_5O_9S$ Mol. weight 872,08 g/mol				
PEG8120	**Biotin-PEG(4)-SS-DBCO**			
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-tetrao xapentadecan-15-amide		PEG8120.0025 PEG8120.0100 PEG8120.0500	25 mg 100 mg 500 mg	€ 225,00 € 650,00 € 2.600,00
Formula $C_{44}H_{60}N_6O_9S_3$ Mol. weight 913,18 g/mol				
RL-2420	**DBCO-PEG(4)-NH_2**			
Dibenzoazacyclooctyne-tetra(ethylene glycol)-amine		RL-2420.0025 RL-2420.0100 RL-2420.0500	25 mg 100 mg 500 mg	€ 375,00 € 850,00 € 2.000,00
CAS-No. 1255942-08-5 Formula $C_{29}H_{37}N_3O_6$ Mol. weight 523,62 g/mol				
RL-2421	**DBCO-Sulfo-PEG(4)-NH_2**			
Dibenzoazacyclooctyne-tetra(ethylene glycol) amine		RL-2421.0025 RL-2421.0100 RL-2421.0500	25 mg 100 mg 500 mg	€ 285,00 € 600,00 € 1.900,00
CAS-No. 2055198-05-3 Formula $C_{32}H_{42}N_4O_{10}S$ Mol. weight 674,76 g/mol				
RL-2510	**DBCO-PEG(4)-OH**			
Dibenzoazacyclooctyne-tetra(ethylene glycol)		RL-2510.0025 RL-2510.0100 RL-2510.1000	25 mg 100 mg 1 g	€ 170,00 € 410,00 € 2.070,00
CAS-No. 1416711-60-8 Formula $C_{29}H_{36}N_2O_6$ Mol. weight 508,61 g/mol				

		Product code	Packing unit	Price
PEG6790	**Bromoacetamido-PEG(4)-DBCO**			
Bromoacetamido-tetra(ethylene glycol)-amido-dibenzoazacyclooctyne Formula $C_{31}H_{38}BrN_3O_7$ Mol. weight 644,55 g/mol		PEG6790.0025 PEG6790.0100 PEG6790.0500	25 mg 100 mg 500 mg	€ 310,00 € 660,00 € 2.010,00
PEG6740	**DBCO-PEG(4)-TFP**			
Dibenzoazacyclooctyne-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 PEG6740.0100 PEG6740.0500	25 mg 100 mg 500 mg	€ 310,00 € 640,00 € 2.010,00
RL-2500	**DBCO-PEG(4)-mal**			
Dibenzoazacyclooctyne-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 RL-2500.0025 RL-2500.0100 RL-2500.0500	10 mg 25 mg 100 mg 500 mg	€ 170,00 € 295,00 € 675,00 € 2.070,00
RL-2450	**DBCO-PEG(5)-COOH**			
Dibenzoazacyclooctyne-penta(ethylene glycol)-propanoic acid Formula $C_{32}H_{40}N_2O_9$ Mol. weight 596,67 g/mol		RL-2450.0025 RL-2450.0100 RL-2450.0500	25 mg 100 mg 500 mg	€ 260,00 € 530,00 € 1.480,00
RL-2460	**DBCO-PEG(5)-NHS**			
Dibenzoazacyclooctyne-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 RL-2460.0025 RL-2460.0100 RL-2460.0500	10 mg 25 mg 100 mg 500 mg	€ 170,00 € 270,00 € 530,00 € 1.600,00
PEG6800	**Bromoacetamido-PEG(12)-DBCO**			
Bromoacetamido-dodeca(ethylene glycol)-amido-dibenzoazacyclooctyne Formula $C_{47}H_{70}BrN_3O_{17}$ Mol. weight 996,97 g/mol		PEG6800.0025 PEG6800.0100 PEG6800.0500	25 mg 100 mg 500 mg	€ 330,00 € 760,00 € 2.300,00

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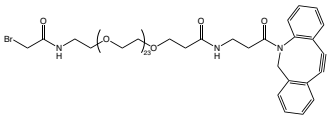
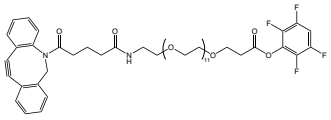
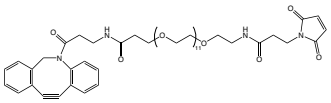
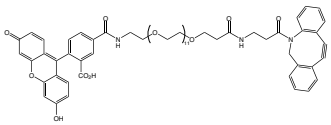
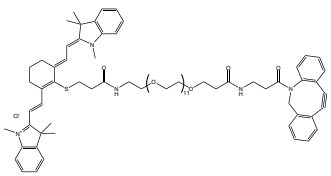
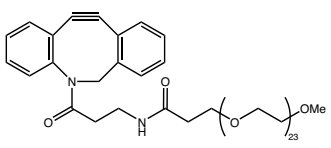
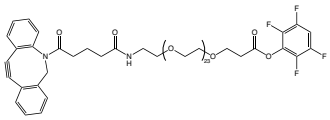
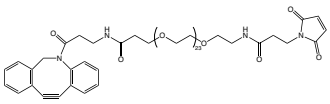
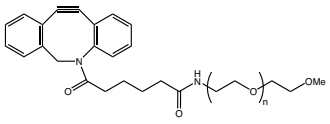
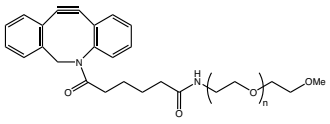
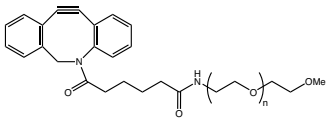
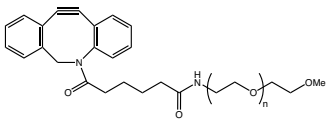
		Product code	Packing unit	Price
PEG6810	**Bromoacetamido-PEG(24)-DBCO**			
Bromoacetamido-24(ethylene glycol)-amido-dibenzoazacyclooctyne Formula $C_{71}H_{118}BrN_3O_{27}$ Mol. weight 1525,6 g/mol		PEG6810.0025 PEG6810.0100 PEG6810.0500	25 mg 100 mg 500 mg	€ 360,00 € 840,00 € 2.530,00
PEG6750	**DBCO-PEG(12)-TFP**			
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 PEG6750.0100 PEG6750.0500	25 mg 100 mg 500 mg	€ 310,00 € 710,00 € 2.130,00
PEG6770	**DBCO-PEG(12)-MAL**			
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 PEG6770.0100 PEG6770.0500	25 mg 100 mg 500 mg	€ 330,00 € 760,00 € 2.300,00
PEG6830	**DBCO-dPEG(12)-(5)6-carboxyfluorescein**			
Dibenzoazacyclooctyne-dodeca(ethylene glycol)-(5)6-carboxyfluorescein Formula $C_{46}H_{39}N_3O_{10}$ Mol. weight 1234,34 g/mol		PEG6830.0001 PEG6830.0005	1 mg 5 mg	€ 300,00 € 500,00
PEG6840	**DBCO-dPEG(12)-meso-TP-IR775**			
Dibenzoazacyclooctyne-dodeca(ethylene glycol)-meso-TP-IR775 Formula $C_{80}H_{108}ClN_5O_{15}S$ Mol. weight 1447,26 g/mol		PEG6840.0001 PEG6840.0005	1 mg 5 mg	€ 310,00 € 490,00
PEG7460	**DBCO-PEG(24)-OMe**			
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
PEG6760 DBCO-PEG(24)-TFP 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 PEG6760.0100 PEG6760.0500	25 mg 100 mg 500 mg	€ 350,00 € 780,00 € 2.240,00
PEG6780 DBCO-PEG(24)-MAL Dibenzoazacyclooctyne-24(ethylene glycol)-maleimide Formula $C_{76}H_{122}N_4O_{29}$ Mol. weight 1555,79 g/mol		PEG6780.0025 PEG6780.0100 PEG6780.0500	25 mg 100 mg 500 mg	€ 360,00 € 840,00 € 2.530,00
RL-2530 DBCO-mPEG (5kDa) alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 5000 Da		RL-2530.0025 RL-2530.0100 RL-2530.1000	25 mg 100 mg 1 g	€ 170,00 € 290,00 € 1.240,00
RL-2540 DBCO-mPEG (10kDa) alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 10000 Da		RL-2540.0025 RL-2540.0100 RL-2540.1000	25 mg 100 mg 1 g	€ 170,00 € 290,00 € 1.240,00
RL-2550 DBCO-mPEG (20kDa) alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 20000 Da		RL-2550.0025 RL-2550.0100 RL-2550.1000	25 mg 100 mg 1 g	€ 170,00 € 290,00 € 1.240,00
RL-2560 DBCO-mPEG (30kDa) alpha-Dibenzoazacyclooctyne-omega-methoxy-poly(ethylene glycol) CAS-No. 2262541-53-5 Mol. weight 30000 Da		RL-2560.0025 RL-2560.0100 RL-2560.1000	25 mg 100 mg 1 g	€ 170,00 € 290,00 € 1.240,00

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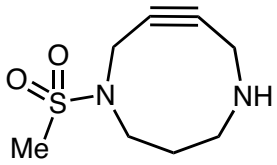
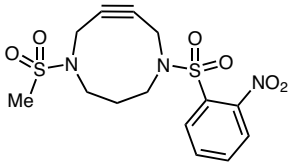
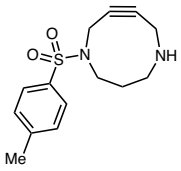
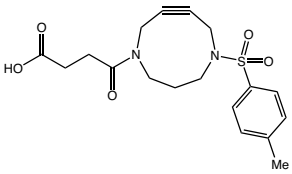
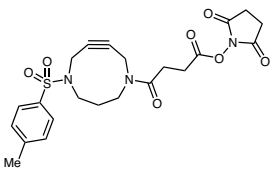
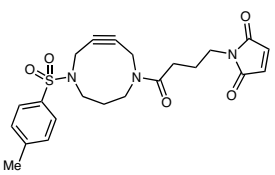
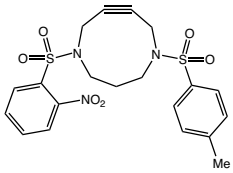
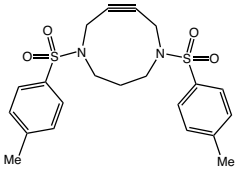
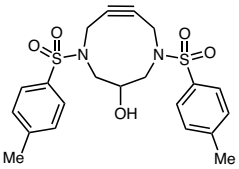
		Product code	Packing unit	Price
RL-3600 DACN(Ms)*HCl N-(Mesyl)-4,8-diazacyclononyne hydrochloride CAS-No. 2331322-16-6 Formula $C_8H_{14}N_2O_2S$*HCl Mol. weight 202,27*36,46 g/mol		RL-3600.0025	25 mg	€ 450,00
RL-3610 DACN(Ms,Ns) N-(Mesyl)-N'-(2-nosyl)-4,8-diazacyclononyne CAS-No. 2411082-25-0 Formula $C_{14}H_{17}N_3O_6S_2$ Mol. weight 387,43 g/mol		RL-3610.0025	25 mg	€ 275,00
RL-2735 DACN(Tos)*HCl N-(p-toluenesulfonyl)-4,8-diazacyclononyne hydrochloride CAS-No. 2331322-18-8 Formula $C_{14}H_{18}N_2O_2S$*HCl Mol. weight 278,37*36,46 g/mol		RL-2735.0025	25 mg	€ 350,00
RL-2720 DACN(Tos,Suc-OH) 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
RL-2725 DACN(Tos,Suc-NHS) 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
RL-3630 DACN(Tos,Mal) N-(maleimidobutyryl)-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
RL-2710 DACN(Tos,Ns) 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 RL-2710.0100	25 mg 100 mg	€ 250,00 € 400,00
RL-2730 DACN(Tos_2) 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 RL-2730.0100	25 mg 100 mg	€ 225,00 € 350,00
RL-2737 DACN(Tos_2,6-OH) 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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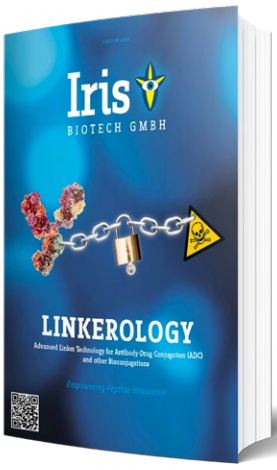

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- *Bioconjugation with strained alkenes and alkynes; M. F. Debets, S. S. van Berkel, J. Dommerholt, A. T. Dirks, F. P. Rutjes and F. L. van Delft;* ***Acc Chem Res*** *2011;* ***44:*** *805-15. https://doi.org/10.1021/ar200059z*
- *Reactivity of biarylazacyclooctynones in copper-free click chemistry; C. G. Gordon, J. L. Mackey, J. C. Jewett, E. M. Sletten, K. N. Houk and C. R. Bertozzi;* ***J Am Chem Soc*** *2012;* ***134:*** *9199-208. https://doi.org/10.1021/ja3000936*
- *Bioorthogonal labelling of biomolecules: new functional handles and ligation methods; M. F. Debets, J. C. van Hest and F. P. Rutjes;* ***Org Biomol Chem*** *2013;* ***11:*** *6439-55. https://doi.org/10.1039/c3ob41329b*
- *18F-labeling using click cycloadditions; K. Kettenbach, H. Schieferstein and T. L. Ross;* ***Biomed Res Int*** *2014;* ***2014:*** *361329. https://doi.org/10.1155/2014/361329*
- *Click Chemistry and Radiochemistry: The First 10 Years; J. P. Meyer, P. Adumeau, J. S. Lewis and B. M. Zeglis;* ***Bioconjug Chem*** *2016;* ***27:*** *2791-2807. https://doi.org/10.1021/acs.bioconjchem.6b00561*
- *Strain-Promoted 1,3-Dipolar Cycloaddition of Cycloalkynes and Organic Azides; J. Dommerholt, F. Rutjes and F. L. van Delft;* ***Top Curr Chem*** *2016;* ***374:*** *16. https://doi.org/10.1007/s41061-016-0016-4*
- *A facile preparation of functional cycloalkynes via an azide-to-cycloalkyne switching approach; S. Yoshida, T. Kuribara, H. Ito, T. Meguro, Y. Nishiyama, F. Karaki, Y. Hatakeyama, Y. Koike, I. Kii and T. Hosoya;* ***Chem Commun (Camb)*** *2019;* ***55:*** *3556-3559. https://doi.org/10.1039/c9cc01113g*
- *Selective strain-promoted azide-alkyne cycloadditions through transient protection of bicyclo[6.1.0]nonynes with silver or gold; K. Adachi, T. Meguro, Y. Sakata, K. Igawa, K. Tomooka, T. Hosoya and S. Yoshida;* ***Chem Commun (Camb)*** *2020;* ***56:*** *9823-9826. https://doi.org/10.1039/d0cc04606j*
- *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*
- *Copper-Free Huisgen Cycloaddition for the 14-3-3-Templated Synthesis of Fusicoccin-Peptide Conjugates; R. Masuda, Y. Kawasaki, K. Igawa, Y. Manabe, H. Fujii, N. Kato, K. Tomooka and J. Ohkanda;* ***Chem Asian J*** *2020;* ***15:*** *742-747. https://doi.org/10.1002/asia.202000042*

1.2.2. 3rd 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_2, the latter rendering the reaction irreversible.

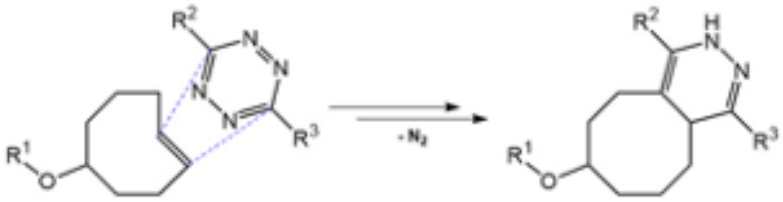


Fig. 4: Reaction between a trans-cyclooctene (TCO) and a tetrazine.

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 $M^{-1}s^{-1}$ and 30000 $M^{-1}s^{-1}$). 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.

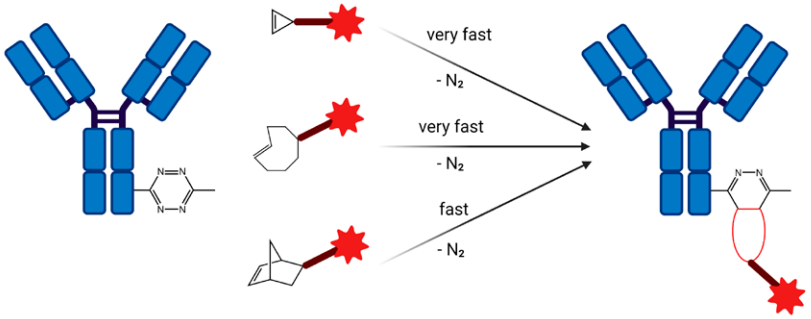
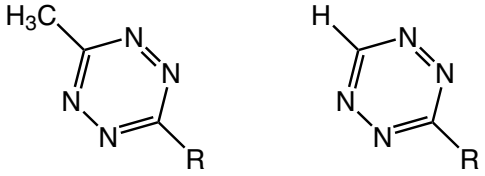


Fig. 5: Common reaction partners for tetrazines.

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 $M^{-1}s^{-1}$). 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 $M^{-1}s^{-1}$) 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.

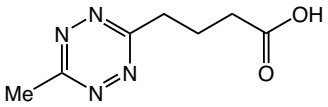
In summary, the reaction between a tetrazine (Tz) and a trans-cyclooctene (TCO) is the innovative third generation Click reaction that proceeds without the use of copper or other catalysts. It is rapid, fully bioorthogonal, irreversible and excels at very low concentrations.

Products with Tetrazine

RL-2140 MeTz-butanoic acid

4-(6-methyl-1,2,4,5-tetrazin-3-yl)butanoic acid

CAS-No. 1923268-81-8
Formula $C_7H_{10}N_4O_2$
Mol. weight 182,18 g/mol

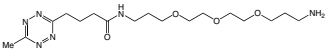


Product code	Packing unit	Price
RL-2140.0250	250 mg	€ 925,00
RL-2140.0500	500 mg	€ 1.680,00
RL-2140.0001	1 g	€ 2.800,00

RL-2100 MeTz-Butanoyl-TOTA*TFA

4-(6-methyl-1,2,4,5-tetrazin-3-yl)-N-(4,7,10-trioxatridecane-13-amine)butanamide trifluoroacetate salt

Formula $C_{17}H_{32}N_6O_4*CF_3CO_2H$
Mol. weight 384,47*114,02 g/mol

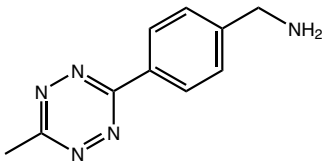


Product code	Packing unit	Price
RL-2100.0025	25 mg	€ 250,00
RL-2100.0100	100 mg	€ 925,00
RL-2100.0250	250 mg	€ 2.150,00

RL-2360 MeTz-Bzl-NH_2*HCl

Methyltetrazine-benzylamine*HCl

CAS-No. 1596117-29-1
Formula $C_{10}H_{11}N_5*HCl$
Mol. weight 201,23*36,46 g/mol

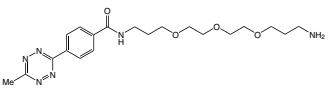


Product code	Packing unit	Price
RL-2360.0025	25 mg	€ 170,00
RL-2360.0100	100 mg	€ 290,00
RL-2360.0500	500 mg	€ 640,00
RL-2360.1000	1 g	€ 1.190,00

RL-2110 MeTz-Phenyl-TOTA*TFA

4-(6-methyl-1,2,4,5-tetrazin-3-yl)-N-(4,7,10-trioxatridecane-13-amine)benzamide trifluoroacetate salt

Formula $C_{20}H_{30}N_6O_4*CF_3CO_2H$
Mol. weight 418,49*114,02 g/mol

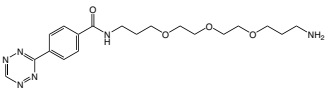


Product code	Packing unit	Price
RL-2110.0025	25 mg	€ 200,00
RL-2110.0100	100 mg	€ 600,00

RL-2590 Tz-benzoyl-TOTA*TFA

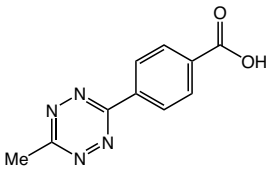
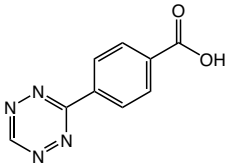
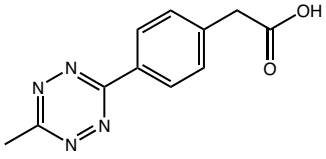
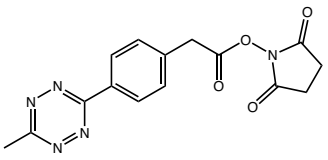
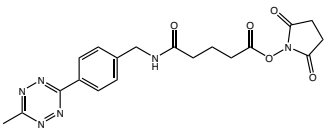
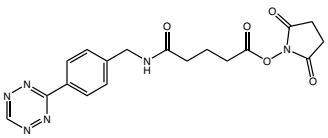
Tz-benzoyl-TOTA*TFA

Formula $C_{19}H_{28}N_6O_4*C_2HF_3O_2$
Mol. weight 404,46*114,02 g/mol

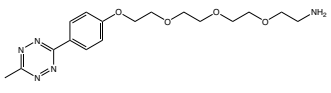
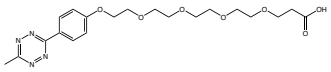
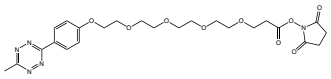
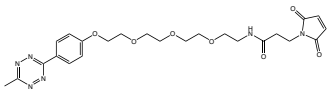
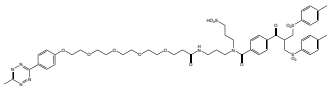
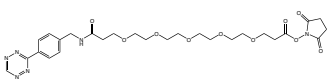


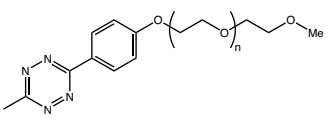
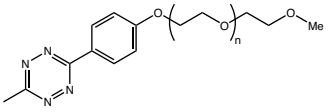
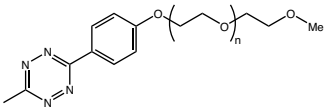
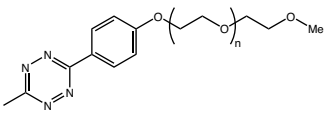
Product code	Packing unit	Price
RL-2590.0050	50 mg	€ 525,00
RL-2590.0100	100 mg	€ 875,00
RL-2590.0250	250 mg	€ 2.100,00
RL-2590.0500	500 mg	€ 3.700,00

Prices are in EUR, net, EXW Germany

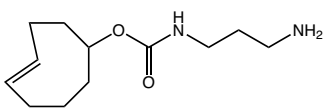
		Product code	Packing unit	Price
RL-2130 MeTz-benzoic acid 4-(6-methyl-1,2,4,5-tetrazin-3-yl)benzoic acid CAS-No. 1345866-66-1 Formula $C_{10}H_8N_4O_2$ Mol. weight 216,2 g/mol		RL-2130.0050 RL-2130.0100 RL-2130.0250 RL-2130.0001	50 mg 100 mg 250 mg 1 g	€ 195,00 € 325,00 € 750,00 € 2.100,00
RL-2580 Tz-benzoic acid 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 RL-2580.0100 RL-2580.0250 RL-2580.0500 RL-2580.1000	50 mg 100 mg 250 mg 500 mg 1 g	€ 200,00 € 350,00 € 800,00 € 1.450,00 € 2.400,00
RL-2300 MeTz-PhAcOH 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 RL-2300.0100 RL-2300.0500 RL-2300.1000	25 mg 100 mg 500 mg 1 g	€ 170,00 € 290,00 € 640,00 € 1.070,00
RL-2320 MeTz-PhAc-NHS 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 RL-2320.0100 RL-2320.0500 RL-2320.1000	25 mg 100 mg 500 mg 1 g	€ 170,00 € 290,00 € 710,00 € 1.190,00
RL-2230 Bz-MeTz-NHS 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
RL-2240 Bz-Tz-NHS 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

Everything for Click Chemistry

		Product code	Packing unit	Price
RL-2370	**MeTz-PEG(4)-NH_2*HCl**			
Methyltetrazine-PEG(4)-amine HCL salt		RL-2370.0025	25 mg	€ 170,00
CAS-No. 1802908-05-9 net		RL-2370.0100	100 mg	€ 410,00
Formula $C_{17}H_{25}N_5O_4$*HCl		RL-2370.0500	500 mg	€ 1.190,00
Mol. weight 363,41*HCl g/mol		RL-2370.1000	1 g	€ 1.840,00
RL-2310	**MeTz-PEG(4)-COOH**			
Methyltetrazine-PEG(4)-acid		RL-2310.0025	25 mg	€ 175,00
CAS-No. 1802907-91-0		RL-2310.0100	100 mg	€ 565,00
Formula $C_{20}H_{28}N_4O_7$		RL-2310.0500	500 mg	€ 1.250,00
Mol. weight 436,56 g/mol		RL-2310.1000	1 g	€ 2.100,00
RL-2330	**MeTz-PEG(4)-NHS**			
Methyltetrazine-PEG(4)-propanoyl succinimidyl ester		RL-2330.0010	10 mg	€ 200,00
CAS-No. 1802907-92-1		RL-2330.0025	25 mg	€ 290,00
Formula $C_{24}H_{31}N_5O_9$		RL-2330.0100	100 mg	€ 640,00
Mol. weight 533,53 g/mol		RL-2330.0500	500 mg	€ 2.070,00
RL-2340	**MeTz-PEG(4)-mal**			
Methyltetrazine-PEG(4)-maleimide		RL-2340.0010	10 mg	€ 200,00
CAS-No. 1802908-02-6		RL-2340.0025	25 mg	€ 290,00
Formula $C_{24}H_{30}N_6O_7$		RL-2340.0100	100 mg	€ 640,00
Mol. weight 514,53 g/mol				
RL-2350	**MeTz-PEG(4)-BisSulfonThiol-Linker**			
Methyltetrazine-PEG(4)-BisSulfon-Thiol-Linker		RL-2350.0010	10 mg	€ 230,00
Formula $C_{51}H_{64}N_6O_{15}S_3$		RL-2350.0025	25 mg	€ 350,00
Mol. weight 1097,28 g/mol		RL-2350.0100	100 mg	€ 1.120,00
RL-2250	**Bz-Tz-PEG(5)-NHS**			
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		RL-2250.0000		please inquire
CAS-No. 1682653-80-0				
Formula $C_{27}H_{36}N_6O_{10}$				
Mol. weight 604,61 g/mol				

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

Products with TCO

		Product code	Packing unit	Price
TCO1060 TCO-NH_2*HCl trans-Cyclooctene-amine hydrochloride CAS-No. 1609659-02-0 Formula $C_{12}H_{22}N_2O_2$*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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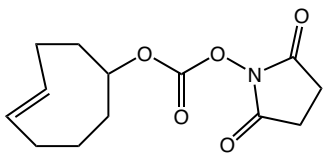
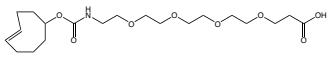
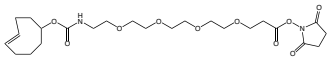
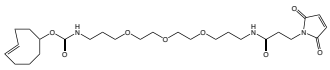
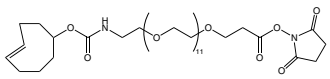
		Product code	Packing unit	Price
TCO1000 TCO-NHS trans-Cyclooctene succinimidyl carbonate CAS-No. 1191901-33-3 Formula $C_{13}H_{17}NO_5$ Mol. weight 267,28 g/mol		TCO1000.0025 TCO1000.0100 TCO1000.1000	25 mg 100 mg 1 g	€ 310,00 € 800,00 € 2.850,00
TCO1040 TCO-PEG(4)-COOH trans-Cyclooctene-PEG(4)-Acid Formula $C_{20}H_{35}NO_8$ Mol. weight 417,49 g/mol		TCO1040.0025 TCO1040.0100 TCO1040.0500	25 mg 100 mg 500 mg	€ 290,00 € 640,00 € 1.960,00
TCO1010 TCO-PEG(4)-NHS 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 TCO1010.0025 TCO1010.0100	10 mg 25 mg 100 mg	€ 325,00 € 450,00 € 950,00
TCO1050 TCO-PEG(3)-mal trans-Cyclooctene-PEG(3)-maleimide CAS-No. 1609659-01-9 Formula $C_{26}H_{41}N_3O_8$ Mol. weight 523,62 g/mol		TCO1050.0025 TCO1050.0100	25 mg 100 mg	€ 425,00 € 850,00
TCO1020 TCO-PEG(12)-NHS trans-Cyclooctene-PEG(12)-carboxy succinimidyl ester Formula $C_{40}H_{70}N_2O_{18}$ Mol. weight 866,99 g/mol		TCO1020.0025 TCO1020.0100	25 mg 100 mg	€ 350,00 € 940,00

References:

- *Biomedical applications of tetrazine cycloadditions; N. K. Devaraj and R. Weissleder;* ***Acc Chem Res*** *2011;* ***44:*** *816-27. https://doi.org/10.1021/ar200037t*
- *trans-Cyclooctene--a stable, voracious dienophile for bioorthogonal labeling; R. Selvaraj and J. M. Fox;* ***Curr Opin Chem Biol*** *2013;* ***17:*** *753-60. https://doi.org/10.1016/j.cbpa.2013.07.031*
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- *3,6-Substituted-1,2,4,5-tetrazines: tuning reaction rates for staged labeling applications; D. Wang, W. Chen, Y. Zheng, C. Dai, K. Wang, B. Ke and B. Wang;* ***Org Biomol Chem*** *2014;* ***12:*** *3950-5. https://doi.org/10.1039/c4ob00280f*
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- *Advances in Tetrazine Bioorthogonal Chemistry Driven by the Synthesis of Novel Tetrazines and Dienophiles; H. Wu and N. K. Devaraj;* ***Acc Chem Res*** *2018;* ***51:*** *1249-1259. https://doi.org/10.1021/acs.accounts.8b00062*
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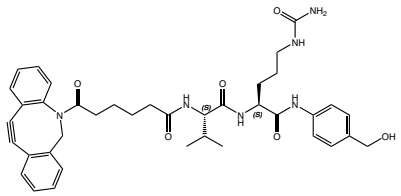
- *Bioorthogonal Fluorescence Turn-On Labeling Based on Bicyclononyne-Tetrazine Cycloaddition Reactions that Form Pyridazine Products; S. J. Siegl, J. Galeta, R. Dzijak, M. Dracinsky and M. Vrabel;* ***Chempluschem*** *2019;* ***84:*** *493-497. https://doi.org/10.1002/cplu.201900176*
- *An Extended Approach for the Development of Fluorogenic trans-Cyclooctene-Tetrazine Cycloadditions; S. J. Siegl, J. Galeta, R. Dzijak, A. Vazquez, M. Del Rio-Villanueva, M. Dracinsky and M. Vrabel;* ***Chembiochem*** *2019;* ***20:*** *886-890. https://doi.org/10.1002/cbic.201800711*

1.2.3. Custom Synthesis of DBCO, Tetrazine and TCO Derivatives

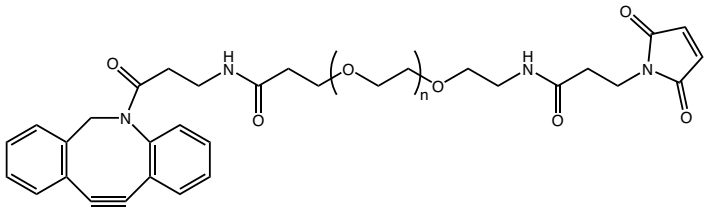
DBCO with Cleavable Linkers

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



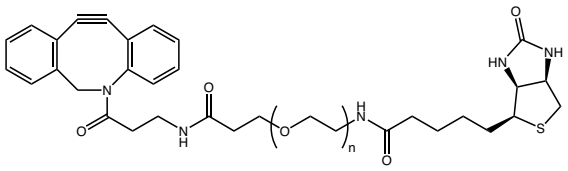
DBCO-PEG-Derivatives

DBCO-PEG-NHS
DBCO-PEG-mal
DBCO-PEG-Bis-Sulfone-Thiol
DBCO-PEG-COOH
DBCO-PEG-NH_2
With mono- or polydisperse PEG.



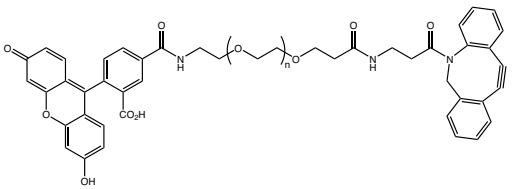
DBCO-Biotin

With both monodisperse
and polydisperse PEG spacers.



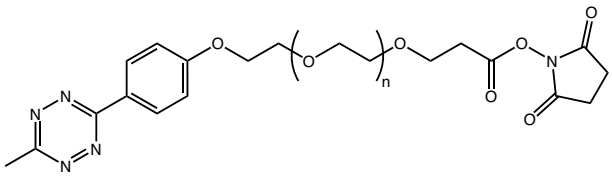
DBCO-Dye

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



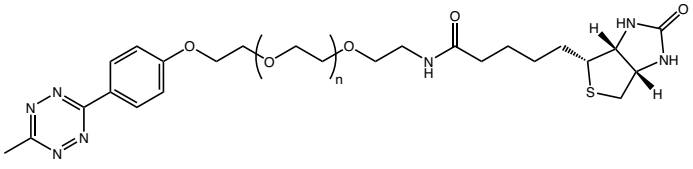
Tetrazine-PEG-Derivatives

Tetrazine-PEG-NHS
Tetrazine-PEG-mal
Tetrazine-PEG-COOH
Tetrazine-PEG-NH_2
With both monodisperse
and polydisperse PEG spacers.



Tetrazine-Biotin

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



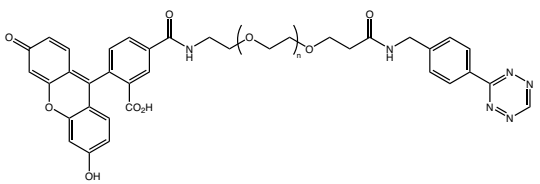
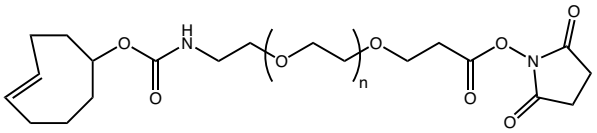
Tetrazine-Dye With both monodisperse and polydisperse PEG spacers. With the dye of your choice, e.g. ICG, (5)6-carboxyfluorescein.	
TCO-PEG-Derivatives TCO-PEG-NHS TCO-PEG-mal TCO-PEG-COOH TCO-PEG-NH_2	

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*

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.

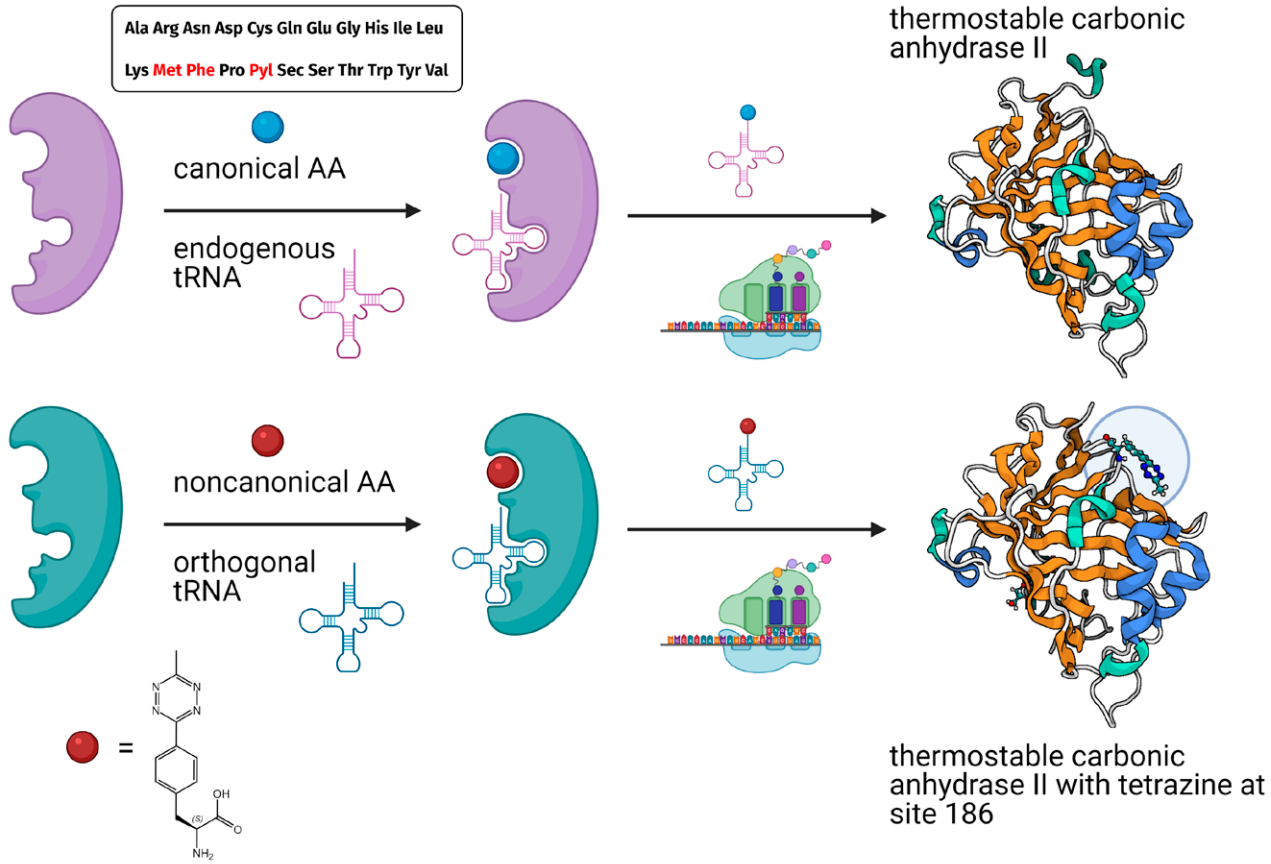


Fig. 6: Principle of genetic code expansion (protein structures adapted from Kean et al., Protein Sci. 2018 ; Bednar et al., ACS Appl. Mater. Interfaces 2019).

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 α-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/ $tRNA^{Pyl}$ 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.

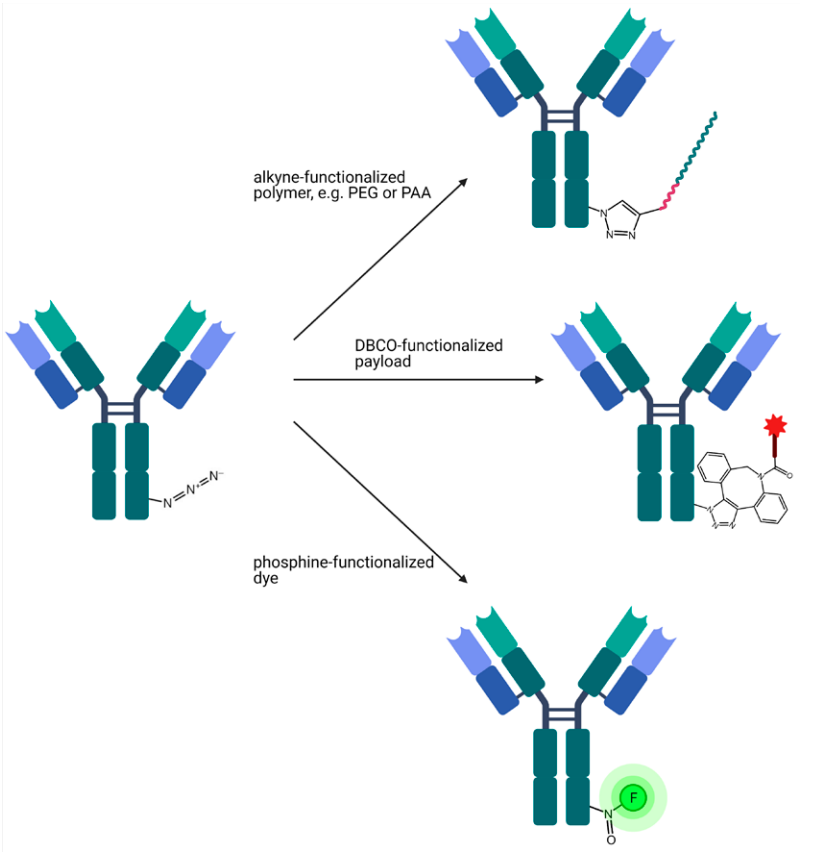
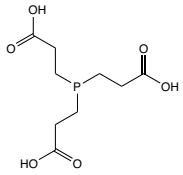


Fig. 7: Site-specific conjugation to an azido-functionalized IgG antibody.

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.

		Product code	Packing unit	Price
LS-3405	**TCEP*HCl**			
Tris-(2-carboxyethyl)phosphine hydrochloride salt		LS-3405.0025	25 g	€ 190,00
		LS-3405.0100	100 g	€ 480,00
CAS-No. 51805-45-9				
Formula $C_9H_{15}O_6P$*HCl				
Mol. weight 250,19*36,45 g/mol				

References:

- *Genetic Code Expansion: Inception, Development, Commercialization; M. Manandhar, E. Chun and F. E. Romesberg;* ***J Am Chem Soc*** *2021. https://doi.org/10.1021/jacs.0c11938*
- *Immobilization of Proteins with Controlled Load and Orientation; R. M. Bednar, T. W. Golbek, K. M. Kean, W. J. Brown, S. Jana, J. E. Baio, P. A. Karplus and R. A. Mehl;* ***ACS Appl Mater Interfaces*** *2019;* ***11:*** *36391-36398. https://doi.org/10.1021/acsami.9b12746*
- *Structural insights into a thermostable variant of human carbonic anhydrase II; K. M. Kean, J. J. Porter, R. A. Mehl and P. A. Karplus;* ***Protein Sci*** *2018;* ***27:*** *573-577. https://doi.org/10.1002/pro.3347*
- *Cell-free protein synthesis as a novel tool for directed glycoengineering of active erythropoietin; A. Zemella, L. Thoring, C. Hoffmeister, M. Samalikova, P. Ehren, D. A. Wustenhagen and S. Kubick;* ***Sci Rep*** *2018;* ***8:*** *8514. https://doi.org/10.1038/s41598-018-26936-x*
- *Cell-free synthesis of functional human epidermal growth factor receptor: Investigation of ligand-independent dimerization in Sf21 microsomal membranes using non-canonical amino acids; R. B. Quast, B. Ballion, M. Stech, A. Sonnabend, B. R. Varga, D. A. Wustenhagen, P. Kele, S. M. Schiller and S. Kubick;* ***Sci Rep*** *2016;* ***6:*** *34048. https://doi.org/10.1038/srep34048*
- *Stabilization of bacterially expressed erythropoietin by single site-specific introduction of short branched PEG chains at naturally occurring glycosylation sites; E. Hoffmann, K. Streichert, N. Nischan, C. Seitz, T. Brunner, S. Schwagerus, C. P. Hackenberger and M. Rubini;* ***Mol Biosyst*** *2016;* ***12:*** *1750-5. https://doi.org/10.1039/c5mb00857c*
- *Cotranslational incorporation of non-standard amino acids using cell-free protein synthesis; R. B. Quast, D. Mrusek, C. Hoffmeister, A. Sonnabend and S. Kubick;* ***FEBS Lett*** *2015;* ***589:*** *1703-12. https://doi.org/10.1016/j.febslet.2015.04.041*
- *Pyrrolysyl-tRNA synthetase: an ordinary enzyme but an outstanding genetic code expansion tool; W. Wan, J. M. Tharp and W. R. Liu;* ***Biochim Biophys Acta*** *2014;* ***1844:*** *1059-70. https://doi.org/10.1016/j.bbapap.2014.03.002*
- *Genetic encoding and labeling of aliphatic azides and alkynes in recombinant proteins via a pyrrolysyl-tRNA Synthetase/ tRNA(CUA) pair and click chemistry; D. P. Nguyen, H. Lusic, H. Neumann, P. B. Kapadnis, A. Deiters and J. W. Chin;* ***J Am Chem Soc*** *2009;* ***131:*** *8720-1. https://doi.org/10.1021/ja900553w*
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- *Tandem orthogonal proteolysis-activity-based protein profiling (TOP-ABPP)--a general method for mapping sites of probe modification in proteomes; E. Weerapana, A. E. Speers and B. F. Cravatt;* ***Nat Protoc*** *2007;* ***2:*** *1414-25. https://doi.org/10.1038/nprot.2007.194*
- *Direct charging of tRNACUA with pyrrolysine in vitro and in vivo; S. K. Blight, R. C. Larue, A. Mahapatra, D. G. Longstaff, E. Chang, G. Zhao, P. T. Kang, K. B. Green-Church, M. K. Chan and J. A. Krzycki;* ***Nature*** *2004;* ***431:*** *333. https://doi.org/10.1038/nature02895*
- *Incorporation of azides into recombinant proteins for chemoselective modification by the Staudinger ligation; K. L. Kiick, E. Saxon, D. A. Tirrell and C. R. Bertozzi;* ***Proc Natl Acad Sci U S A*** *2002;* ***99:*** *19-24. https://doi.org/10.1073/pnas.012583299*
- *Global replacement of tryptophan with aminotryptophans generates non-invasive protein-based optical pH sensors; N. Budisa, M. Rubini, J. H. Bae, E. Weyher, W. Wenger, R. Golbik, R. Huber and L. Moroder;* ***Angew. Chem. Int. Ed. Engl.*** *2002;* ***41:*** *4066-9. https://doi.org/10.1002/1521-3773(20021104)41:21<4066::AID-ANIE4066>3.0.CO;2-6*

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 α-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 µmol peptide in 4 ml *t*BuOH/H_2O (1:2) with excess of ascorbic acid (40 µmol) and $CuSO_4$*5 H_2O (40 µmol) 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]

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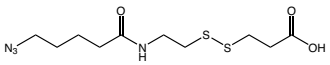
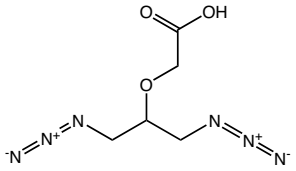
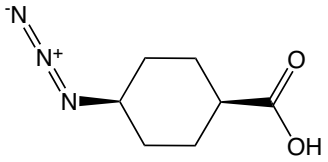
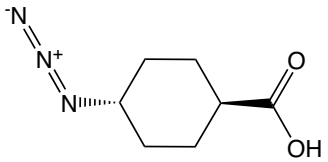
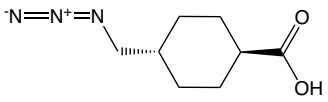
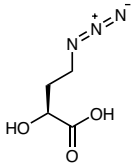
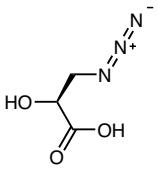
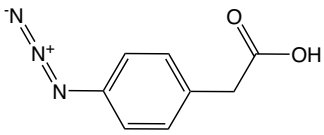
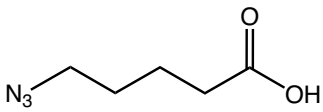
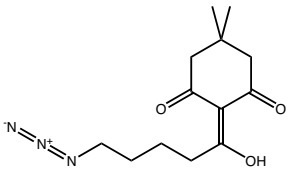
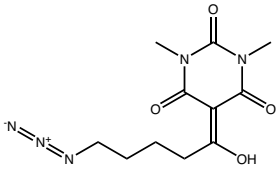
- *Synthesis and conformational analysis of a cyclic peptide obtained via i to i+4 intramolecular side-chain to side-chain azide-alkyne 1,3-dipolar cycloaddition; S. Cantel, C. Isaad Ale, M. Scrima, J. J. Levy, R. D. DiMarchi, P. Rovero, J. A. Halperin, A. M. D'Ursi, A. M. Papini and M. Chorev; **J Org Chem** 2008; **73:** 5663-74. https://doi.org/10.1021/jo800142s*
- *Side chain-to-side chain cyclization by click reaction; A. Le Chevalier Isaad, A. M. Papini, M. Chorev and P. Rovero; **J. Pept. Sci.** 2009; **15:** 451-4. https://doi.org/10.1002/psc.1141*
- *CuI-Catalyzed Azide-Alkyne Intramolecular i-to-(i+4) Side-Chain-to-Side-Chain Cyclization Promotes the Formation of Helix-Like Secondary Structures; M. Scrima, A. Le Chevalier-Isaad, P. Rovero, A. M. Papini, M. Chorev and A. M. D'Ursi; **Eur. J. Org. Chem.** 2010; **2010:** 446-457. https://doi.org/10.1002/ejoc.200901157*
- *Improved synthesis and biological evaluation of chelator-modified alpha-MSH analogs prepared by copper-free click chemistry; N. J. Baumhover, M. E. Martin, S. G. Parameswarappa, K. C. Kloepping, M. S. O'Dorisio, F. C. Pigge and M. K. Schultz; **Bioorg Med Chem Lett** 2011; **21:** 5757-61. https://doi.org/10.1016/j.bmcl.2011.08.017*
- *„Click"-cyclized (68)Ga-labeled peptides for molecular imaging and therapy: synthesis and preliminary in vitro and in vivo evaluation in a melanoma model system; M. E. Martin, M. Sue O'Dorisio, W. M. Leverich, K. C. Kloepping, S. A. Walsh and M. K. Schultz; **Recent Results Cancer Res** 2013; **194:** 149-75. https://doi.org/10.1007/978-3-642-27994-2_9*

2.3. Azido Amino Acids

Azido-Alkyl Acids and Azido-Aryl Acids

		Product code	Packing unit	Price
RL-3320 Azido-SS-COOH 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
AAA2190 DAPOA*DCHA 2-(1,3-diazidopropan-2-yloxy)acetic acid dicyclo-hexylamine CAS-No. 2389064-43-9 net Formula $C_5H_8N_6O_3*C_{12}H_{23}N$ 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
HAA2230 N_3-1,4-cis-CHC-OH 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
HAA2235 N_3-1,4-trans-CHC-OH 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
HAA2240 N_3-trans-MCHC-OH 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
HAA3175 N_3-HABA*DCHA (2S) (S)-4-azido-2-hydroxybutyric acid dicyclohexalamine CAS-No. 959148-55-1 net Formula $C_4H_7N_3O_3*C_{12}H_{23}N$ Mol. weight 145,12*181,32 g/mol		HAA3175.0250 HAA3175.0500 HAA3175.1000 HAA3175.5000	250 mg 500 mg 1 g 5 g	€ 80,00 € 145,00 € 225,00 € 800,00
HAA3365 N_3-IsoSer*DCHA (2S) (S)-2-Hydroxy-3-azidopropanoic acid dicyclohexalamine CAS-No. 1620171-65-4 net Formula $3H_5N_3O_3*C_{12}H_{23}N$ Mol. weight 131,09*181,32 g/mol		HAA3365.0250 HAA3365.0500 HAA3365.1000 HAA3365.5000	250 mg 500 mg 1 g 5 g	€ 80,00 € 145,00 € 225,00 € 800,00
HAA2245 N_3-PhAc-OH (4-Azidophenyl)acetic acid CAS-No. 62893-37-2 Formula $C_8H_7N_3O_2$ Mol. weight 177,16 g/mol		HAA2245.0500 HAA2245.0001 HAA2245.0005 HAA2245.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
AAA1970 N_3-Pen-OH 5-Azido-pentanoic acid CAS-No. 79583-98-5 Formula $C_5H_9N_3O_2$ Mol. weight 143,14 g/mol		AAA1970.0001 AAA1970.0005	1 g 5 g	€ 120,00 € 450,00
RL-3280 N_3-Pen-Dde 2-(5-azido-1-hydroxypentylidene)-5,5-dimethylcyclohexane-1,3-dione CAS-No. 1867129-38-1 Formula $C_{13}H_{19}N_3O_3$ Mol. weight 265,31 g/mol		RL-3280.0250 RL-3280.0001 RL-3280.0005	250 mg 1 g 5 g	€ 125,00 € 350,00 € 1.400,00
RL-3290 N_3-Pen-Dtpp 5-(5-azido-1-hydroxypentylidene)-1,3-dimethylpyrimidine-2,4,6(1H,3H,5H)-trione CAS-No. 1867129-42-7 Formula $C_{11}H_{15}N_5O_4$ Mol. weight 281,27 g/mol		RL-3290.0250 RL-3290.0001 RL-3290.0005	250 mg 1 g 5 g	€ 125,00 € 350,00 € 1.400,00

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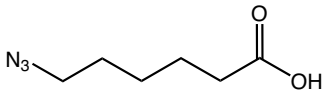
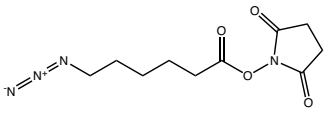
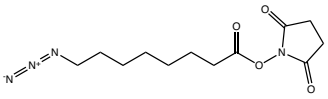
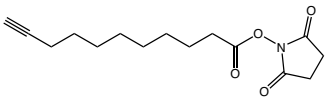
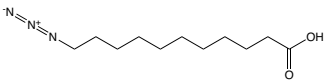
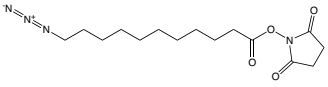
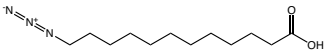
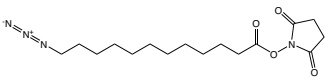
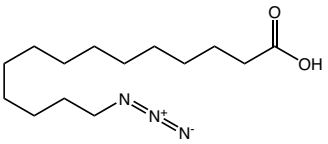
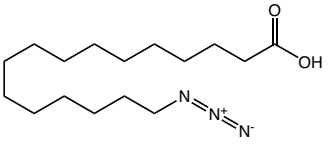
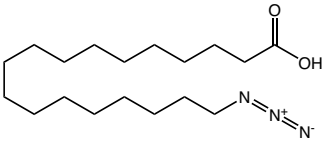
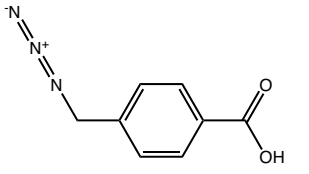
		Product code	Packing unit	Price
AAA1960 N_3-Hx-OH 6-Azido-hexanoic acid CAS-No. 79598-53-1 Formula $C_6H_{11}N_3O_2$ Mol. weight 157,17 g/mol		AAA1960.0001 AAA1960.0005	1 g 5 g	€ 120,00 € 450,00
RL-2980 N_3-Aca-OSu 6-Azidocaproic acid N-hydroxysuccinimidyl ester CAS-No. 866363-70-4 Formula $C_{10}H_{14}N_4O_4$ Mol. weight 254,24		RL-2980.0100 RL-2980.0250 RL-2980.0500 RL-2980.0001 RL-2980.0005	100 mg 250 mg 500 mg 1 g 5 g	€ 115,00 € 195,00 € 320,00 € 480,00 € 1.600,00
RL-3480 8-azido-octanoyl-OSu 8-Azidodooctanoic acid N-hydroxysuccinimide ester Formula $C_{12}H_{18}N_4O_4$ Mol. weight 282,30 g/mol		RL-3480.0250 RL-3480.0500 RL-3480.1000 RL-3480.5000	250 mg 500 mg 1 g 5 g	€ 120,00 € 216,00 € 336,00 € 1.200,00
RL-3460 10-Undecynoyl-OSu 10-Undecynoic acid N-hydroxysuccinimide ester CAS-No. 1006592-57-9 Formula $C_{15}H_{21}NO_4$ Mol. weight 279,34 g/mol		RL-3460.0250 RL-3460.0500 RL-3460.0001 RL-3460.0005	250 mg 500 mg 1 g 5 g	€ 89,00 € 160,00 € 250,00 € 890,00
RL-3200 11-Azidoundecanoic acid 11-Azido-undecanoic acid CAS-No. 118162-45-1 Formula $C_{11}H_{21}N_3O_2$ Mol. weight 227,30 g/mol		RL-3200.0500 RL-3200.0001 RL-3200.0005 RL-3200.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
RL-3170 11-azido-undecanoyl-OSu 11-azidoundecanoic acid N-hydroxysuccinimide ester CAS-No. 850080-13-6 Formula $C_{15}H_{24}N_4O_4$ Mol. weight 324,38 g/mol		RL-3170.0250 RL-3170.0500 RL-3170.1000 RL-3170.5000	250 mg 500 mg 1 g 5 g	€ 100,00 € 180,00 € 280,00 € 1.000,00

		Product code	Packing unit	Price
RL-3210	**12-Azidododecanoic acid**			
12-Azido-dodecanoic acid		RL-3210.0500	500 mg	€ 108,00
CAS-No. 80667-36-3		RL-3210.0001	1 g	€ 168,00
Formula $C_{12}H_{23}N_3O_2$		RL-3210.0005	5 g	€ 600,00
Mol. weight 241,33 g/mol		RL-3210.0025	25 g	€ 2.400,00
RL-3220	**12-azido-dodecanoyl-OSu**			
12-Azidododecanoic acid N-hydroxysuccinimide ester		RL-3220.0250	250 mg	€ 100,00
		RL-3220.0500	500 mg	€ 180,00
CAS-No. 2489524-00-5		RL-3220.0001	1 g	€ 280,00
Formula $C_{16}H_{26}N_4O_4$		RL-3220.0005	5 g	€ 1.000,00
Mol. weight 338,40 g/mol				
RL-3230	**14-Azido-myristic acid**			
14-azidotetradecanoic acid		RL-3230.0100	100 mg	€ 175,00
CAS-No. 176108-61-5		RL-3230.0500	500 mg	€ 600,00
Formula $C_{14}H_{27}N_3O_2$		RL-3230.0001	1 g	€ 1.000,00
Mol. weight 269,38 g/mol				
RL-3240	**16-Azido-palmitic acid**			
16-azidohexadecanoic acid		RL-3240.0100	100 mg	€ 250,00
CAS-No. 112668-54-9		RL-3240.0500	500 mg	€ 960,00
Formula $C_{16}H_{31}N_3O_2$		RL-3240.1000	1 g	€ 1.600,00
Mol. weight 297,44 g/mol				
RL-3250	**18-Azido-stearic acid**			
18-azidooctadecanoic acid		RL-3250.0100	100 mg	€ 375,00
CAS-No. 1529763-58-3		RL-3250.0250	250 mg	€ 750,00
Formula $C_{18}H_{35}N_3O_2$		RL-3250.0500	500 mg	€ 1.450,00
Mol. weight 325,49 g/mol		RL-3250.0001	1 g	€ 2.400,00
RL-2995	**4-(Azidomethyl)benzoic acid**			
4-Azidomethylbenzoic acid		RL-2995.9500	500 mg	€ 90,00
CAS-No. 79584-03-5		RL-2995.0001	1 g	€ 140,00
Formula $C_8H_7N_3O_2$		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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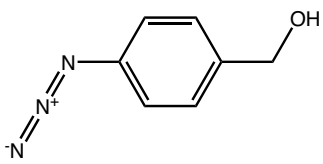
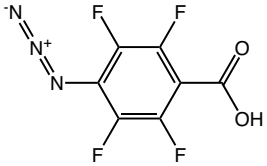
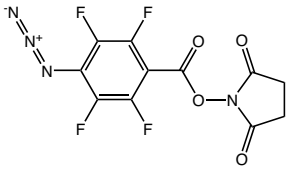
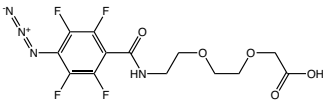
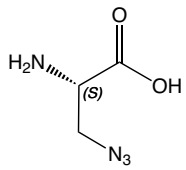
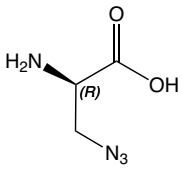
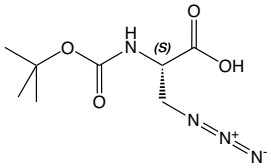
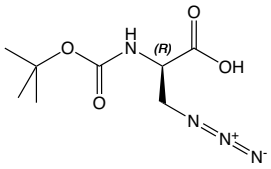
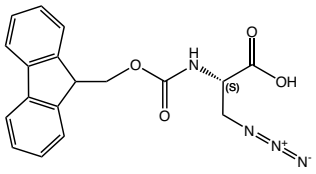
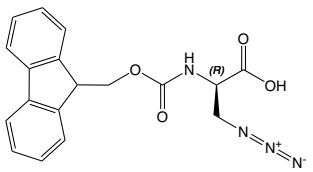
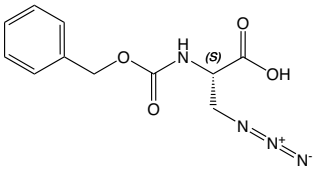
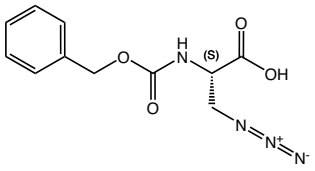
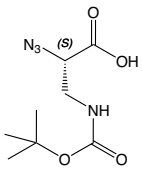
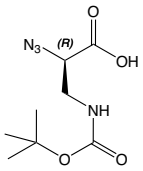
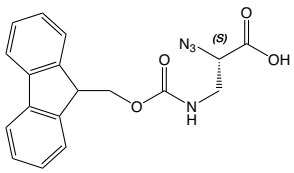
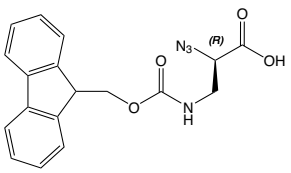
		Product code	Packing unit	Price
RL-2990	**4-Azidobenzyl alcohol**			
(4-azidophenyl)methanol		RL-2990.0100	100 mg	€ 150,00
CAS-No. 31499-54-4		RL-2990.0250	250 mg	€ 250,00
Formula $C_7H_7N_3O$		RL-2990.0500	500 mg	€ 450,00
Mol. weight 149,15 g/mol		RL-2990.0001	1 g	€ 700,00
RL-2035	**ATFB**			
4-Azido-2,3,5,6-tetrafluorobenzoic acid		RL-2035.0250	250 mg	€ 100,00
CAS-No. 122590-77-6		RL-2035.0500	500 mg	€ 180,00
Formula $C_7HF_4N_3O_2$		RL-2035.0001	1 g	€ 280,00
Mol. weight 235,1 g/mol		RL-2035.0005	5 g	€ 1.000,00
RL-2045	**ATFB-NHS**			
N-Succinimidyl 4-azido-2,3,5,6-tetrafluoroben-zoate		RL-2045.0100	100 mg	€ 96,00
CAS-No. 126695-58-7		RL-2045.0250	250 mg	€ 160,00
Formula $C_{11}H_4F_4N_4O_4$		RL-2045.0500	500 mg	€ 288,00
Mol. weight 332,17 g/mol		RL-2045.1000	1 g	€ 448,00
		RL-2045.5000	5 g	€ 1.600,00
PEG5000	**N_3-TFBA-O2Oc**			
{2-[2-(4-Azido-2,3,5,6-tetrafluorobenzoyl-amino) ethoxy]ethoxy}acetic acid		PEG5000.0100	100 mg	€ 120,00
CAS-No. 1993119-45-1		PEG5000.0250	250 mg	€ 200,00
Formula $C_{13}H_{12}F_4N_4O_5$		PEG5000.0500	500 mg	€ 360,00
Mol. weight 380,25 g/mol		PEG5000.1000	1 g	€ 560,00
		PEG5000.5000	5 g	€ 2.000,00

Azido-Alanine and Propionic Acid Derivatives

		Product code	Packing unit	Price
HAA1880	**H-L-Aza-OH*HCl hydrate**			
(S)-2-Amino-3-azidopropanoic acid hydrochloride hydrate		HAA1880.0500	500 mg	€ 108,00
CAS-No. 1620171-64-3		HAA1880.0001	1 g	€ 168,00
Formula $C_3H_6N_4O_2$*HCl*nH_2O		HAA1880.0005	5 g	€ 600,00
Mol. weight 130,11*36,45 g/mol		HAA1880.0025	25 g	€ 2.400,00

		Product code	Packing unit	Price
HAA1885 H-D-Aza-OH*HCl hydrate (R)-2-Amino-3-azidopropanoic acid hydrochloride hydrate CAS-No. 1379690-01-3 Formula $C_3H_6N_4O_2$*HCl*nH_2O Mol. weight 130,11*36,45 g/mol		HAA1885.0250 HAA1885.0500 HAA1885.0001 HAA1885.0005	250 mg 500 mg 1 g 5 g	€ 70,00 € 126,00 € 196,00 € 700,00
BAA1820 Boc-L-Aza-OH*CHA (S)-2-t-Butyloxycarbonylamino-3-azidopropanoic acid cyclohexylamine CAS-No. 2098496-88-7 Formula $C_8H_{14}N_4O_4$*$C_6H_{13}N$ Mol. weight 230,22*99,18 g/mol		BAA1820.0001 BAA1820.0005 BAA1820.0025	1 g 5 g 25 g	€ 112,00 € 400,00 € 1.600,00
BAA1825 Boc-D-Aza-OH*CHA (R)-2-t-Butyloxycarbonylamino-3-azidopropanoic acid cyclohexylamine CAS-No. 225780-77-8net Formula $C_8H_{14}N_4O_4$*$C_6H_{13}N$ Mol. weight 230,22*99,18 g/mol		BAA1825.0500 BAA1825.0001 BAA1825.0005 BAA1825.0025	500 mg 1 g 5 g 25 g	€ 99,00 € 154,00 € 550,00 € 2.200,00
FAA1820 Fmoc-L-Aza-OH (solv.) (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 FAA1820.0001 FAA1820.0005 FAA1820.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
FAA6870 Fmoc-D-Aza-OH (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 FAA6870.0001 FAA6870.0005 FAA6870.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
ZAA1280 Z-L-Dap(N_3)-OH*CHA (S)-2-Benzyloxycarbonylamino-3-azidopropanoic acid cyclohexylamine CAS-No. 684270-44-8 net Formula $C_{11}H_{12}N_4O_4$*$C_6H_{13}N$ Mol. weight 264,24*99,18 g/mol		ZAA1280.0500 ZAA1280.0001 ZAA1280.0005 ZAA1280.0025	500 mg 1 g 5 g 25 g	€ 72,00 € 112,00 € 400,00 € 1.600,00

		Product code	Packing unit	Price
ZAA1300 Z-L-Dap(N_3)-OH N-alpha-Benzyloxycarbonyl-L-2-amino-3-azido-propanoic acid CAS-No. 684270-44-8 Formula $C_{11}H_{12}N_4O_4$ Mol. weight 264,24 g/mol		ZAA1300.0500 ZAA1300.0001 ZAA1300.0005 ZAA1300.0025	500 mg 1 g 5 g 25 g	€ 72,00 € 112,00 € 400,00 € 1.600,00
HAA2130 N_3-L-Dap(Boc)-OH (S)-2-Azido-3-((t-butyloxycarbonyl)amino)propanoic acid CAS-No. 1932432-15-9 Formula $C_8H_{14}N_4O_4$ Mol. weight 230,22 g/mol		HAA2130.0500 HAA2130.0001 HAA2130.0005 HAA2130.0025	500 mg 1 g 5 g 25 g	€ 90,00 € 140,00 € 500,00 € 2.000,00
HAA2135 N_3-D-Dap(Boc)-OH (R)-2-Azido-3-((t-butyloxycarbonyl)amino)propanoic acid Formula $C_8H_{14}N_4O_4$ Mol. weight 230,22 g/mol		HAA2135.0500 HAA2135.0001 HAA2135.0005 HAA2135.0025	500 mg 1 g 5 g 25 g	€ 126,00 € 196,00 € 700,00 € 2.800,00
HAA2140 N_3-L-Dap(Fmoc)-OH (S)-2-Azido-3-[(9-fluorenylmethyloxycarbonyl) amino]propanoic acid CAS-No. 880637-82-1 Formula $C_{18}H_{16}N_4O_4$ Mol. weight 352,34 g/mol		HAA2140.0500 HAA2140.0001 HAA2140.0005 HAA2140.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
HAA2145 N_3-D-Dap(Fmoc)-OH (R)-2-Azido-3-[(9-fluorenylmethyloxycarbonyl) amino]propanoic acid CAS-No. 1807631-13-5 Formula $C_{18}H_{16}N_4O_4$ Mol. weight 352,34 g/mol		HAA2145.0250 HAA2145.0500 HAA2145.0001 HAA2145.0005 HAA2145.0025	250 mg 500 mg 1 g 5 g 25 g	€ 80,00 € 144,00 € 224,00 € 800,00 € 3.200,00

Prices are in EUR, net, EXW Germany

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- *Peptide tertiary structure nucleation by side-chain crosslinking with metal complexation and double „click" cycloaddition; O. Torres, D. Yuksel, M. Bernardina, K. Kumar and D. Bong;* ***Chembiochem*** *2008;* ***9:*** *1701-5. https://doi.org/10.1002/cbic.200800040*
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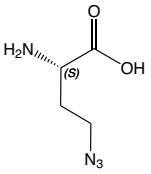
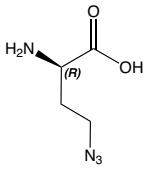
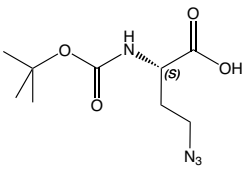
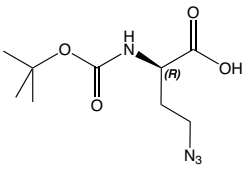
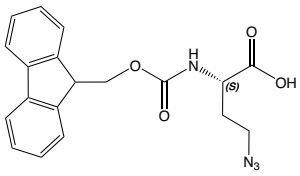
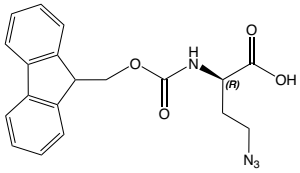
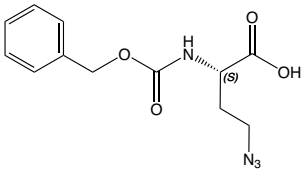
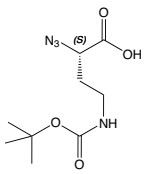
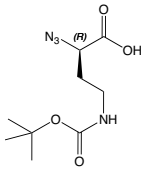
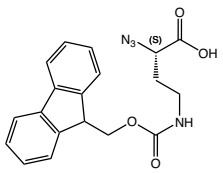
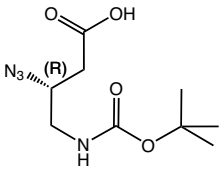
Azido-Homoalanine and Butanoic Acid Derivatives

		Product code	Packing unit	Price
HAA5730 H-L-Aha-OH*HCl (S)-2-Amino-4-azidobutanoic acid hydrochloride CAS-No. 942518-29-8 Formula $C_4H_8N_4O_2$*HCl Mol. weight 144,13*36,45 g/mol		HAA5730.0500 HAA5730.0001 HAA5730.0005 HAA5730.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
HAA1630 H-D-Aha-OH*HCl (R)-2-Amino-4-azidobutanoic acid hydrochloride CAS-No. 1858224-26-6 Formula $C_4H_8N_4O_2$*HCl Mol. weight 144,13*36.45 g/mol		HAA1630.0250 HAA1630.0500 HAA1630.0001 HAA1630.0005	250 mg 500 mg 1 g 5 g	€ 70,00 € 126,00 € 196,00 € 700,00
BAA1800 Boc-L-Aha-OH*CHA (S)-2-t-Butyloxycarbonylamino-4-azidobutanoic acid cyclohexylamine CAS-No. 120042-08-2net Formula $C_9H_{16}N_4O_4$*$C_6H_{13}N$ Mol. weight 244,25*99,18 g/mol		BAA1800.0500 BAA1800.0001 BAA1800.0005 BAA1800.0025	500 mg 1 g 5 g 25 g	€ 72,00 € 112,00 € 400,00 € 1.600,00

		Product code	Packing unit	Price
BAA1805 Boc-D-Aha-OH*CHA (R)-2-t-Butyloxycarbonylamino-4-azidobutanoic acid cyclohexylamine CAS-No. 1609202-75-6 net Formula $C_9H_{16}N_4O_4*C_6H_{13}N$ Mol. weight 244,25*99,18 g/mol		BAA1805.0500 BAA1805.0001 BAA1805.0005 BAA1805.0025	500 mg 1 g 5 g 25 g	€ 99,00 € 154,00 € 550,00 € 2.200,00
FAA6620 Fmoc-L-Aha-OH (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 FAA6620.0001 FAA6620.0005 FAA6620.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
FAA6810 Fmoc-D-Aha-OH (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 FAA6810.0001 FAA6810.0005 FAA6810.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
ZAA5700 Z-L-Aha-OH*DCHA (S)-2-Benzyloxycarbonylamino-4-azidobutanoic acid dicyclohexylamine CAS-No. 1263047-43-3 net Formula $C_{12}H_{14}N_4O_4*C_{12}H_{23}N$ Mol. weight 278,26*181,34 g/mol		ZAA5700.0500 ZAA5700.0001 ZAA5700.0005 ZAA5700.0025	500 mg 1 g 5 g 25 g	€ 72,00 € 112,00 € 400,00 € 1.600,00
HAA2150 N_3-L-Dab(Boc)-OH (S)-2-Azido-4-((t-butyloxycarbonyl)amino)butanoic acid CAS-No. 1932403-71-8 Formula $C_9H_{16}N_4O_4$ Mol. weight 244,25 g/mol		HAA2150.0500 HAA2150.0001 HAA2150.0005 HAA2150.0025	500 mg 1 g 5 g 25 g	€ 90,00 € 140,00 € 500,00 € 2.000,00
HAA2155 N_3-D-Dab(Boc)-OH (R)-2-Azido-4-((t-butyloxycarbonyl)amino)butanoic acid CAS-No. 1922891-74-4 Formula $C_9H_{16}N_4O_4$ Mol. weight 244,25 g/mol		HAA2155.0500 HAA2155.0001 HAA2155.0005 HAA2155.0025	500 mg 1 g 5 g 25 g	€ 135,00 € 210,00 € 750,00 € 3.000,00

Prices are in EUR, net, EXW Germany

		Product code	Packing unit	Price
HAA3170 N_3-L-Dab(Fmoc)-OH (S)-2-Azido-4-[(9-fluorenylmethyloxycarbonyl) amino]butanoic acid CAS-No. 2250436-44-1 Formula $C_9H_{16}N_4O_4$ 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
HAA2280 N_3-Dbu(Boc)-OH (R) (R)-3-Azido-4-((t-butyloxycarbonyl)amino)butanoic acid CAS-No. 1923268-76-1 Formula $C_9H_{16}N_4O_4$ Mol. weight 244,25 g/mol		HAA2280.0100	100 mg	€ 108,00
		HAA2280.0250	250 mg	€ 180,00
		HAA2280.0500	500 mg	€ 324,00
		HAA2280.1000	1 g	€ 504,00
		HAA2280.5000	5 g	€ 1.800,00

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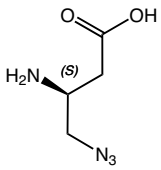
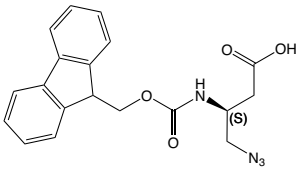
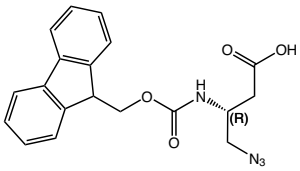
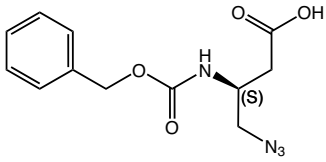
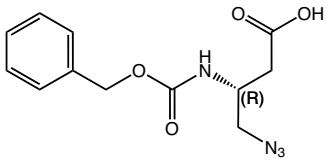
- *„Clickable" elastins: elastin-like polypeptides functionalized with azide or alkyne groups; R. L. Teeuwen, S. S. van Berkel, T. H. van Dulmen, S. Schoffelen, S. A. Meeuwissen, H. Zuilhof, F. A. de Wolf and J. C. van Hest;* ***Chem Commun (Camb)*** *2009: 4022-4. https://doi.org/10.1039/b903903a*

Azido-beta-Homoalanine

		Product code	Packing unit	Price
HAA3970 H-L-Dbu(N_3)-OH*HCl (S)-3-Amino-4-azidobutanoic acid hydrochloride CAS-No. 2389078-78-6 net Formula $C_4H_8N_4O_2$*HCl Mol. weight 144,13*36,45 g/mol		HAA3970.0250 HAA3970.0500 HAA3970.0001 HAA3970.0005	250 mg 500 mg 1 g 5 g	€ 100,00 € 180,00 € 280,00 € 1.000,00
FAA2035 Fmoc-L-Dbu(N_3)-OH (S)-3-(9-Fluorenylmethyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 934502-72-4 Formula $C_{19}H_{18}N_4O_4$ Mol. weight 366,37 g/mol		FAA2035.0500 FAA2035.0001 FAA2035.0005 FAA2035.0025	500 mg 1 g 5 g 25 g	€ 135,00 € 210,00 € 750,00 € 3.000,00
FAA3650 Fmoc-D-Dbu(N_3)-OH (R)-3-(9-Fluorenylmethyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 1932023-47-6 Formula $C_{19}H_{18}N_4O_4$ Mol. weight 366,37 g/mol		FAA3650.0250 FAA3650.0500 FAA3650.0001 FAA3650.0005	250 mg 500 mg 1 g 5 g	€ 100,00 € 180,00 € 280,00 € 1.000,00
ZAA1290 Z-L-Dbu(N_3)-OH (S)-3-(Benzyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 1932657-23-2 Formula $C_{12}H_{14}N_4O_4$ Mol. weight 278,26 g/mol		ZAA1290.0000		please inquire
ZAA1285 Z-D-Dbu(N_3)-OH (R)-3-(Benzyloxycarbonyl)amino-4-azido-butanoic acid CAS-No. 1931958-82-5 Formula $C_{12}H_{14}N_4O_4$ Mol. weight 278,26 g/mol		ZAA1285.0000		please inquire

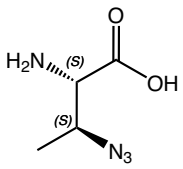
2-Amino-3-Azido-Butanoic Acid

	Product code	Packing unit	Price

HAA3010 H-Abu(3-N_3)-OH*HCl (2S,3S)

(2S,3S)-2-amino-3-azidobutanoic acid hydrochloride

Formula $C_4H_8N_4O_2$*HCl
Mol. weight 144,13*36,45 g/mol

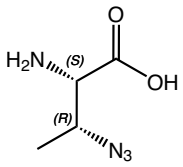


HAA3010.0100	100 mg	€ 145,00
HAA3010.0250	250 mg	€ 240,00
HAA3010.0500	500 mg	€ 435,00
HAA3010.1000	1 g	€ 675,00
HAA3010.5000	5 g	€ 2.400,00

HAA3020 H-Abu(3-N_3)-OH*HCl (2S,3R)

(2S,3S)-2-amino-3-azidobutanoic acid hydrochloride

Formula $C_4H_8N_4O_2$*HCl
Mol. weight 144,13*36,45 g/mol

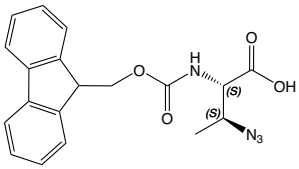


HAA3020.0100	100 mg	€ 390,00
HAA3020.0250	250 mg	€ 650,00
HAA3020.0500	500 mg	€ 1.150,00
HAA3020.1000	1 g	€ 1.800,00

FAA2040 Fmoc-Abu(3-N_3)-OH (2S,3S)

(2S,3S)-2-(9-Fluorenylmethyloxycarbonyl)amino-3-azido-butanoic acid

CAS-No. 131669-42-6
Formula $C_{19}H_{18}N_4O_4$
Mol. weight 366,37 g/mol

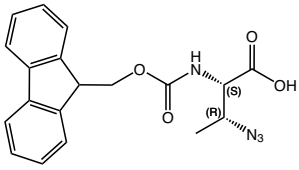


FAA2040.0250	250 mg	€ 75,00
FAA2040.0500	500 mg	€ 135,00
FAA2040.0001	1 g	€ 210,00
FAA2040.0005	5 g	€ 750,00
FAA2040.0025	25 g	€ 3.000,00

FAA3200 Fmoc-Abu(3-N_3)-OH (2S,3R)

(2S,3R)-2-(9-Fluorenylmethyloxycarbonyl)amino-3-azido-butanoic acid

CAS-No. 146306-79-8
Formula $C_{19}H_{18}N_4O_4$
Mol. weight 366,37 g/mol

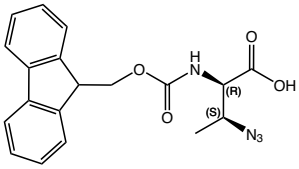


FAA3200.0100	100 mg	€ 132,00
FAA3200.0250	250 mg	€ 220,00
FAA3200.0500	100 mg	€ 396,00
FAA3200.1000	1 g	€ 616,00
FAA3200.5000	5 g	€ 2.200,00

FAA3540 Fmoc-Abu(3-N_3)-OH (2R,3S)

(2R,3S)-2-(9-Fluorenylmethyloxycarbonyl)amino-3-azido-butanoic acid

CAS-No. 1932349-21-7
Formula $C_{19}H_{18}N_4O_4$
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

	Product code	Packing unit	Price
FAA2095 Fmoc-Abu(3-N_3)-OH (2R,3R) (2R,3R)-2-(9-Fluorenylmethyloxycarbonyl)amino-3-azidobutanoic acid CAS-No. 1229394-75-5 Formula $C_{19}H_{18}N_4O_4$ Mol. weight 366,37 g/mol	FAA2095.0250	250 mg	€ 100,00
	FAA2095.0500	500 mg	€ 180,00
	FAA2095.0001	1 g	€ 280,00
	FAA2095.0005	5 g	€ 1.000,00

Azido-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.

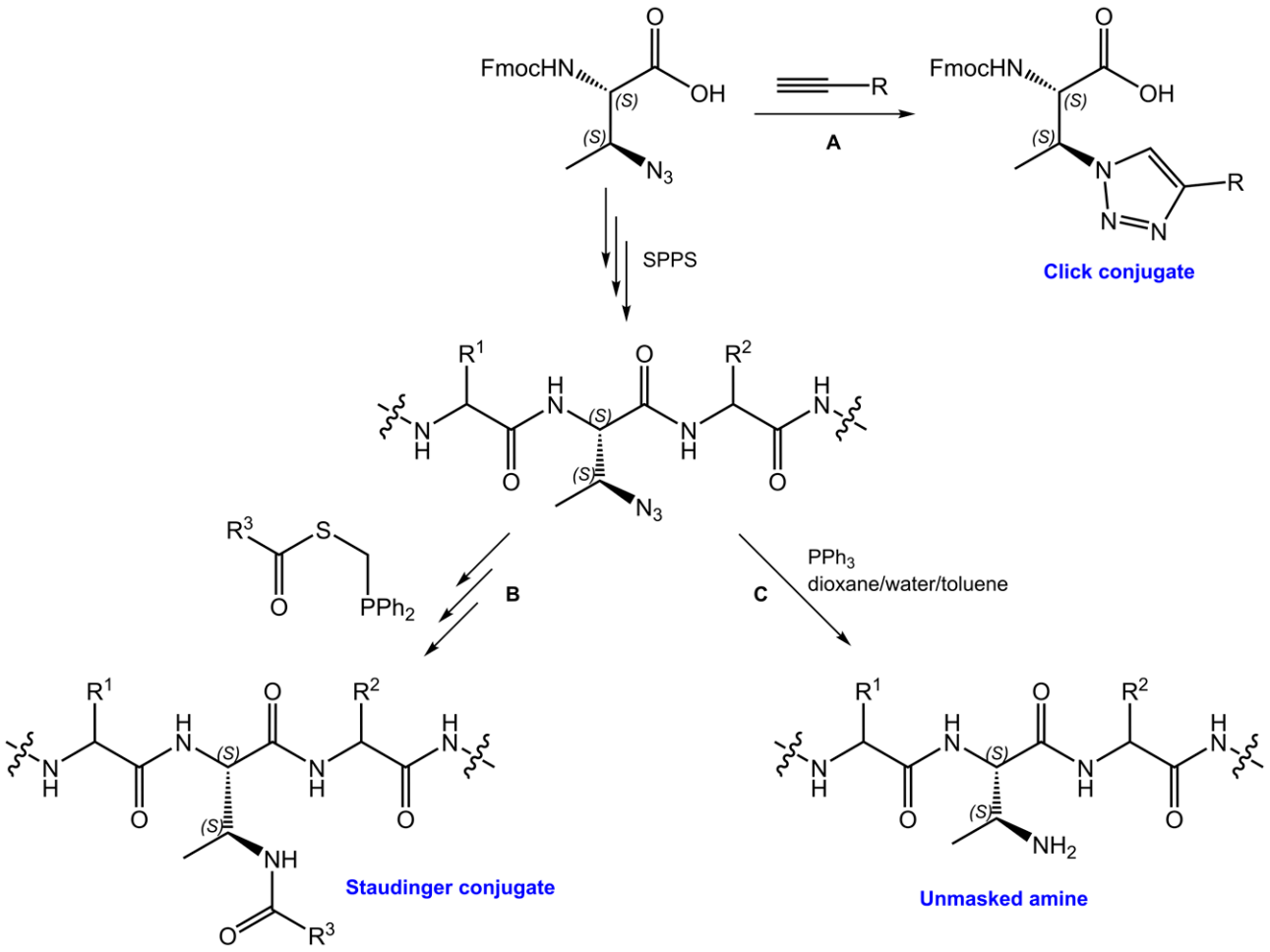


Fig. 8: Possible applications of amino acids bearing azide groups in the side chain.

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 α,β-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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- *The Staudinger Ligation; C. Bednarek, I. Wehl, N. Jung, U. Schepers and S. Bräse;* ***Chem Rev*** *2020;* ***120:*** *4301-4354. https://doi.org/10.1021/acs.chemrev.9b00665*
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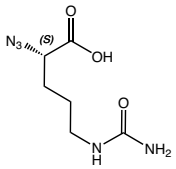
Azido-Citrulline

HAA4980 N_3-L-Cit-OH*DCHA

(S)-2-Azido-citrulline dicyclohexylamine

CAS-No. 1799421-66-1 net
Formula $C_6H_{11}N_5O_3$*$C_{12}H_{23}N$
Mol. weight 201,18*181,32 g/mol



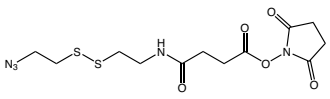
Product code	Packing unit	Price
HAA4980.0500	500 mg	€ 90,00
HAA4980.0001	1 g	€ 140,00
HAA4980.0005	5 g	€ 500,00
HAA4980.0025	25 g	€ 2.000,00

Azido-Cysteine

HAA2255 N_3-Cystamine-Suc-OSu

4-(2-((2-Azidoethyl)disulfanyl)ethylamino)-4-oxobutanoic acid succinimidyl ester

CAS-No. 1987341-40-1
Formula $C_{12}H_{17}N_5O_5S_2$
Mol. weight 375,42 g/mol

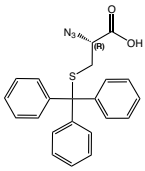


Product code	Packing unit	Price
HAA2255.0100	100 mg	€ 171,00
HAA2255.0250	250 mg	€ 286,00
HAA2255.0500	500 mg	€ 514,00
HAA2255.1000	1 g	€ 800,00

HAA2810 N_3-L-Cys(Trt)-OH*CHA

(R)-2-azido-3-(tritylthio)propanoic acid cyclohexylamine

CAS-No. 1286670-90-3
Formula $C_{22}H_{19}N_3O_2S$*$C_6H_{13}N$
Mol. weight 389,47*99,17 g/mol



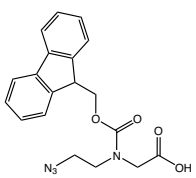
Product code	Packing unit	Price
HAA2810.0250	250 mg	€ 80,00
HAA2810.0500	500 mg	€ 144,00
HAA2810.0001	1 g	€ 224,00
HAA2810.0005	5 g	€ 800,00
HAA2810.0025	25 g	€ 3.200,00

Azido-Glycine

FAA4060 Fmoc-Aeg(N_3)-OH

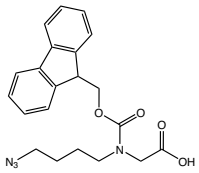
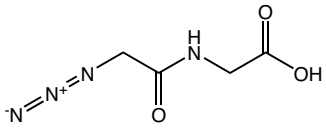
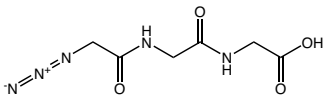
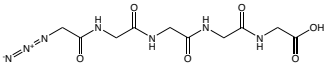
N-(9-Fluorenylmethyloxycarbonyl)-N-(2-azidoethyl)glycine

CAS-No. 1935981-35-3
Formula $C_{19}H_{18}N_4O_4$
Mol. weight 366,37 g/mol

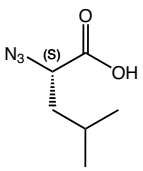


Product code	Packing unit	Price
FAA4060.0001	1 g	€ 200,00
FAA4060.0005	5 g	€ 800,00

Prices are in EUR, net, EXW Germany

		Product code	Packing unit	Price
FAA4055 Fmoc-Abg(N_3)-OH N-(9-Fluorenylmethyloxycarbonyl)-N-(4-azido-butyl)glycine CAS-No. 2250433-81-7 Formula $C_{21}H_{22}N_4O_4$ Mol. weight 394,42 g/mol		FAA4055.0001 FAA4055.0005	1 g 5 g	€ 200,00 € 800,00
HAA2850 N_3-Gly-Gly-OH*DCHA Azido-glycylglycine dicyclohexylamine CAS-No. 855750-87-7 net Formula $C_4H_6N_4O_3*C_{12}H_{23}N$ Mol. weight 158,12*181,32 g/mol		HAA2850.0001 HAA2850.0005 HAA2850.0025	1 g 5 g 25 g	€ 125,00 € 400,00 € 1.600,00
HAA2840 N_3-Gly-Gly-Gly-OH Azido-glycylglycylglycine CAS-No. 1993176-75-2 Formula $C_6H_9N_5O_4$ Mol. weight 215,17 g/mol		HAA2840.0500 HAA2840.0001 HAA2840.0005 HAA2840.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
HAA2860 N_3-Gly-Gly-Gly-Gly-Gly-OH CAS-No. 2250433-77-1 Formula $C_{10}H_{15}N_7O_6$ Mol. weight 329,27 g/mol		HAA2860.0250 HAA2860.0500 HAA2860.0001 HAA2860.0005 HAA2860.0025	250 mg 500 mg 1 g 5 g 25 g	€ 90,00 € 162,00 € 252,00 € 900,00 € 3.600,00

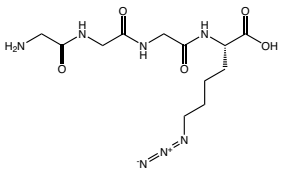
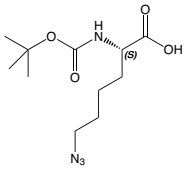
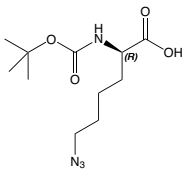
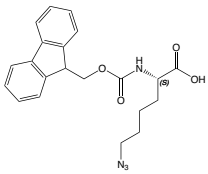
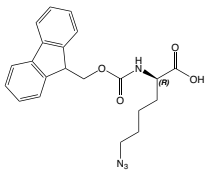
Azido-Leucine

		Product code	Packing unit	Price
HAA3350 N_3-L-Leu-OH*BHA (S)-2-azido-4-methylpentanoic acid benzhydrylamine salt CAS-No. 79410-33-6 Formula $C_6H_{11}N_3O_2*C_{13}H_{13}N$ Mol. weight 157,17*183.25 g/mol		HAA3350.0001 HAA3350.0005 HAA3350.0025	1 g 5 g 25 g	€ 120,00 € 400,00 € 1.600,00

	Product code	Packing unit	Price
HAA2820 N_3-L-Leu-OH*CHA (S)-2-Azido-4-methylpentanoic acid cyclohexylamine CAS-No. 1286670-79-8 Formula $C_6H_{11}N_3O_2*C_6H_{13}N$ Mol. weight 157,17*99,18 g/mol	HAA2820.0500 HAA2820.0001 HAA2820.0005 HAA2820.0025	500 mg 1 g 5 g 25 g	€ 72,00 € 112,00 € 400,00 € 1.600,00

Azido-Lysine

	Product code	Packing unit	Price
HAA9210 H-L-Lys(N_3)-OH N-epsilon-azido-L-lysine CAS-No. 159610-92-1 Formula $C_6H_{12}N_4O_2$ Mol. weight 172,19 g/mol	HAA9210.0250 HAA9210.0500 HAA9210.1000 HAA9210.5000 HAA9210.9025	250 mg 500 mg 1 g 5 g 25 g	€ 70,00 € 126,00 € 196,00 € 700,00 € 2.800,00
HAA1625 H-L-Lys(N_3)-OH*HCl N-epsilon-Azido-L-lysine hydrochloride CAS-No. 1454334-76-9 Formula $C_6H_{12}N_4O_2*HCl$ Mol. weight 172,19*36,45 g/mol	HAA1625.0500 HAA1625.0001 HAA1625.0005 HAA1625.0025 HAA1625.0100	500 mg 1 g 5 g 25 g 100 g	€ 99,00 € 154,00 € 550,00 € 2.200,00 € 6.600,00
HAA1890 H-D-Lys(N_3)-OH*HCl N-epsilon-Azido-D-lysine hydrochloride CAS-No. 2098497-01-7 Formula $C_6H_{12}N_4O_2*HCl$ Mol. weight 172,19*36,45 g/mol	HAA1890.0250 HAA1890.0500 HAA1890.0001 HAA1890.0005	250 mg 500 mg 1 g 5 g	€ 70,00 € 126,00 € 196,00 € 700,00
HAA2080 H-L-Lys(EO-N_3)-OH*HCl (S)-2-amino-6-((2-azidoethoxy)carbonylamino) hexanoic acid hydrochloride CAS-No. 1994331-17-7 Formula $C_9H_{17}N_5O_4*HCl$ Mol. weight 259,26*36.46 g/mol	HAA2080.0250 HAA2080.0500 HAA2080.0001 HAA2080.0005 HAA2080.0025	250 mg 500 mg 1 g 5 g 25 g	€ 70,00 € 126,00 € 196,00 € 700,00 € 2.800,00

		Product code	Packing unit	Price
HAA2870 H-(Gly)$_3$-Lys(N$_3$)-OH*HCl Triglycyl-epsilon-azido-L-lysine hydrochloride CAS-No. 2250437-45-5 net Formula $C_{12}H_{21}N_7O_5$*HCl Mol. weight 343,34*36,45 g/mol		HAA2870.0025 HAA2870.0100	25 mg 100 mg	€ 250,00 € 750,00
BAA1810 Boc-L-Lys(N$_3$)-OH*CHA N-alpha-t-Butyloxycarbonyl-epsilon-azido-L-lysine cyclohexylamine CAS-No. 846549-33-5net Formula $C_{11}H_{20}N_4O_4$*$C_6H_{13}N$ Mol. weight 272,30*99,18 g/mol		BAA1810.0001 BAA1810.0005 BAA1810.0025	1 g 5 g 25 g	€ 98,00 € 350,00 € 1.400,00
BAA1815 Boc-D-Lys(N$_3$)-OH*CHA N-alpha-t-Butyloxycarbonyl-epsilon-azido-D-lysine cyclohexylamine CAS-No. 1620410-04-9 net Formula $C_{11}H_{20}N_4O_4$*$C_6H_{13}N$ Mol. weight 272,30*99,18 g/mol		BAA1815.0500 BAA1815.0001 BAA1815.0005 BAA1815.0025	500 mg 1 g 5 g 25 g	€ 99,00 € 154,00 € 550,00 € 2.200,00
FAA1793 Fmoc-L-Lys(N$_3$)-OH N-alpha-(9-Fluorenylmethyloxycarbonyl)-epsilon-azido-L-lysine CAS-No. 159610-89-6 Formula $C_{21}H_{22}N_4O_4$ Mol. weight 394,42 g/mol		FAA1793.0500 FAA1793.0001 FAA1793.0005 FAA1793.0025 FAA1793.0100	500 mg 1 g 5 g 25 g 100 g	€ 72,00 € 112,00 € 400,00 € 1.600,00 € 4.800,00
FAA1835 Fmoc-D-Lys(N$_3$)-OH N-alpha-(9-Fluorenylmethyloxycarbonyl)-epsilon-azido-D-lysine CAS-No. 1198791-53-5 Formula $C_{21}H_{22}N_4O_4$ Mol. weight 394,42 g/mol		FAA1835.0500 FAA1835.0001 FAA1835.0005 FAA1835.0025	500 mg 1 g 5 g 25 g	€ 90,00 € 140,00 € 500,00 € 2.000,00

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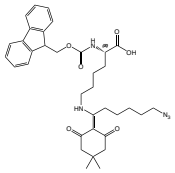
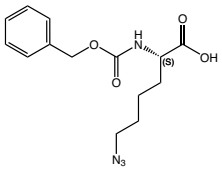
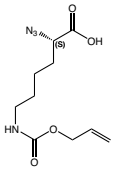
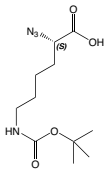
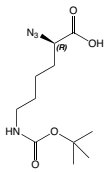
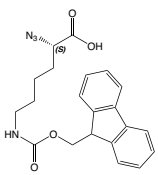
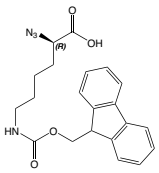
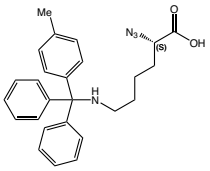
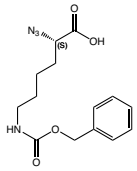
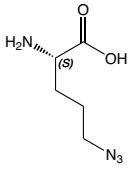
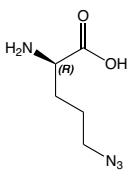
		Product code	Packing unit	Price
FAA8145 **Fmoc-L-Lys(N_3-Aca-DIM)-OH**				
N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-epsilon-[6-azido-1-(4,4-dimethyl-2,6- dioxocyclohexylidene)hexyl]-L-lysine		FAA8145.0100	100 mg	€ 120,00
CAS-No. 2408993-39-3		FAA8145.0250	250 mg	€ 200,00
Formula $C_{35}H_{43}N_5O_6$		FAA8145.0500	500 mg	€ 360,00
Mol. weight 629,76 g/mol		FAA8145.0001	1 g	€ 560,00
		FAA8145.0005	5 g	€ 2.000,00
ZAA1295 **Z-L-Lys(N_3)-OH*CHA**				
N-alpha-Benzyloxycarbonyl-epsilon-azido-L-lysine-cyclohexylamin		ZAA1295.0001	1 g	€ 125,00
CAS-No. 901300-81-0		ZAA1295.0005	5 g	€ 350,00
Formula $C_{14}H_{18}N_4O_4*C_6H_{13}N$		ZAA1295.0025	25 g	€ 1.400,00
Mol. weight 306,32*99,18 g/mol				
HAA2900 **N_3-L-Lys(Alloc)-OH*DCHA**				
(S)-2-Azido-6-[(allyloxycarbonyl)amino]hexanoic acid dicyclohexylamine		HAA2900.0500	500 mg	€ 81,00
CAS-No. 1799661-51-0		HAA2900.0001	1 g	€ 126,00
Formula $C_{10}H_{16}N_4O_4*C_{12}H_{23}N$		HAA2900.0005	5 g	€ 450,00
Mol. weight 256,26*181,32 g/mol		HAA2900.0025	25 g	€ 1.800,00
HAA2170 **N_3-L-Lys(Boc)-OH**				
(S)-2-Azido-6-[(t-butyloxycarbonyl)amino]hexanoic acid		HAA2170.0500	500 mg	€ 81,00
CAS-No. 333366-32-8		HAA2170.0001	1 g	€ 126,00
Formula $C_{11}H_{20}N_4O_4$		HAA2170.0005	5 g	€ 450,00
Mol. weight 272,3 g/mol		HAA2170.0025	25 g	€ 1.800,00
HAA2175 **N_3-D-Lys(Boc)-OH**				
(R)-2-Azido-6-[(t-butyloxycarbonyl)amino]hexanoic acid		HAA2175.0500	500 mg	€ 85,50
CAS-No. 1178899-92-7		HAA2175.0001	1 g	€ 133,00
Formula $C_{11}H_{20}N_4O_4$		HAA2175.0005	5 g	€ 475,00
Mol. weight 272,3 g/mol		HAA2175.0025	25 g	€ 1.900,00
HAA2160 **N_3-L-Lys(Fmoc)-OH**				
(S)-2-Azido-6-[(9-fluorenylmethyloxycarbonyl) amino]hexanoic acid		HAA2160.0500	500 mg	€ 90,00
CAS-No. 473430-12-5		HAA2160.0001	1 g	€ 140,00
Formula $C_{21}H_{22}N_4O_4$		HAA2160.0005	5 g	€ 500,00
Mol. weight 394,42 g/mol		HAA2160.0025	25 g	€ 2.000,00

		Product code	Packing unit	Price
HAA2165 N_3-D-Lys(Fmoc)-OH (R)-2-Azido-3-[(9-fluorenylmethyloxycarbonyl) amino]propanoic acid CAS-No. 1994300-35-4 Formula $C_{21}H_{22}N_4O_4$ Mol. weight 394,42 g/mol		HAA2165.0500 HAA2165.0001 HAA2165.0005 HAA2165.0025	500 mg 1 g 5 g 25 g	€ 126,00 € 196,00 € 700,00 € 2.800,00
HAA2880 N_3-L-Lys(Mtt)-OH (S)-2-Azido-6-[(4-methyltrityl)amino]hexanoic acid CAS-No. 1333231-26-7 Formula $C_{26}H_{28}N_4O_2$ Mol. weight 428,53 g/mol		HAA2880.0500 HAA2880.0001 HAA2880.0005 HAA2880.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
HAA2910 N_3-L-Lys(Z)-OH*DCHA (S)-2-Azido-6-[(benzyloxycarbonyl)amino]hexanoic acid dicyclohexylamine CAS-No. 1414891-50-1 Formula $C_{14}H_{18}N_4O_4*C_{12}H_{23}N$ Mol. weight 306,32*181,22 g/mol		HAA2910.0001 HAA2910.0005 HAA2910.0025	1 g 5 g 25 g	€ 110,00 € 375,00 € 1.500,00

Azido-Ornithine

		Product code	Packing unit	Price
HAA1620 H-L-Orn(N_3)-OH*HCl N-delta-Azido-L-ornithine hydrochloride CAS-No. 1782935-10-7 Formula $C_5H_{10}N_4O_2$*HCl Mol. weight 158,16*36,45 g/mol		HAA1620.0250 HAA1620.0500 HAA1620.0001 HAA1620.0005 HAA1620.0025	250 mg 500 mg 1 g 5 g 25 g	€ 90,00 € 135,00 € 210,00 € 750,00 € 3.000,00
HAA1895 H-D-Orn(N_3)-OH*HCl N-delta-Azido-D-ornithine hydrochloride CAS-No. 1858224-08-4 Formula $C_5H_{10}N_4O_2$*HCl Mol. weight 158,16*36,45 g/mol		HAA1895.0250 HAA1895.0500 HAA1895.0001 HAA1895.0005	250 mg 500 mg 1 g 5 g	€ 75,00 € 135,00 € 210,00 € 750,00

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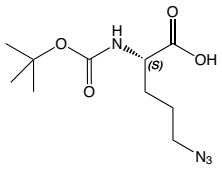
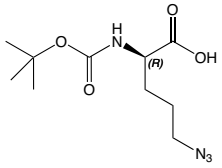
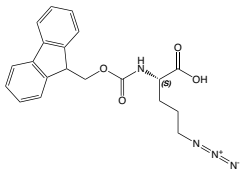
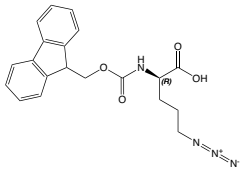
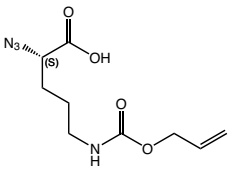
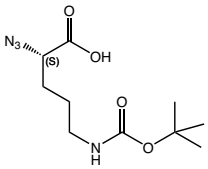
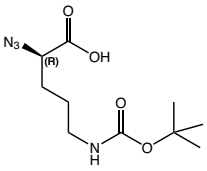
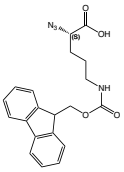
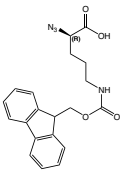
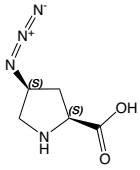
		Product code	Packing unit	Price
BAA1830 **Boc-L-Orn(N_3)-OH*CHA** N-alpha-t-Butyloxycarbonyl-delta-azido-L-ornithine cyclohexylamine CAS-No. 763139-35-1net Formula $C_{10}H_{18}N_4O_4*C_6H_{13}N$ Mol. weight 258,27*99,18 g/mol		BAA1830.0500 BAA1830.0001 BAA1830.0005 BAA1830.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
BAA1835 **Boc-D-Orn(N_3)-OH*CHA** N-alpha-t-Butyloxycarbonyl-delta-azido-D-ornithine cyclohexylamine CAS-No. 1858224-18-6 net Formula $C_{10}H_{18}N_4O_4*C_6H_{13}N$ Mol. weight 258,27*99,18 g/mol		BAA1835.0500 BAA1835.0001 BAA1835.0005 BAA1835.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
FAA6880 **Fmoc-L-Orn(N_3)-OH** N-alpha-(9-Fluorenylmethyloxycarbonyl)-delta-azido-L-ornithine CAS-No. 1097192-04-5 Formula $C_{20}H_{20}N_4O_4$ Mol. weight 380,4 g/mol		FAA6880.0500 FAA6880.0001 FAA6880.0005 FAA6880.0025	500 mg 1 g 5 g 25 g	€ 90,00 € 140,00 € 500,00 € 2.000,00
FAA6890 **Fmoc-D-Orn(N_3)-OH** N-alpha-(9-Fluorenylmethyloxycarbonyl)-delta-azido-D-ornithine CAS-No. 1176270-25-9 Formula $C_{20}H_{20}N_4O_4$ Mol. weight 380,4 g/mol		FAA6890.0500 FAA6890.0001 FAA6890.0005 FAA6890.0025	500 mg 1 g 5 g 25 g	€ 126,00 € 196,00 € 700,00 € 2.800,00
HAA2920 **N_3-L-Orn(Alloc)-OH*DCHA** (S)-2-Azido-5-[(allyloxycarbonyl)amino]pentanoic acid dicyclohexylamine CAS-No. 2250436-43-0 net Formula $C_9H_{14}N_4O_4*C_{12}H_{23}N$ Mol. weight 242,23*181,32 g/mol		HAA2920.0500 HAA2920.0001 HAA2920.0005 HAA2920.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
HAA2220 **N_3-L-Orn(Boc)-OH*CHA** (S)-2-Azido-5-[(t-butyloxycarbonyl)amino]pentanoic acid cyclohexylamine CAS-No. 2301169-18-4 Formula $C_{10}H_{18}N_4O_4*C_6H_{13}N$ Mol. weight 258,27*99,18 g/mol		HAA2220.0500 HAA2220.0001 HAA2220.0005 HAA2220.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00

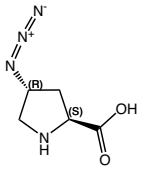
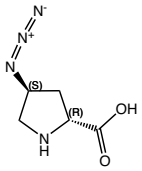
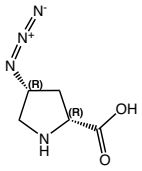
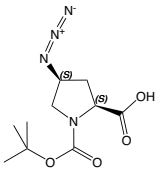
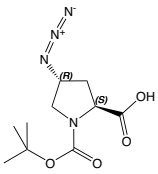
		Product code	Packing unit	Price
HAA2210 N_3-D-Orn(Boc)-OH*CHA (R)-2-Azido-5-[(t-butyloxycarbonyl)amino]pentanoic acid cyclohexylamine CAS-No. 2165877-62-1 net Formula $C_{10}H_{18}N_4O_4*C_6H_{13}N$ Mol. weight 258,27*99,18 g/mol		HAA2210.0500 HAA2210.0001 HAA2210.0005 HAA2210.0025	500 mg 1 g 5 g 25 g	€ 117,00 € 182,00 € 650,00 € 2.600,00
HAA2225 N_3-L-Orn(Fmoc)-OH (S)-2-Azido-5-[(9-fluorenylmethyloxycarbonyl) amino]pentanoic acid CAS-No. 1994267-98-9 Formula $C_{20}H_{20}N_4O_4$ Mol. weight 380,4 g/mol		HAA2225.0500 HAA2225.0001 HAA2225.0005 HAA2225.0025	500 mg 1 g 5 g 25 g	€ 99,00 € 154,00 € 550,00 € 2.200,00
HAA2215 N_3-D-Orn(Fmoc)-OH (R)-2-Azido-5-[(9-fluorenylmethyloxycarbonyl) amino]pentanoic acid CAS-No. 1994300-41-2 Formula $C_{20}H_{20}N_4O_4$ Mol. weight 380,4 g/mol		HAA2215.0500 HAA2215.0001 HAA2215.0005 HAA2215.0025	500 mg 1 g 5 g 25 g	€ 126,00 € 196,00 € 700,00 € 2.800,00

References:

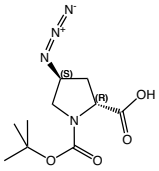
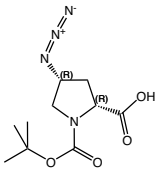
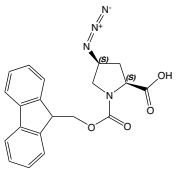
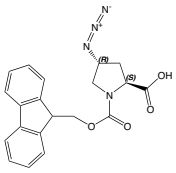
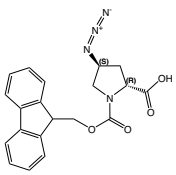
→ *Application of metal-free triazole formation in the synthesis of cyclic RGD-DTPA conjugates; S. S. van Berkel, A. Dirks, S. A. Meeuwissen, D. L. Pingen, O. C. Boerman, P. Laverman, F. L. van Delft, J. J. Cornelissen and F. P. Rutjes;* ***Chembiochem*** *2008;* ***9:*** *1805-15. https://doi.org/10.1002/cbic.200800074*

Azido-Proline

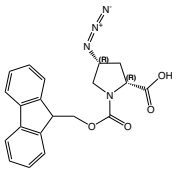
		Product code	Packing unit	Price
HAA2125 H-L-Pro(4-N_3)-OH*HCl (2S,4S) (2S,4S)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride CAS-No. 892128-58-4 net Formula $C_5H_8N_4O_2*HCl$ Mol. weight 156,14*36,45 g/mol		HAA2125.0250 HAA2125.0500 HAA2125.0001 HAA2125.0005	250 mg 500 mg 1 g 5 g	€ 90,00 € 162,00 € 252,00 € 900,00

		Product code	Packing unit	Price
HAA3150	**H-L-Pro(4-N_3)-OH*HCl (2S,4R)**			
(2S,4R)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride		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
CAS-No. 1019849-13-8 net Formula $C_5H_8N_4O_2$*HCl Mol. weight 156,14*36,45 g/mol				
HAA3140	**H-D-Pro(4-N_3)-OH*HCl (2R,4S)**			
(2R,4S)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride		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
CAS-No. 2137086-50-9 Formula $C_5H_8N_4O_2$*HCl Mol. weight 156,14*36,45 g/mol				
HAA3190	**H-D-Pro(4-N_3)-OH*HCl (2R,4R)**			
(2R,4R)-4-Azidopyrrolidine-2-carboxylic acid hydrochloride		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
Formula $C_5H_8N_4O_2$*HCl Mol. weight 156,14*36,45 g/mol				
BAA1905	**Boc-L-Pro(4-N_3)-OH (2S,4S)**			
cis-N-alpha-(t-Butyloxycarbonyl)-4-azido-L-proline		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
CAS-No. 132622-65-2 Formula $C_{10}H_{16}N_4O_4$ Mol. weight 256,26 g/mol				
BAA1930	**Boc-L-Pro(4-N_3)-OH*DCHA (2S,4R)**			
trans-N-alpha-(t-Butyloxycarbonyl)-4-azido-L-proline dicyclohexylamine		BAA1930.0250	250 mg	€ 80,00
		BAA1930.0500	500 mg	€ 144,00
		BAA1930.0001	1 g	€ 224,00
		BAA1930.0005	5 g	€ 800,00
		BAA1930.0025	25 g	€ 3.200,00
CAS-No. 132622-68-5 net Formula $C_{10}H_{16}N_4O_4$*$C_{12}H_{23}N$ Mol. weight 256,26*181,32 g/mol				

Prices are in EUR, net, EXW Germany

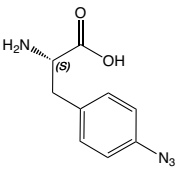
		Product code	Packing unit	Price
BAA3110	**Boc-D-Pro(4-N_3)-OH*DCHA (2R,4S)**			
trans-N-alpha-(t-Butyloxycarbonyl)-4-azido-D-proline dicyclohexylamine		BAA3110.0250	250 mg	€ 80,00
CAS-No. 132622-77-6 net		BAA3110.0500	500 mg	€ 145,00
Formula $C_{10}H_{16}N_4O_4*C_{12}H_{23}N$		BAA3110.0001	1 g	€ 225,00
Mol. weight 256,26*181,32 g/mol		BAA3110.0005	5 g	€ 800,00
		BAA3110.0025	25 g	€ 3.200,00
BAA3120	**Boc-D-Pro(4-N_3)-OH (2R,4R)**			
cis-N-alpha-(t-Butyloxycarbonyl)-4-azido-D-proline		BAA3120.0250	250 mg	€ 90,00
CAS-No. 650601-59-5		BAA3120.0500	500 mg	€ 165,00
Formula $C_{10}H_{16}N_4O_4$		BAA3120.0001	1 g	€ 255,00
Mol. weight 256,26 g/mol		BAA3120.0005	5 g	€ 900,00
FAA2050	**Fmoc-L-Pro(4-N_3)-OH (2S,4S)**			
cis-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-L-proline		FAA2050.0500	500 mg	€ 90,00
CAS-No. 263847-08-1		FAA2050.0001	1 g	€ 140,00
Formula $C_{20}H_{18}N_4O_4$		FAA2050.0005	5 g	€ 500,00
Mol. weight 378,38 g/mol		FAA2050.0025	25 g	€ 2.000,00
FAA3000	**Fmoc-L-Pro(4-N_3)-OH (2S,4R)**			
trans-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-L-proline		FAA3000.0250	250 mg	€ 120,00
CAS-No. 702679-55-8		FAA3000.0500	500 mg	€ 216,00
Formula $C_{20}H_{18}N_4O_4$		FAA3000.0001	1 g	€ 336,00
Mol. weight 378,38 g/mol		FAA3000.0005	5 g	€ 1.200,00
FAA4630	**Fmoc-D-Pro(4-N_3)-OH (2R,4S)**			
trans-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-D-proline		FAA4630.0250	250 mg	€ 120,00
CAS-No. 2137142-63-1		FAA4630.0500	500 mg	€ 220,00
Formula $C_{20}H_{18}N_4O_4$		FAA4630.0001	1 g	€ 340,00
Mol. weight 378,38 g/mol		FAA4630.0005	5 g	€ 1.200,00

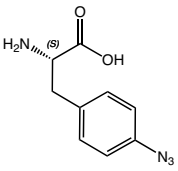
	Product code	Packing unit	Price
FAA4720 Fmoc-D-Pro(4-N_3)-OH (2R,4R)			
cis-N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-D-proline	FAA4720.0100	100 mg	€ 85,00
CAS-No. 1378847-51-8	FAA4720.0250	250 mg	€ 140,00
Formula $C_{20}H_{18}N_4O_4$	FAA4720.0500	500 mg	€ 255,00
Mol. weight 378,38 g/mol	FAA4720.0001	1 g	€ 395,00
	FAA4720.0005	5 g	€ 1.400,00

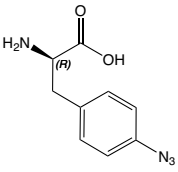


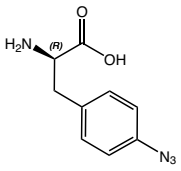
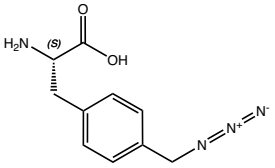
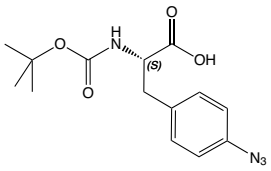
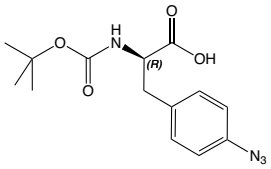
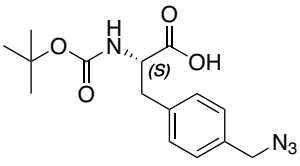
Azido-Phenylalanine

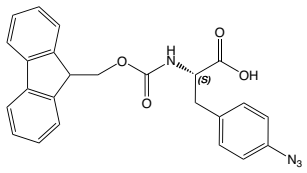
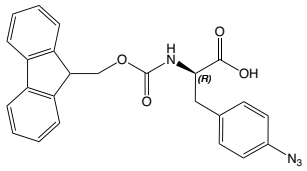
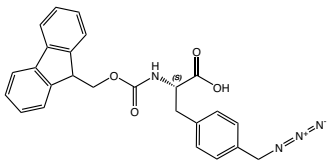
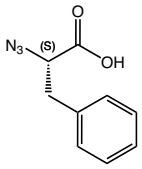
	Product code	Packing unit	Price
HAA1850 H-L-Phe(4-N_3)-OH			
4-Azido-L-phenylalanine	HAA1850.0250	250 mg	€ 80,00
CAS-No. 33173-53-4	HAA1850.0500	500 mg	€ 144,00
Formula $C_9H_{10}N_4O_2$	HAA1850.0001	1 g	€ 224,00
Mol. weight 206,20 g/mol	HAA1850.0005	5 g	€ 800,00
	HAA1850.0025	25 g	€ 3.200,00
HAA2980 H-L-Phe(4-N_3)-OH*HCl			
4-Azido-L-phenylalanine hydrochloride	HAA2980.0250	250 mg	€ 80,00
CAS-No. 34670-43-4	HAA2980.0500	500 mg	€ 110,00
Formula $C_9H_{10}N_4O_2$*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
HAA1855 H-D-Phe(4-N_3)-OH			
4-Azido-D-phenylalanine	HAA1855.0001	1 g	€ 425,00
CAS-No. 1241681-80-0	HAA1855.0005	5 g	€ 1.600,00
Formula $C_9H_{10}N_4O_2$			
Mol. weight 206,20 g/mol			



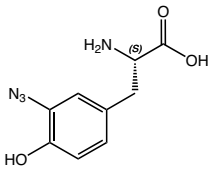


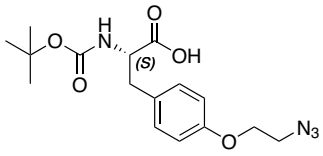
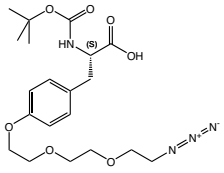
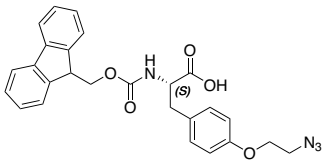


		Product code	Packing unit	Price
HAA1856 H-D-Phe(4-N_3)-OH*HCl 4-Azido-D-phenylalanine hydrochloride CAS-No. 1241681-80-0 net Formula $C_9H_{10}N_4O_2$*HCl Mol. weight 206,2*36,45 g/mol		HAA1856.0500 HAA1856.1000 HAA1856.5000 HAA1856.9025	500 mg 1 g 5 g 25 g	€ 135,00 € 210,00 € 750,00 € 3.000,00
HAA4090 H-L-Phe(4-CH_2-N_3)*HCl 4-azidomethyl-L-phenylalanine hydrochloride CAS-No. 1446772-80-0 Formula $C_{10}H_{12}N_4O_2$*HCl Mol. weight 220,23*36,45 g/mol		HAA4090.0100 HAA4090.0250 HAA4090.0500 HAA4090.1000 HAA4090.5000	100 mg 250 mg 500 mg 1 g 5 g	€ 84,00 € 140,00 € 252,00 € 392,00 € 1.400,00
BAA1850 Boc-L-Phe(4-N_3)-OH N-alpha-t-Butyloxycarbonyl-4-azido-L-phenyl-alanine CAS-No. 33173-55-6 Formula $C_{14}H_{18}N_4O_4$ Mol. weight 306,32 g/mol		BAA1850.9500 BAA1850.0001 BAA1850.0005 BAA1850.0025	500 mg 1 g 5 g 25 g	€ 110,00 € 170,00 € 600,00 € 2.400,00
BAA1855 Boc-D-Phe(4-N_3)-OH N-alpha-t-Butyloxycarbonyl-4-azido-D-phenyl-alanine CAS-No. 214630-05-4 Formula $C_{14}H_{18}N_4O_4$ Mol. weight 306,32 g/mol		BAA1855.9250 BAA1855.9500 BAA1855.0001 BAA1855.0005 BAA1855.0025	250 mg 500 mg 1 g 5 g 25 g	€ 90,00 € 165,00 € 255,00 € 900,00 € 3.600,00
BAA4660 Boc-L-Phe(4-CH_2-N_3)-OH N-alpha-t-Butyloxycarbonyl-4-azido-methyl-L-phenylalanine CAS-No. 205127-59-9 Formula $C_{15}H_{20}N_4O_4$ Mol. weight 320,35 g/mol		BAA4660.0000		please inquire

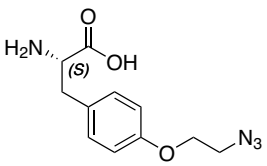
		Product code	Packing unit	Price
FAA1905 **Fmoc-L-Phe(4-N_3)-OH** N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-L-phenylalanine CAS-No. 163217-43-4 Formula $C_{24}H_{20}N_4O_4$ Mol. weight 428,44 g/mol		FAA1905.9500 FAA1905.0001 FAA1905.0005 FAA1905.0025	500 mg 1 g 5 g 25 g	€ 110,00 € 170,00 € 600,00 € 2.400,00
FAA1910 **Fmoc-D-Phe(4-N_3)-OH** N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azido-D-phenylalanine CAS-No. 1391586-30-3 Formula $C_{24}H_{20}N_4O_4$ Mol. weight 428,44 g/mol		FAA1910.9250 FAA1910.9500 FAA1910.0001 FAA1910.0005 FAA1910.0025	250 mg 500 mg 1 g 5 g 25 g	€ 90,00 € 165,00 € 255,00 € 900,00 € 3.600,00
FAA7740 **Fmoc-L-Phe(4-CH_2-N_3)-OH** N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-azidomethyl-L-phenylalanine CAS-No. 2375587-79-2 Formula $C_{25}H_{22}N_4O_4$ Mol. weight 442,47 g/mol		FAA7740.0250 FAA7740.0500 FAA7740.0001 FAA7740.0005	250 mg 500 mg 1 g 5 g	€ 120,00 € 220,00 € 300,00 € 1.200,00
HAA3360 **N_3-L-Phe-OH*DCHA** (S)-2-Azido-3-phenylpropanoic acid dicyclohexylamine CAS-No. 79410-36-9 Formula $C_9H_9N_3O_2$*$C_{13}H_{23}N$ Mol. weight 191,19*181,32 g/mol		HAA3360.0001 HAA3360.0005 HAA3360.0025	1 g 5 g 25 g	€ 120,00 € 400,00 € 1.600,00

Azido-Tryptophane

		Product code	Packing unit	Price
HAA3940 **H-L-Tyr(3-N_3)-OH** 3-Azido-L-tyrosine CAS-No. 129960-90-3 Formula $C_9H_{10}N_4O_3$ Mol. weight 222,2 g/mol		HAA3940.0001 HAA3940.0005	1 g 5 g	€ 570,00 € 2.070,00

	Product code	Packing unit	Price
BAA4650 Boc-L-Tyr(2-azidoethyl)-OH 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
BAA2235 Boc-L-Tyr(PEG(3)-N_3)-OH*DCHA N-alpha-t-Butyloxycarbonyl-O-(2-(2-(2-azidoethoxy)ethoxy)ethyl)-L-tyrosine dicyclohexylamine CAS-No. 1831059-64-3 net Formula $C_{20}H_{30}N_4O_7*C_{12}H_{23}N$ Mol. weight 438,47*181,32 g/mol 	BAA2235.0000		please inquire
FAA8535 Fmoc-L-Tyr(2-azidoethyl)-OH 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
HAA9215 H-L-Tyr(2-azidoethyl)-OH*HCl O-(2-azidoethyl)-L-tyrosine hydrochloride CAS-No. 1567845-62-8 Formula $C_{11}H_{14}N_4O_3*HCl$ Mol. weight 250,26*36,46 g/mol 	HAA9215.0000		please inquire

References:

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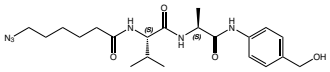
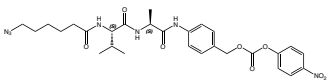
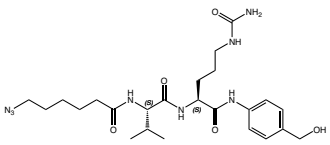
- *Azide reduction during peptide cleavage from solid support-the choice of thioscavenger?; P. E. Schneggenburger, B. Worbs and U. Diederichsen;* ***J. Pept. Sci.*** *2010;* ***16:*** *10-4. https://doi.org/10.1002/psc.1202*
- *A DOTA-peptide conjugate by copper-free click chemistry; M. E. Martin, S. G. Parameswarappa, M. S. O'Dorisio, F. C. Pigge and M. K. Schultz;* ***Bioorg Med Chem Lett*** *2010;* ***20:*** *4805-7. https://doi.org/10.1016/j.bmcl.2010.06.111*
- *CuI-Catalyzed Azide-Alkyne Intramolecular i-to-(i+4) Side-Chain-to-Side-Chain Cyclization Promotes the Formation of Helix-Like Secondary Structures; M. Scrima, A. Le Chevalier-Isaad, P. Rovero, A. M. Papini, M. Chorev and A. M. D'Ursi;* ***Eur. J. Org. Chem.*** *2010;* ***2010:*** *446-457. https://doi.org/10.1002/ejoc.200901157*
- *Synthesis and conformational analysis of a cyclic peptide obtained via i to i+4 intramolecular side-chain to side-chain azide-alkyne 1,3-dipolar cycloaddition; S. Cantel, C. Isaad Ale, M. Scrima, J. J. Levy, R. D. DiMarchi, P. Rovero, J. A. Halperin, A. M. D'Ursi, A. M. Papini and M. Chorev;* ***J Org Chem*** *2008;* ***73:*** *5663-74. https://doi.org/10.1021/jo800142s*
- *Side chain-to-side chain cyclization by click reaction; A. Le Chevalier Isaad, A. M. Papini, M. Chorev and P. Rovero;* ***J. Pept. Sci.*** *2009;* ***15:*** *451-4. https://doi.org/10.1002/psc.1141*
- *An efficient peptide ligation using azido-protected peptides via the thioester method; H. Katayama, H. Hojo, T. Ohira and Y. Nakahara;* ***Tetrahedron Lett.*** *2008;* ***49:*** *5492-5494. https://doi.org/10.1016/j.tetlet.2008.07.037*

Azido-ADC Linker

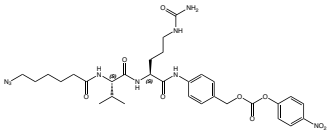
		Product code	Packing unit	Price
ADC1290	**6-Azidohexanoyl-Val-Ala-PAB**			
6-azidohexanoyl-valyl-alanyl-(4-aminobenzyl alcohol) Formula $C_{21}H_{32}N_6O_4$ Mol. weight 432,52 g/mol		ADC1290.0100 ADC1290.0250	100 mg 250 mg	€ 325,00 € 650,00
ADC1300	**6-Azidohexanoyl-Val-Ala-PAB-PNP**			
6-azidohexanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{28}H_{35}N_7O_8$ Mol. weight 597,62 g/mol		ADC1300.0100 ADC1300.0250	100 mg 250 mg	€ 375,00 € 750,00
ADC1120	**6-Azidohexanoyl-Val-Cit-PAB**			
6-azidohexanoyl-valyl-citrullyl-(4-aminobenzyl alcohol) CAS-No. 1613321-02-0 Formula $C_{24}H_{38}N_8O_5$ Mol. weight 518,61 g/mol		ADC1120.0100 ADC1120.0250	100 mg 250 mg	€ 325,00 € 650,00

	Product code	Packing unit	Price

ADC1130 6-Azidohexanoyl-Val-Cit-PAB-PNP

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

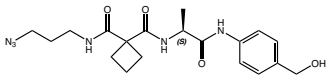


Product code	Packing unit	Price
ADC1130.0100	100 mg	€ 375,00
ADC1130.0250	250 mg	€ 750,00

ADC1580 Azido-cyclobutane-1,1-dicarboxamide-Ala-PAB

3-azidopropyl-cyclobutane-1,1-dicarboxamide-alanyl-(4-aminobenzyl alcohol)

Formula $C_{19}H_{26}N_6O_4$
Mol. weight 402,45 g/mol

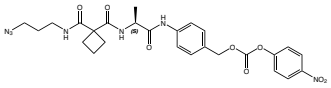


Product code	Packing unit	Price
ADC1580.0000		please inquire

ADC1590 Azido-cyclobutane-1,1-dicarboxamide-Ala-PAB-PNP

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

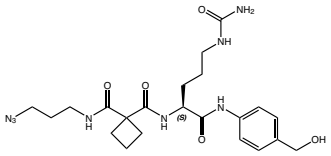


Product code	Packing unit	Price
ADC1590.0000		please inquire

ADC1480 Azido-cyclobutane-1,1-dicarboxamide-Cit-PAB

3-azidopropyl-cyclobutane-1,1-dicarboxamide-citrullyl-(4-aminobenzyl alcohol)

Formula $C_{22}H_{32}N_8O_5$
Mol. weight 488,54 g/mol

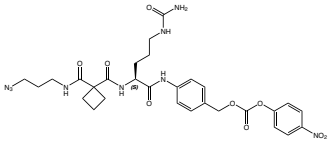


Product code	Packing unit	Price
ADC1480.0000		please inquire

ADC1490 Azido-cyclobutane-1,1-dicarboxamide-Cit-PAB-PNP

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

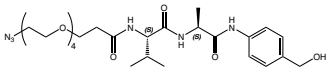


Product code	Packing unit	Price
ADC1490.0000		please inquire

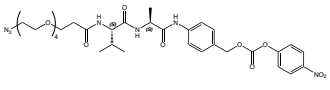
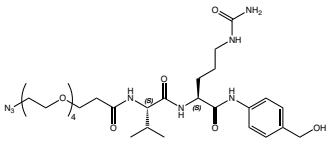
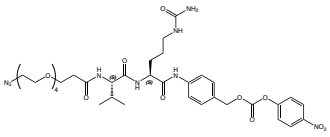
ADC1330 Azido-PEG(4)-Val-Ala-PAB

azido-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl alcohol)

Formula $C_{26}H_{42}N_6O_8$
Mol. weight 566,65 g/mol

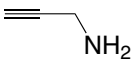
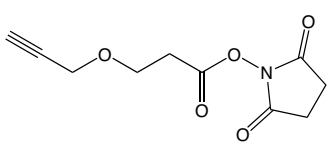


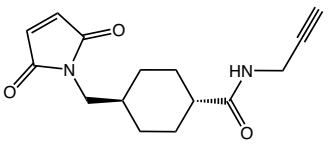
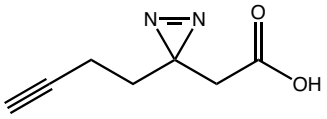
Product code	Packing unit	Price
ADC1330.0100	100 mg	€ 450,00
ADC1330.0250	250 mg	€ 900,00

		Product code	Packing unit	Price
ADC1340	**Azido-PEG(4)-Val-Ala-PAB-PNP**			
azido-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate		ADC1340.0100	100 mg	€ 500,00
		ADC1340.0250	250 mg	€ 1.000,00
Formula $C_{33}H_{45}N_7O_{12}$				
Mol. weight 731,75 g/mol				
ADC1160	**Azido-PEG(4)-Val-Cit-PAB**			
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 $C_{29}H_{48}N_8O_9$				
Mol. weight 652,74 g/mol				
ADC1170	**Azido-PEG(4)-Val-Cit-PAB-PNP**			
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 $C_{36}H_{51}N_9O_{13}$				
Mol. weight 817,84 g/mol				

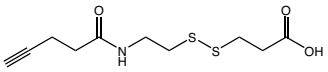
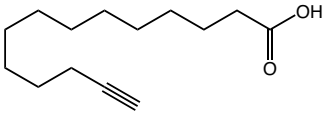
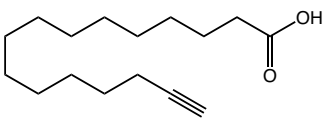
2.4. Alkyne Amino Acids and Related Derivatives

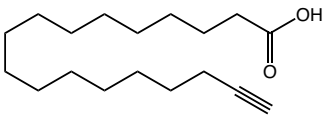
Propargylating Reagents

		Product code	Packing unit	Price
PEG2755	**Propargyl amine**			
		PEG2755.0005	5 g	€ 175,00
		PEG2755.0025	25 g	€ 350,00
CAS-No. 2450-71-7				
Formula C_3H_5N				
Mol. weight 55,08 g/mol				
PEG1935	**Propargyl-NHS**			
3-(Prop-2-ynyloxy)propanoic acid succinimidyl ester		PEG1935.0100	100 mg	€ 200,00
		PEG1935.0001	1 g	€ 610,00
CAS-No. 1174157-65-3				
Formula $C_{10}H_{11}NO_5$				
Mol. weight 225,2 g/mol				

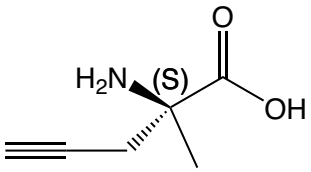
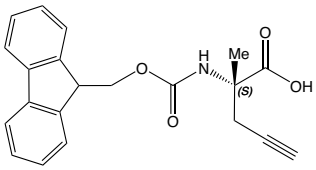
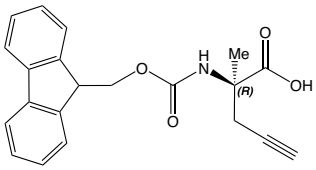
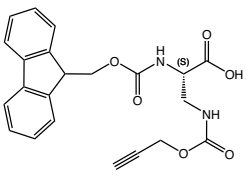
		Product code	Packing unit	Price
MAA1100	**Mal-AMCHC-N-Propargylamide**			
trans-4-[(2,5-dioxo-2,5-dihydro-1H-pyrrol-1-yl) methyl]-N-(prop-2-yn-1-yl)cyclohexane-1-carboxamide		MAA1100.0250	250 mg	€ 120,00
		MAA1100.0500	500 mg	€ 216,00
		MAA1100.0001	1 g	€ 336,00
		MAA1100.0005	5 g	€ 1.200,00
CAS-No. 2027476-42-0				
Formula $C_{15}H_{18}N_2O_3$				
Mol. weight 274,32 g/mol				
RL-3410	**Propargyl-Photo-Propanoic acid**			
2-(3-(but-3-ynyl)-3H-diazirin-3-yl)acetic acid		RL-3410.0000		please inquire
CAS-No. 2049109-24-0				
Formula $C_7H_8N_2O_2$				
Mol. weight 152,15 g/mol				

Alkyne-Alkyl Acids

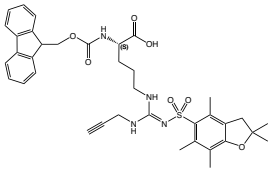
		Product code	Packing unit	Price
RL-3330	**Alkyne-SS-COOH**			
3-((2-pent-4-ynamidoethyl)disulfanyl)propanoic acid		RL-3330.0000		please inquire
CAS-No. 2279938-29-1				
Formula $C_{10}H_{15}NO_3S_2$				
Mol. weight 261,36 g/mol				
RL-2055	**Alkyne-myristic acid**			
13-Tetradecynoic acid		RL-2055.0100	100 mg	€ 250,00
		RL-2055.0500	500 mg	€ 960,00
		RL-2055.1000	1 g	€ 1.600,00
CAS-No. 82909-47-5				
Formula $C_{14}H_{24}O_2$				
Mol. weight 224,34 g/mol				
RL-2060	**Alkyne-palmitic acid**			
15-Hexadecynoic acid		RL-2060.0100	100 mg	€ 250,00
		RL-2060.0500	500 mg	€ 960,00
		RL-2060.1000	1 g	€ 1.600,00
CAS-No. 99208-90-9				
Formula $C_{16}H_{28}O_2$				
Mol. weight 252,39 g/mol				

		Product code	Packing unit	Price
RL-2065 Alkyne-stearic acid 17-Octadecynoic acid CAS-No. 34450-18-5 Formula $C_{18}H_{32}O_2$ Mol. weight 280,45 g/mol		RL-2065.1000	1 g	€ 2.000,00

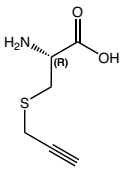
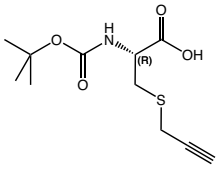
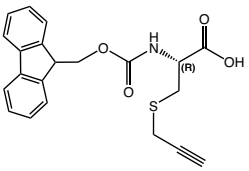
Propargylalanine and Propionic Acid Derivatives

		Product code	Packing unit	Price
HAA5510 H-alpha-Prg-D-Ala-OH (S)-a-Propargylalanine (>98%, >98%ee) CAS-No. 1231709-27-5 Formula $C_6H_9NO_2$ Mol. weight 127,14 g/mol		HAA5510.0001 HAA5510.0005	1 g 5 g	€ 750,00 € 2.800,00
FAA2080 Fmoc-alpha-Prg-D-Ala-OH CAS-No. 1198791-58-0 Formula $C_{21}H_{19}NO_4$ Mol. weight 349,38 g/mol		FAA2080.0000		please inquire
FAA2070 Fmoc-alpha-Prg-L-Ala-OH N-alpha-(9-Fluorenylmethyloxycarbonyl)-alpha-propargyl-L-alanine, solvate with 20 to 50% MTBE (98%, 98%ee) CAS-No. 1198791-65-9 Formula $C_{21}H_{19}NO_4$ Mol. weight 349,38 g/mol		FAA2070.0000		please inquire
FAA4230 Fmoc-L-Dap(Poc)-OH N-alpha-(9-Fluorenylmethyloxycarbonyl)-N-beta-propargyloxycarbonyl-L-2,3-diaminopropionic acid CAS-No. 2250437-44-4 Formula $C_{22}H_{20}N_2O_6$ Mol. weight 408,41 g/mol		FAA4230.0500 FAA4230.0001 FAA4230.0005 FAA4230.0025	500 mg 1 g 5 g 25 g	€ 99,00 € 154,00 € 550,00 € 2.200,00

Alkyne-Arginine

	Product code	Packing unit	Price
FAA7400 Fmoc-L-Arg(Propargyl,Pbf)-OH 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 FAA7400.1000	250 mg 1 g	€ 275,00 € 900,00

Propargylcysteine

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

References:

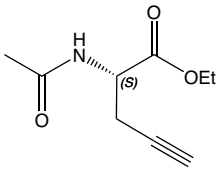
- *Photoinduced addition of glycosyl thiols to alkynyl peptides: use of free-radical thiol-yne coupling for post-translational double-glycosylation of peptides; M. Lo Conte, S. Pacifico, A. Chambery, A. Marra and A. Dondoni;* ***J Org Chem*** *2010;* ***75:*** *4644-7. https://doi.org/10.1021/jo1008178*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

Propargylglycine

AAA1937 Ac-L-Pra-OEt

N-alpha-Acetyl-L-propargylglycine ethyl ester

Formula $C_9H_{13}NO_3$
Mol. weight 183,2 g/mol

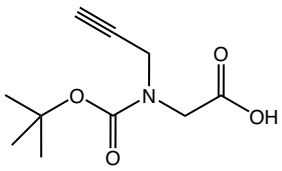


Product code	Packing unit	Price
AAA1937.0001	1 g	€ 240,00
AAA1937.0005	5 g	€ 675,00

BAA3230 Boc-N-(propargyl)-glycine

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

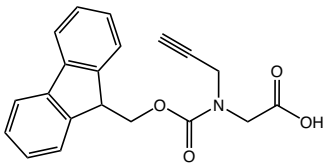


Product code	Packing unit	Price
BAA3230.0000		please inquire

FAA4950 Fmoc-N-(propargyl)-glycine

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

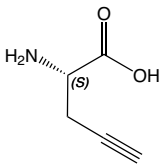


Product code	Packing unit	Price
FAA4950.0000		please inquire

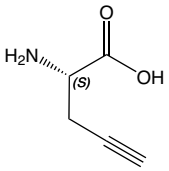
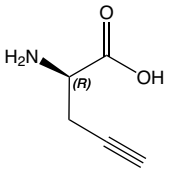
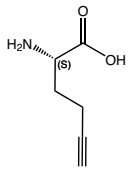
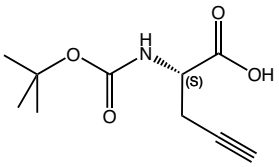
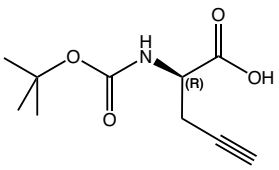
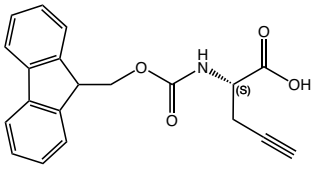
HAA7151 H-L-Pra-OH

L-Propargylglycine

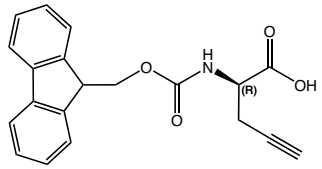
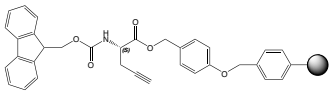
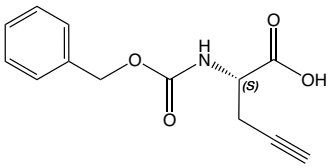
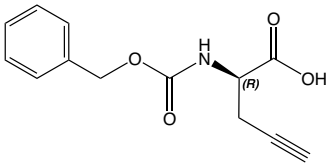
CAS-No. 23235-01-0
Formula $C_5H_7NO_2$
Mol. weight 113,11 g/mol



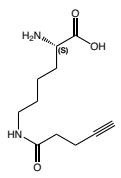
Product code	Packing unit	Price
HAA7151.0001	1 g	€ 250,00
HAA7151.0005	5 g	€ 950,00

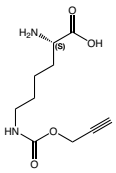
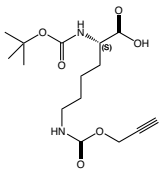
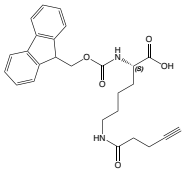
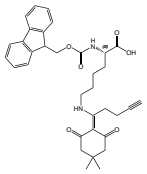
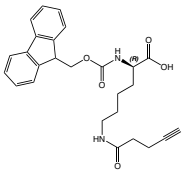
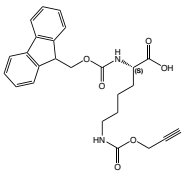
		Product code	Packing unit	Price
HAA7150 H-L-Pra-OH*HCl L-Propargylglycine hydrochloride CAS-No. 23235-01-0net Formula $C_5H_7NO_2$*HCl Mol. weight 113,11*36,45 g/mol		HAA7150.0001 HAA7150.0005	1 g 5 g	€ 225,00 € 800,00
HAA6490 H-D-Pra-OH*HCl D-Propargylglycine hydrochloride CAS-No. 23235-03-2 Formula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

Everything for Click Chemistry

		Product code	Packing unit	Price
FAA1690 **Fmoc-D-Pra-OH** 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 FAA1690.0005 FAA1690.0025	1 g 5 g 25 g	€ 135,00 € 575,00 € 2.400,00
WAA6025 **Fmoc-L-Pra-Wang Resin** Fmoc-L-Propargylglycine-Wang Resin		WAA6025.0001 WAA6025.0005	1 g 5 g	€ 175,00 € 600,00
ZAA1240 **Z-L-Pra-OH** N-alpha-Benzyloxycarbonyl-L-propargylglycine Formula $C_{13}H_{13}NO_4$ Mol. weight 246,96 g/mol		ZAA1240.0001 ZAA1240.0005	1 g 5 g	€ 250,00 € 750,00
ZAA1210 **Z-D-Pra-OH*DCHA** N-alpha-Benzyloxycarbonyl-D-propargylglycine dicyclohexylamine Formula $C_{13}H_{13}NO_4*C_{12}H_{23}N$ Mol. weight 246,96*181,32 g/mol		ZAA1210.0001 ZAA1210.0005	1 g 5 g	€ 220,00 € 650,00

Propargyllysine

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

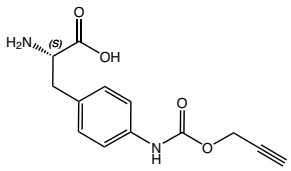
		Product code	Packing unit	Price
HAA2090 H-L-Lys(Poc)-OH*HCl (S)-Amino-6-((prop-2-ynyloxy)carbonylamino) hexanoic acid hydrochloride CAS-No. 1428330-91-9 Formula $C_{10}H_{16}N_2O_4$*HCl Mol. weight 228,25*36,45 g/mol		HAA2090.0250 HAA2090.0500 HAA2090.0001 HAA2090.0005 HAA2090.0025	250 mg 500 mg 1 g 5 g 25 g	€ 70,00 € 126,00 € 196,00 € 700,00 € 2.800,00
BAA1960 Boc-L-Lys(Poc)-OH (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 BAA1960.0001 BAA1960.0005 BAA1960.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
FAA4175 Fmoc-L-Lys(pentynoyl)-OH 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 FAA4175.0005 FAA4175.0025	1 g 5 g 25 g	€ 125,00 € 400,00 € 1.600,00
FAA8115 Fmoc-L-Lys(Pentynoyl-DIM)-OH 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 FAA8115.0500 FAA8115.0001 FAA8115.0005	250 mg 500 mg 1 g 5 g	€ 180,00 € 324,00 € 504,00 € 1.800,00
FAA8135 Fmoc-D-Lys(pentynoyl)-OH 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 FAA8135.0001 FAA8135.0005 FAA8135.0025	500 mg 1 g 5 g 25 g	€ 99,00 € 154,00 € 550,00 € 2.200,00
FAA3150 Fmoc-L-Lys(Pryoc)-OH (S)-2-((9-Fluorenylmethyloxyl)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 FAA3150.0001 FAA3150.0005 FAA3150.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00

Propargylphenylalanine

HAA4970 H-L-Phe(4-NH-Poc)-OH*HCl

4-(Propargyloxycarbonyl)amino-L-phenylalanine hydrochloride

Formula $C_{13}H_{14}N_2O_4$*HCl
Mol. weight 262,26*36,45 g/mol

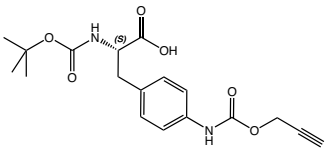


Product code	Packing unit	Price
HAA4970.0250	250 mg	€ 80,00
HAA4970.0500	500 mg	€ 144,00
HAA4970.0001	1 g	€ 224,00
HAA4970.0005	5 g	€ 800,00
HAA4970.0025	25 g	€ 3.200,00

BAA3980 Boc-L-Phe(4-NH-Poc)-OH

N-alpha-t-Butyloxycarbonyl-4-(propargyloxycarbonyl)amino-L-phenylalanine

Formula $C_{18}H_{22}N_2O_6$
Mol. weight 362,38 g/mol

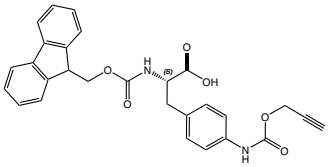


Product code	Packing unit	Price
BAA3980.0500	500 mg	€ 126,00
BAA3980.0001	1 g	€ 196,00
BAA3980.0005	5 g	€ 700,00
BAA3980.0025	25 g	€ 2.800,00

FAA7720 Fmoc-L-Phe(4-NH-Poc)-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-4-propargyloxycarbonylamino-L-phenylalanine

Formula $C_{28}H_{24}N_2O_6$
Mol. weight 484,5 g/mol



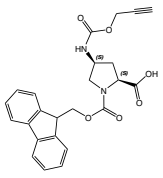
Product code	Packing unit	Price
FAA7720.0500	500 mg	€ 108,00
FAA7720.0001	1 g	€ 168,00
FAA7720.0005	5 g	€ 600,00
FAA7720.0025	25 g	€ 2.400,00

Propargylproline

FAA7130 Fmoc-L-Pro(4-NHPoc)-OH (2S,4S)

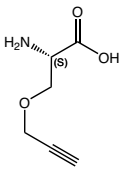
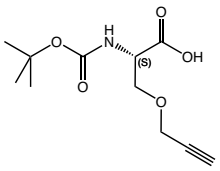
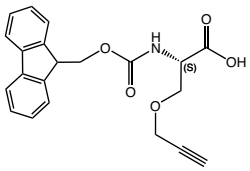
(2S,4S)-1-(9-Fluorenylmethyloxycarbonyl)-4-(propargyloxycarbonyl)amino-pyrrolidine-2-carboxylic acid

CAS-No. 2451202-17-6
Formula $C_{24}H_{22}N_2O_6$
Mol. weight 434,44 g/mol



Product code	Packing unit	Price
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

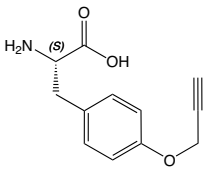
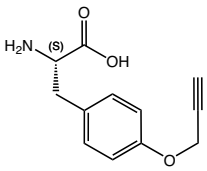
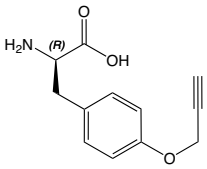
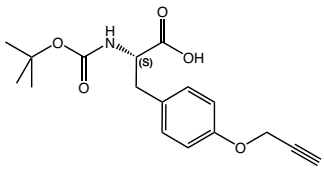
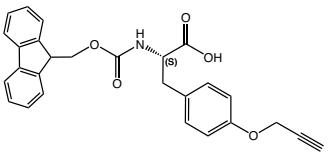
Propargylserine

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

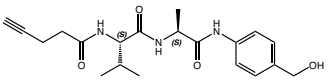
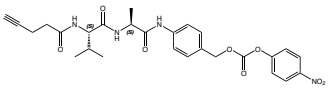
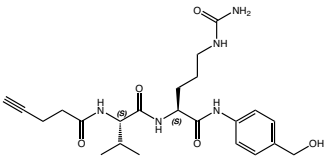
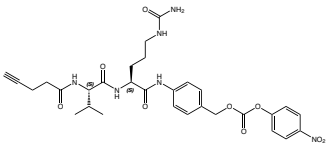
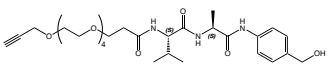
References:

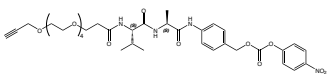
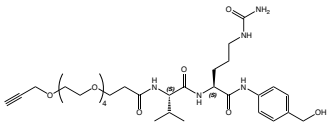
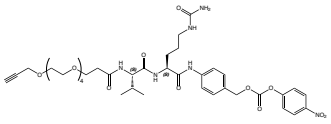
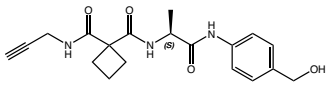
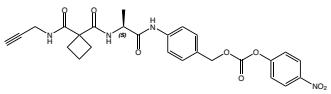
- *Isoxazolyl-serine-based agonists of peroxisome proliferator-activated receptor: design, synthesis, and effects on cardiomyocyte differentiation; Z. L. Wei, P. A. Petukhov, F. Bizik, J. C. Teixeira, M. Mercola, E. A. Volpe, R. I. Glazer, T. M. Willson and A. P. Kozikowski;* ***J Am Chem Soc*** *2004;* ***126:*** *16714-5. https://doi.org/10.1021/ja046386l*
- *Lacosamide isothiocyanate-based agents: novel agents to target and identify lacosamide receptors; K. D. Park, P. Morieux, C. Salome, S. W. Cotten, O. Reamtong, C. Eyers, S. J. Gaskell, J. P. Stables, R. Liu and H. Kohn;* ***J Med Chem*** *2009;* ***52:*** *6897-911. https://doi.org/10.1021/jm9012054*

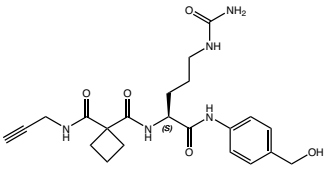
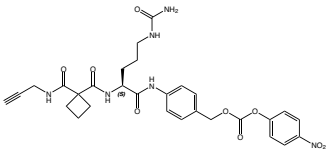
Propargyltyrosine

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

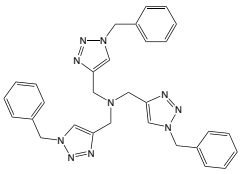
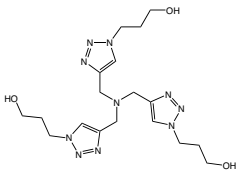
Alkyne-ADC Linker

		Product code	Packing unit	Price
ADC1310	**4-Pentynoyl-Val-Ala-PAB**			
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 $C_{20}H_{27}N_3O_4$				
Mol. weight 373,45 g/mol				
ADC1320	**4-Pentynoyl-Val-Ala-PAB-PNP**			
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 $C_{27}H_{30}N_4O_8$				
Mol. weight 538,55 g/mol				
ADC1140	**4-Pentynoyl-Val-Cit-PAB**			
4-pentynoyl-valyl-citrullyl-(4-aminobenzyl alcohol)		ADC1140.0100	100 mg	€ 325,00
		ADC1140.0250	250 mg	€ 650,00
Formula $C_{23}H_{33}N_5O_5$				
Mol. weight 459,54 g/mol				
ADC1150	**4-Pentynoyl-Val-Cit-PAB-PNP**			
4-pentynoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate		ADC1150.0100	100 mg	€ 375,00
		ADC1150.0250	250 mg	€ 750,00
Formula $C_{30}H_{36}N_6O_9$				
Mol. weight 624,64 g/mol				
ADC1350	**Alkyne-PEG(4)-Val-Ala-PAB**			
propargyl-tetraethyleneglycol-propanoyl-valyl-alanyl-(4-aminobenzyl alcohol)		ADC1350.0100	100 mg	€ 450,00
		ADC1350.0250	250 mg	€ 900,00
Formula $C_{29}H_{45}N_3O_9$				
Mol. weight 579,68 g/mol				

	Product code	Packing unit	Price
ADC1360 Alkyne-PEG(4)-Val-Ala-PAB-PNP 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 ADC1360.0250	100 mg 250 mg	€ 500,00 € 1.000,00
ADC1180 Alkyne-PEG(4)-Val-Cit-PAB propargyl-tetraethyleneglycol-propanoyl-valyl-citrullyl-(4-aminobenzyl alcohol) Formula $C_{32}H_{51}N_5O_{10}$ Mol. weight 665,77 g/mol 	ADC1180.0100 ADC1180.0250	100 mg 250 mg	€ 450,00 € 900,00
ADC1190 Alkyne-PEG(4)-Val-Cit-PAB-PNP propargyl-tetraethyleneglycol-propanoyl-valyl-citrullyl-(4-aminobenzyl)-(4-nitrophenyl)-carbonate Formula $C_{39}H_{54}N_6O_{14}$ Mol. weight 830,88 g/mol 	ADC1190.0100 ADC1190.0250	100 mg 250 mg	€ 500,00 € 1.000,00
ADC1600 Propargyl-cyclobutane-1,1-dicarboxamide-Ala-PAB 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
ADC1610 Propargyl-cyclobutane-1,1-dicarboxamide-Ala-PAB-PNP 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
ADC1500	**Propargyl-cyclobutane-1,1-dicarboxamide-Cit-PAB** propargyl-cyclobutane-1,1-dicarboxamide-citrul-lyl-(4-aminobenzyl alcohol) Formula $C_{22}H_{29}N_5O_5$ Mol. weight 443,50 g/mol 	ADC1500.0000		please inquire
ADC1510	**Propargyl-cyclobutane-1,1-dicarboxamide-Cit-PAB-PNP** propargyl-cyclobutane-1,1-dicarboxamide-citrul-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
RL-2010	**TBTA** 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
RL-2210	**THPTA** 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

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 κB (NF-κB) to their respective response elements at 100 to 500 µM 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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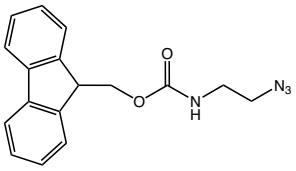
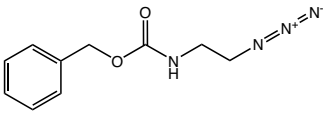
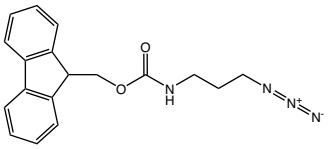
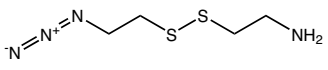
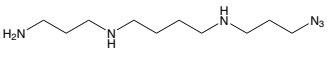
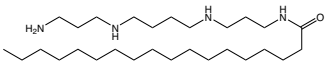
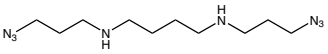
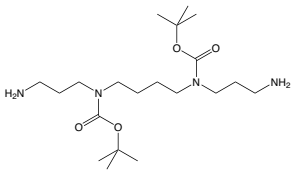
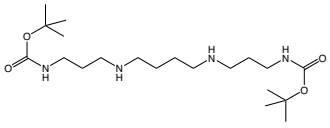
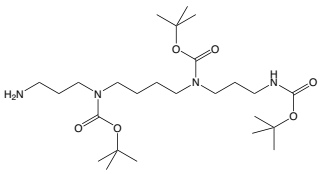
→ *Targeting polyamine metabolism and function in cancer and other hyperproliferative diseases; R. A. Casero, Jr. and L. J. Marton;* ***Nat Rev Drug Discov*** *2007;* ***6:*** *373-90. https://doi.org/10.1038/nrd2243*

		Product code	Packing unit	Price
FNN1020 Fmoc-EDA-N_3 1-[(9-Fluorenylmethyloxycarbonyl)amino]-2-azidoethane CAS-No. 432507-62-5 Formula $C_{17}H_{16}N_4O_2$ Mol. weight 308,33 g/mol		FNN1020.0001 FNN1020.0005 FNN1020.0025	1 g 5 g 25 g	€ 100,00 € 350,00 € 1.400,00
ZNN1050 Z-EDA-N_3 N1-Azido-N2-benzyloxycarbonyl-ethylenediamine CAS-No. 146552-66-1 Formula $C_{10}H_{12}N_4O_2$ Mol. weight 220,23 g/mol		ZNN1050.0001 ZNN1050.0005 ZNN1050.0025	1 g 5 g 25 g	€ 100,00 € 350,00 € 1.400,00
FNN1030 Fmoc-DAP-N_3 1-[(9-Fluorenylmethyloxycarbonyl)amino]-3-azidopropane CAS-No. 1021422-85-4 Formula $C_{18}H_{18}N_4O_2$ Mol. weight 322,36 g/mol		FNN1030.0001 FNN1030.0005 FNN1030.0025	1 g 5 g 25 g	€ 125,00 € 400,00 € 1.600,00
HNN1090 N_3-Cystamine*HCl Azido-cystamine hydrochloride CAS-No. 1807512-40-8 net Formula $C_4H_{10}N_4S_2$*HCl Mol. weight 178,28*36,45 g/mol		HNN1090.0100 HNN1090.0250 HNN1090.0500 HNN1090.0001 HNN1090.0005	100 mg 250 mg 500 mg 1 g 5 g	€ 90,00 € 150,00 € 280,00 € 420,00 € 1.500,00
SNN1170 Spermine(HHHN$_3$)*3HCl N1-(3-Aminopropyl)-N4-(3-azidopropyl)butane-1,4-diamine trihydrochloride CAS-No. 1823475-98-4 Formula $C_{10}H_{24}N_6$*3HCl Mol. weight 228,34*109,38 g/mol		SNN1170.0100 SNN1170.0250 SNN1170.0500 SNN1170.1000 SNN1170.5000	100 mg 250 mg 500 mg 1 g 5 g	€ 192,00 € 320,00 € 576,00 € 896,00 € 3.200,00

Everything for Click Chemistry

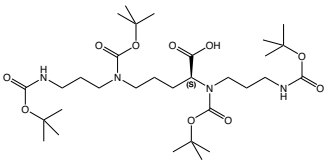
		Product code	Packing unit	Price
SNN1130	**Spermine(HHHStea)*3HCl**			
N1-Stearoyl-1,5,10,14-tetra-aza-quatrodecan trihydrochloride		SNN1130.0100	100 mg	€ 240,00
CAS-No. 273935-54-9net		SNN1130.0250	250 mg	€ 400,00
Formula $C_{28}H_{60}N_4O*3HCl$		SNN1130.0500	500 mg	€ 720,00
Mol. weight 468,82*109,35 g/mol		SNN1130.0001	1 g	€ 1.120,00
		SNN1130.0005	5 g	€ 4.000,00
SNN1210	**Spermine(N_3HHN_3)*2TsOH**			
N1-(3-Aminopropyl)-N4-(3-azidopropyl)butane-1,4-diamine bistosylate		SNN1210.0250	250 mg	€ 100,00
CAS-No. 2250433-79-3 net		SNN1210.0500	500 mg	€ 180,00
Formula $C_{10}H_{22}N_8*C_{14}H_{16}O_6S_2$		SNN1210.0001	1 g	€ 280,00
Mol. weight 254,34*344,40 g/mol		SNN1210.0005	5 g	€ 1.000,00
SNN1080	**Spermine(HBBH)**			
N2,N3-Bis-(t-butyloxycarbonyl)-1,5,10,14-tetra-aza-quatrodecan		SNN1080.9100	100 mg	€ 96,00
CAS-No. 177213-61-5		SNN1080.0250	250 mg	€ 192,00
Formula $C_{20}H_{42}N_4O_4$		SNN1080.0500	500 mg	€ 320,00
Mol. weight 402,58 g/mol		SNN1080.0001	1 g	€ 480,00
		SNN1080.0005	5 g	€ 1.600,00
SNN1200	**Spermine(BHHB)**			
N1,N4-Bis-(t-butyloxycarbonyl)-1,5,10,14-tetra-aza-tetradecan		SNN1200.0250	250 mg	€ 80,00
CAS-No. 140652-55-7		SNN1200.0500	500 mg	€ 144,00
Formula $C_{20}H_{42}N_4O_4$		SNN1200.1000	1 g	€ 224,00
Mol. weight 402,57 g/mol		SNN1200.5000	5 g	€ 800,00
		SNN1200.0025	25 g	€ 3.200,00
SNN1040	**Spermine(HBBB)**			
N2,N3,N4-Tris-(t-butyloxycarbonyl)-1,5,10,14-tetra-aza-quatrodecan		SNN1040.0100	100 mg	€ 133,00
CAS-No. 114459-62-0		SNN1040.0250	250 mg	€ 228,00
Formula $C_{25}H_{50}N_4O_6$		SNN1040.0500	500 mg	€ 380,00
Mol. weight 502,7 g/mol		SNN1040.0001	1 g	€ 570,00
		SNN1040.0005	5 g	€ 1.900,00

	Product code	Packing unit	Price

SNN1190 Spermine(BBBB-CO_2H) (S)

(S)-N1,N5,N10,N14-Tetrakis-(t-butyloxycarbonyl)-1,5,10,14-tetraazatetradecan-9-carboxylic acid

CAS-No. 119798-08-2
Formula $C_{31}H_{58}N_4O_{10}$
Mol. weight 646,81 g/mol

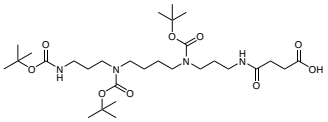


SNN1190.0100	100 mg	€ 330,00
SNN1190.0001	1 g	€ 990,00

SNN1220 Spermine(BBBSuc)

N1,N5,N10-triBoc-N14-succinoyl Spermine

CAS-No. 1247874-32-3
Formula $C_{29}H_{54}N_4O_9$
Mol. weight 602,77 g/mol

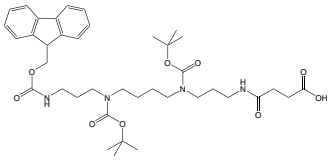


SNN1220.0100	100 mg	€ 138,00
SNN1220.0250	250 mg	€ 230,00
SNN1220.0500	500 mg	€ 414,00
SNN1220.1000	1 g	€ 644,00
SNN1220.5000	5 g	€ 2.300,00

SNN1140 Spermine(FBBSuc-OH)

N2,N3-Bis-(t-butyloxycarbonyl)-N1-(9-fluorenyl-methyloxycarbonyl)-1,5,10,14-tetra-aza-quatro-decan-N4-succinamic acid

CAS-No. 1263046-90-7
Formula $C_{39}H_{56}N_4O_9$
Mol. weight 724,9 g/mol



SNN1140.0100	100 mg	€ 240,00
SNN1140.0250	250 mg	€ 400,00
SNN1140.0500	500 mg	€ 720,00
SNN1140.0001	1 g	€ 1.120,00
SNN1140.0005	5 g	€ 4.000,00

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

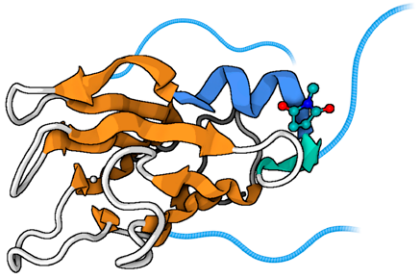


Fig. 9: PEGylation increases the hydrodynamic radius and aqueous solubility of proteins (example: PEGylated plastocyanin, adapted from Cattani et al., Nat Chem 2015).

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.

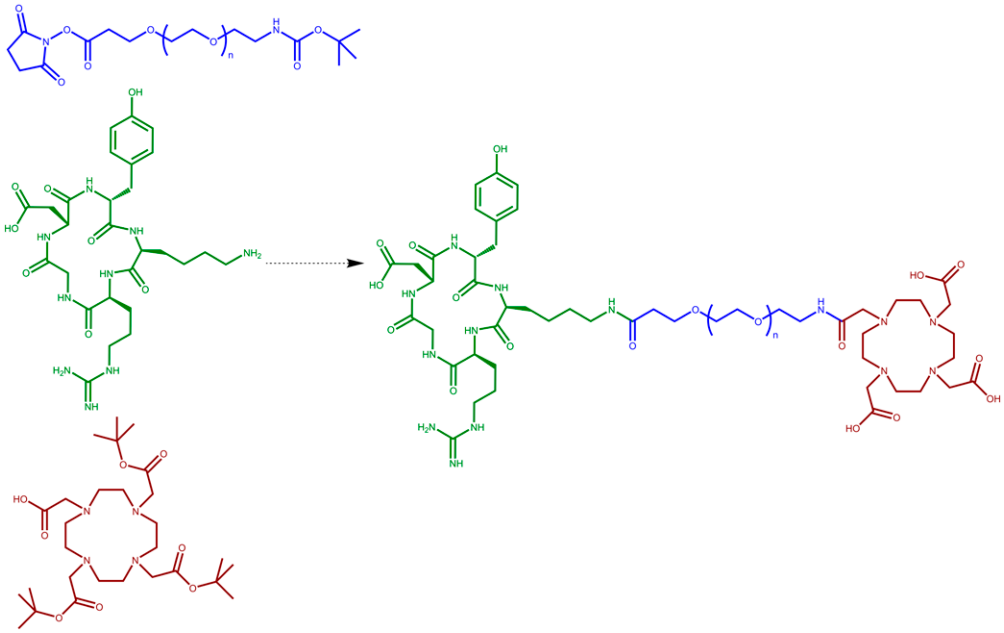


Fig. 10: Synthesis of a PEGylated RGD-DOTA conjugate for PET imaging (adapted from Chen et al., J. Nucl. Med. 2004).

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-α-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.

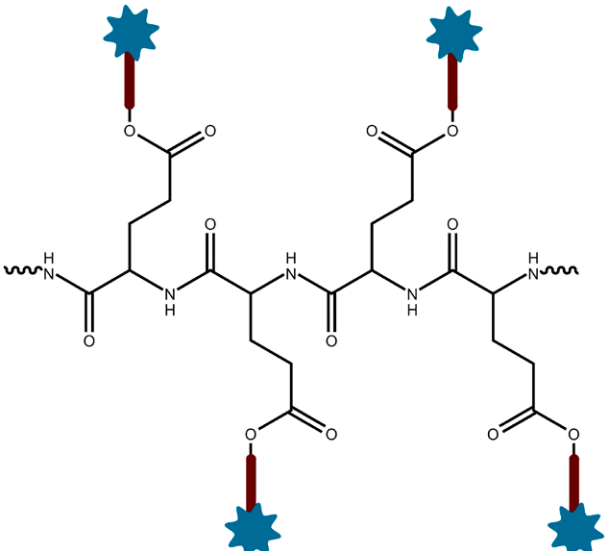


Fig. 11: Multivalent presentation of a drug on poly-α-(glutamic acid).

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.

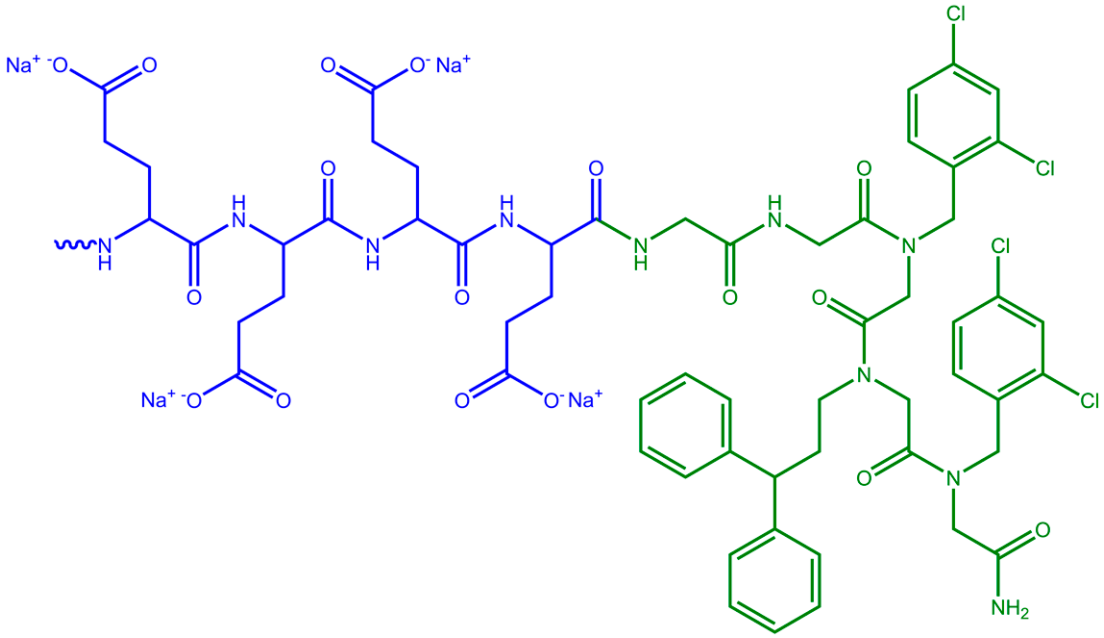


Fig. 12: A pentapeptide (green) conjugated to poly-α (glutamic acid) (blue).

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.

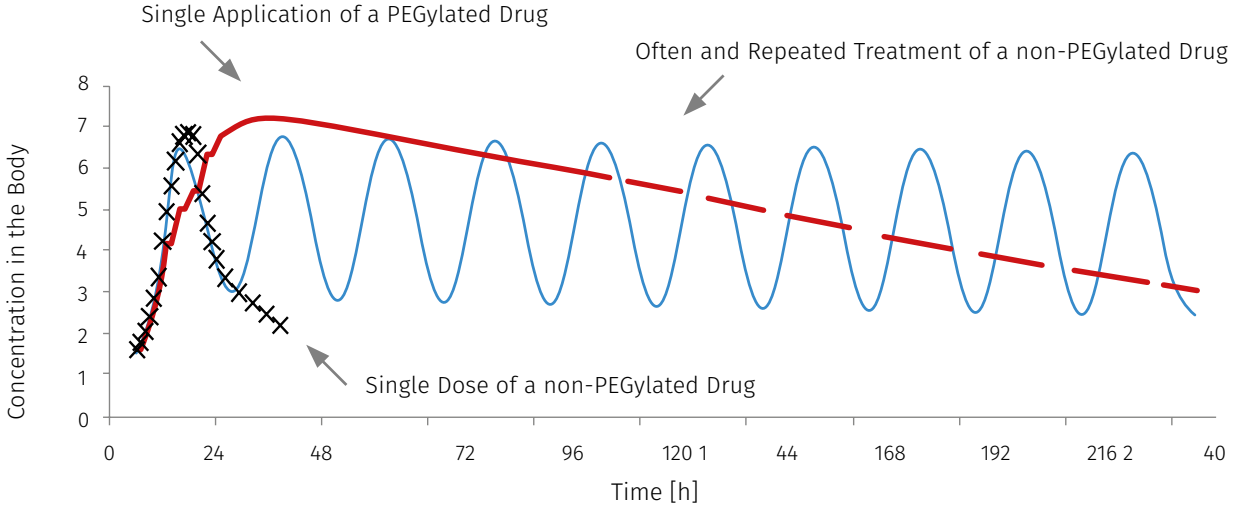
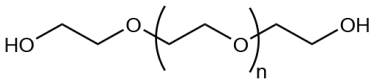


Fig. 13: Pharmacokinetic properties of a PEGylated drug in comparison to a non-PEGylated drug.

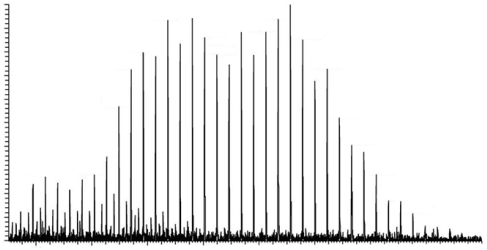
PEGylated drugs show decreased rates of renal clearance and reduced immunogenicity. Consequently, plasma half-life of the drug is significantly increased, extending the time intervals between applications of the drug over the course of the treatment. This is due to the following mechanisms:

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

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

Whenever there is a distribution of molecular weights, the weight average M_w° is always greater than the number average M_n° and the polydispersity Đ is greater than 1.

Fig. 14: Composition of poly(ethylene glycols), typical mass spectrum of a polydisperse PEG, and formula for the polydispersity Đ.

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 Đ, 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 Đ 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 Đ is greater than 1. The dispersity of PEGs typically used in PEGylations ranges between 1.05 and 1.50.

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.

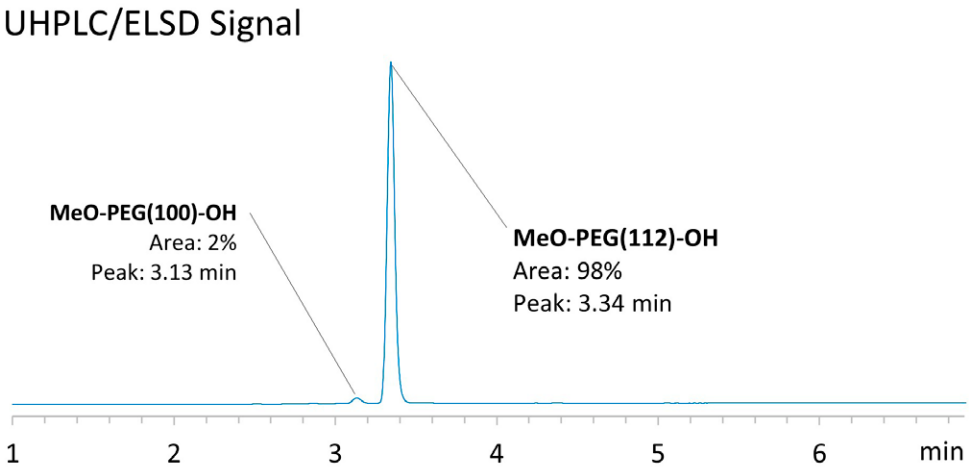


Fig. 15: Typical UHPLC spectrum of a monodisperse MeO-PEG(112)-OH.

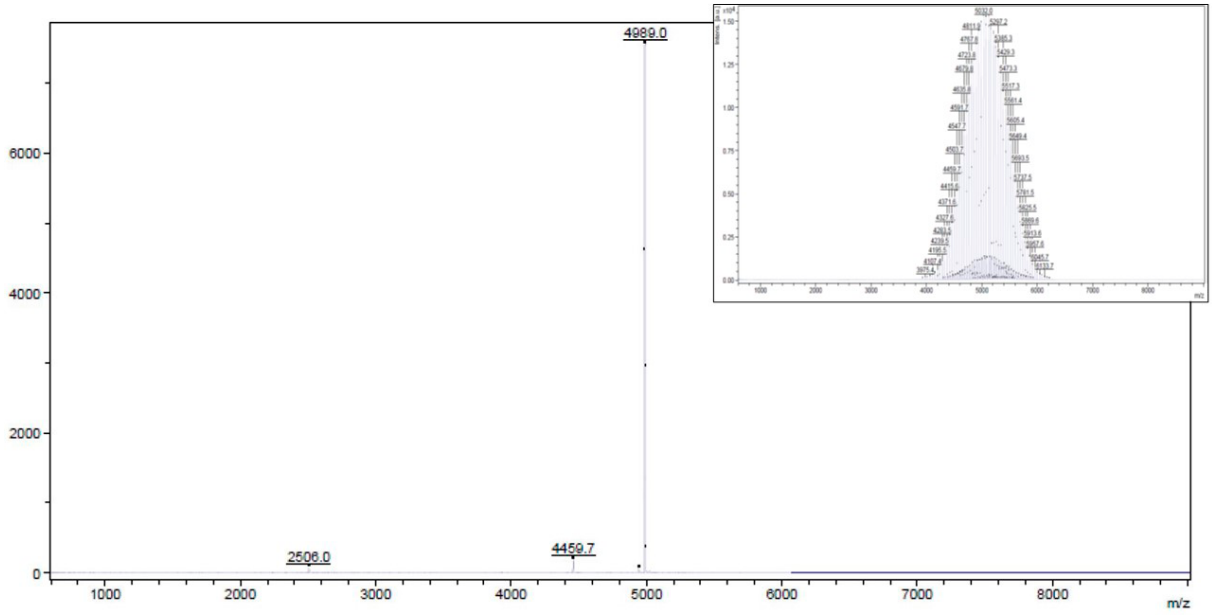
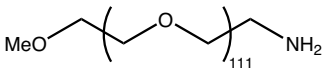
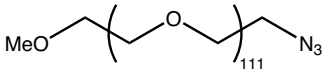
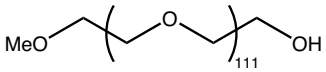
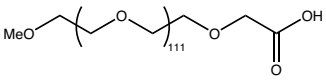
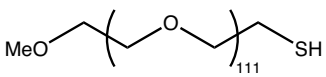


Fig. 16: MALDI-TOF MS spectrum of a monodisperse MeO-PEG(112)-OH; $[MeO\text{-}PEG(112)\text{-}OH+Na]^+$ = 4989.0 (97%), $[MeO\text{-}PEG(111)\text{-}OH+Na]^+$ = 4945.0 (0.8%), $[MeO\text{-}PEG(100)\text{-}OH+Na]^+$ = 4459.7 (2.8%), $[MeO\text{-}PEG(112)\text{-}OH+2Na]^{2+}$ = 2506.0 (1%); typical MALDI-TOF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

		Product code	Packing unit	Price
PEG7930 MeO-PEG(112)-NH_2 alpha-Methoxy-omega-amino 112(ethylene glycol) CAS-No. 80506-64-5 Formula $C_{225}H_{453}NO_{112}$ Mol. weight 4964.94 g/mol		PEG7930.0100 PEG7930.0200 PEG7930.0500 PEG7930.1000	100 mg 200 mg 500 mg 1 g	€ 450,00 € 650,00 € 1.275,00 € 2.425,00
PEG8020 MeO-PEG(112)-N_3 alpha-Methoxy-omega-azido 112(ethylene glycol) CAS-No. 89485-61-0 Formula $C_{225}H_{451}N_3O_{112}$ Mol. weight 4990.94 g/mol		PEG8020.0100 PEG8020.0200 PEG8020.0500 PEG8020.1000	100 mg 200 mg 500 mg 1 g	€ 450,00 € 650,00 € 1.275,00 € 2.425,00
PEG8070 MeO-PEG(111)-OH alpha-Methoxy-111(ethylene glycol)-omega-alcohol Formula $C_{225}H_{452}O_{113}$ Mol. weight 4965,93 g/mol		PEG8070.0100 PEG8070.0200 PEG8070.0500 PEG8070.1000	100 mg 200 mg 500 mg 1 g	€ 450,00 € 650,00 € 1.275,00 € 2.425,00
PEG8030 MeO-PEG(112)-COOH alpha-Methoxy-112(ethylene glycol)-omega-acetic acid CAS-No. 102013-72-9 Formula $C_{227}H_{454}O_{115}$ Mol. weight 5023.96 g/mol		PEG8030.0100 PEG8030.0200 PEG8030.0500 PEG8030.1000	100 mg 200 mg 500 mg 1 g	€ 450,00 € 650,00 € 1.275,00 € 2.425,00
PEG8040 MeO-PEG(112)-SH alpha-Methoxy-omega-mercapto 112(ethylene glycol) CAS-No. 134874-49-0 Formula $C_{225}H_{452}O_{112}S$ Mol. weight 4981.99 g/mol		PEG8040.0100 PEG8040.0200 PEG8040.0500 PEG8040.1000	100 mg 200 mg 500 mg 1 g	€ 450,00 € 650,00 € 1.275,00 € 2.425,00

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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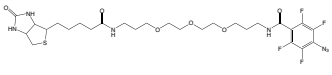
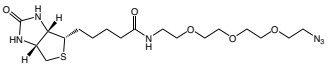
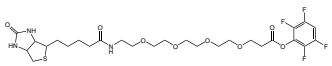
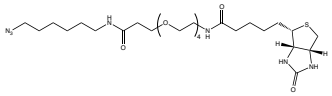
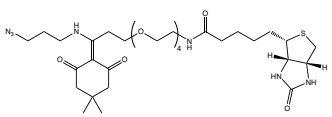
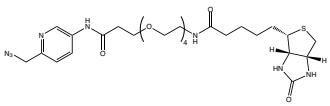
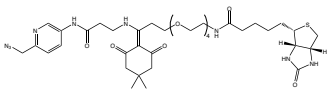
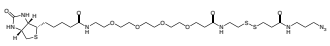
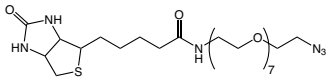
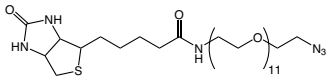
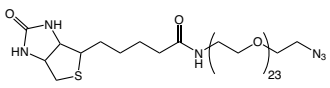
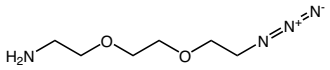
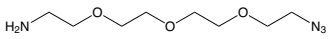
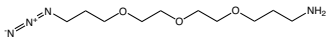
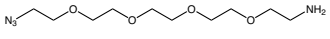
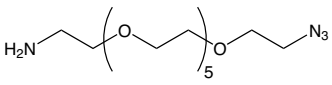
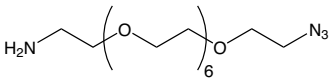
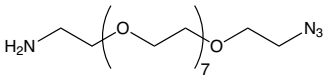
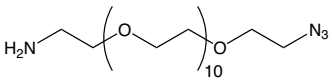
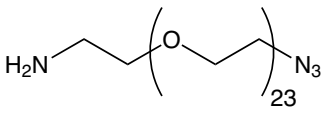
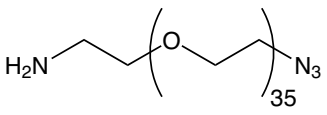
4.3. Azido-PEG Derivatives for Click Chemistry

		Product code	Packing unit	Price
PEG2065 **Biotin-TEG-ATFBA** Biotin-triethylenglycol-(p-azido-tetrafluoroben-zamide) CAS-No. 1264662-85-2 Formula $C_{27}H_{37}F_4N_7O_6S$ Mol. weight 663,68 g/mol		PEG2065.0025 PEG2065.0100	25 mg 100 mg	€ 230,00 € 410,00
PEG4940 **Biotin-PEG(3)-N_3** 11-[D(+)-Biotinylamino]-1-azido-3,6,9-trioxaun-decane CAS-No. 875770-34-6 Formula $C_{18}H_{32}N_6O_5S$ Mol. weight 444,55 g/mol		PEG4940.0000		please inquire
PEG2071 **Biotin-TEG-TFP** Biotin-tetra(ethylene glycol)-2,3,5,6-tetrafluor-phenyl ester Formula $C_{27}H_{37}F_4N_3O_8S$ Mol. weight 639.66 g/mol		PEG2071.0100 PEG2071.1000	100 mg 1 g	€ 200,00 € 780,00
PEG7990 **Biotin-PEG(4)-N_3** (3aS,4S,6aR)-4-(28-azido-5,21-dioxo-9,12,15,18-te-traoxa-6,22-diazaoctacosyl)tetrahy-dro-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 PEG7990.0025 PEG7990.0100	5 mg 25 mg 100 mg	€ 145,00 € 415,00 € 1.250,00
PEG7960 **Biotin-PEG(4)-Dde-N_3** N-(19-azido-15-(4,4-dimethyl-2,6-dioxocy-clohexylidene)-3,6,9,12-tetraoxa-16-azan-onadecyl)-5-((3aS,4S,6aR)-2-oxohexahy-dro-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 PEG7960.0025 PEG7960.0100	10 mg 25 mg 100 mg	€ 250,00 € 415,00 € 1.250,00

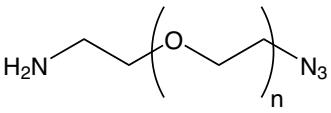
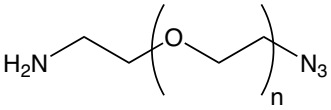
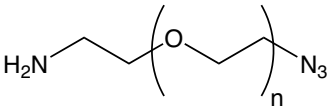
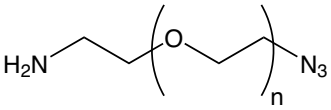
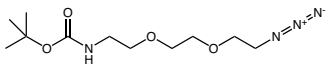
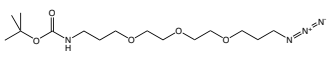
		Product code	Packing unit	Price
PEG8000 **Biotin-PEG(4)-Picolyl-N_3** (3aS,4S,6aR)-4-(1-(6-(azidomethyl)pyridin-3-ylamino)-1,17-dioxo-4,7,10,13-tetraoxa-16-azahenicosan-21-yl)tetrahydro-1H-thieno[3,4-d]imidazol-2(3H)-one CAS-No. 2222687-71-8 Formula $C_{27}H_{42}N_8O_7S$ Mol. weight 622,74 g/mol		PEG8000.0005 PEG8000.0025 PEG8000.0100	5 mg 25 mg 100 mg	€ 195,00 € 375,00 € 1.025,00
PEG7970 **Biotin-PEG(4)-Dde-Picolyl-N_3** 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-azanonadecan-19-amide CAS-No. 2055048-42-3 Formula $C_{38}H_{57}N_9O_9S$ Mol. weight 815,98 g/mol		PEG7970.0005 PEG7970.0010 PEG7970.0100	5 mg 10 mg 100 mg	€ 195,00 € 300,00 € 1.450,00
PEG8100 **Biotin-PEG(4)-SS-Azide** 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 CAS-No. 1260247-52-6 Formula $C_{29}H_{52}N_8O_8S_3$ Mol. weight 736,96 g/mol		PEG8100.0025 PEG8100.0100 PEG8100.0500	25 mg 100 mg 500 mg	€ 225,00 € 650,00 € 2.600,00
PEG4330 **Biotin-dPEG™(7)-N_3** alpha-Biotin-omega-azido hepta(ethylene glycol) CAS-No. 1334172-75-6 Formula $C_{26}H_{48}N_6O_9S$ Mol. weight 620,76 g/mol		PEG4330.0100 PEG4330.1000	100 mg 1 g	€ 320,00 € 1.660,00
PEG4340 **Biotin-dPEG™(11)-N_3** [2-(2-aminoethoxy)ethoxy]acetic acid tert-butyl ester*HCl CAS-No. 956494-20-5 Formula $C_{34}H_{64}N_6O_{13}S$ Mol. weight 796,97 g/mol		PEG4340.0100 PEG4340.1000	100 mg 1 g	€ 380,00 € 1.720,00

		Product code	Packing unit	Price
PEG4350 Biotin-dPEG™(23)-N_3 alpha-Biotin-omega-azido 23(ethylene glycol) CAS-No. 956494-20-5 Formula $C_{58}H_{112}N_6O_{25}S$ Mol. weight 1325,6 g/mol		PEG4350.0100 PEG4350.1000	100 mg 1 g	€ 430,00 € 1.950,00

		Product code	Packing unit	Price
PEG4980 H_2N-PEG(2)-N_3*TosOH 2-[2-(2-Azidoethoxy)ethoxy]ethanaminium tosylat CAS-No. 2173092-98-1 Formula $C_7H_{14}N_4O_2$*$C_7H_8O_3S$ Mol. weight 174,20*172,20 g/mol		PEG4980.0001 PEG4980.0005 PEG4980.0025	1 g 5 g 25 g	€ 125,00 € 450,00 € 1.800,00
PEG3060 H_2N-PEG(3)-N_3 1-Amino-11-azido-3,6,9-trioxaundecane CAS-No. 134179-38-7 Formula $C_8H_{18}N_4O_3$ Mol. weight 218,25 g/mol		PEG3060.0001 PEG3060.0005 PEG3060.0025	1 g 5 g 25 g	€ 95,00 € 375,00 € 1.500,00
BNN1150 N_3-TOTA 1-Azido-4,7,10-trioxa-13-tridecanamine CAS-No. 1162336-72-2 Formula $C_{10}H_{22}N_4O_3$ Mol. weight 246,31 g/mol		BNN1150.0500 BNN1150.0001 BNN1150.0005 BNN1150.0025	500 mg 1 g 5 g 25 g	€ 100,00 € 150,00 € 500,00 € 2.000,00
PEG5320 N_3-PEG(4)-NH_2 14-Azido-3,6,9,12-tetraoxatetradecan-1-amine CAS-No. 951671-92-4 Formula $C_{10}H_{22}N_4O_4$ Mol. weight 262,31 g/mol		PEG5320.0250 PEG5320.0500 PEG5320.0001 PEG5320.0005 PEG5320.0025	250 mg 500 mg 1 g 5 g 25 g	€ 108,00 € 180,00 € 270,00 € 900,00 € 3.600,00

		Product code	Packing unit	Price
PEG1087 H_2N-PEG(6)-N_3 alpha-Amino-omega-azido hexa(ethylene glycol) CAS-No. 957486-82-7 Formula $C_{14}H_{30}N_4O_6$ Mol. weight 350,42 g/mol		PEG1087.0001 PEG1087.0005 PEG1087.0025	1 g 5 g 25 g	€ 320,00 € 1.050,00 € 3.230,00
PEG2350 H_2N-PEG(7)-N_3 alpha-Amino-omega-azido hepta(ethylene glycol) CAS-No. 1333154-77-0 Formula $C_{16}H_{34}N_4O_7$ Mol. weight 394,46 g/mol		PEG2350.0100 PEG2350.0001	100 mg 1 g	€ 320,00 € 670,00
PEG3050 H_2N-PEG(8)-N_3 alpha-Amino-omega-azido octa(ethylene glycol) CAS-No. 857891-82-8 Formula $C_{18}H_{38}N_4O_8$ Mol. weight 438,52 g/mol		PEG3050.0001 PEG3050.0005	1 g 5 g	€ 320,00 € 1.050,00
PEG1081 H_2N-PEG(11)-N_3 alpha-Amino-omega-azido undecae(ethylene glycol) CAS-No. 1800414-71-4 Formula $C_{24}H_{50}N_4O_{11}$ Mol. weight 570,69 g/mol		PEG1081.0001 PEG1081.0005 PEG1081.0025	1 g 5 g 25 g	€ 375,00 € 1.140,00 € 3.770,00
PEG3070 H_2N-PEG(23)-N_3 alpha-Azido-omega-amino 23(ethylene glycol) CAS-No. 2172677-19-7 Formula $C_{48}H_{98}N_4O_{23}$ Mol. weight 1099,3 g/mol		PEG3070.0100 PEG3070.0001	100 mg 1 g	€ 430,00 € 1.080,00
PEG3080 H_2N-PEG(35)-N_3 alpha-Azido-omega-amino 35(ethylene glycol) CAS-No. 749244-38-0 Formula $C_{72}H_{146}N_4O_{35}$ Mol. weight 1627,94 g/mol		PEG3080.0100 PEG3080.0001	100 mg 1 g	€ 490,00 € 1.660,00

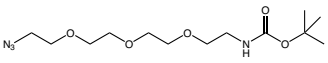
Prices are in EUR, net, EXW Germany

		Product code	Packing unit	Price
PEG3020 H_2N-PEG-N_3 (20 kDa) alpha-Amino-omega-azido poly(ethylene glycol) Mol. weight 20000 Da		PEG3020.0500 PEG3020.0001	500 mg 1 g	€ 440,00 € 730,00
PEG3010 H_2N-PEG-N_3 (3 kDa) alpha-Amino-omega-azido poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight 3000 Da		PEG3010.0500 PEG3010.0001	500 mg 1 g	€ 410,00 € 670,00
PEG3030 H_2N-PEG-N_3 (5 kDa) alpha-Amino-omega-azido poly(ethylene glycol) Mol. weight 5000 Da		PEG3030.0500 PEG3030.0001	500 mg 1 g	€ 410,00 € 670,00
PEG3000 H_2N-PEG-N_3 (10 kDa) alpha-Amino-omega-azido poly(ethylene glycol) Mol. weight 10000 Da		PEG3000.0500 PEG3000.0001	500 mg 1 g	€ 440,00 € 730,00
PEG4960 Boc-NH-PEG(2)-N_3 1-(t-Butyloxycarbonyl-amino)-3,6-dioxa-8-octaneazide CAS-No. 950683-55-3 Formula $C_{11}H_{22}N_4O_4$ Mol. weight 274,32 g/mol		PEG4960.0500 PEG4960.0001 PEG4960.0005 PEG4960.0025	500 mg 1 g 5 g 25 g	€ 90,00 € 135,00 € 450,00 € 1.800,00
BNN1140 Boc-TOTA-N_3 1-(t-Butyloxycarbonyl-amino)-4,7,10-trioxa-13-tridecanazide CAS-No. 1162070-33-8 Formula $C_{15}H_{30}N_4O_5$ Mol. weight 346,42 g/mol		BNN1140.0500 BNN1140.0001 BNN1140.0005 BNN1140.0025	500 mg 1 g 5 g 25 g	€ 90,00 € 135,00 € 450,00 € 1.800,00

	Product code	Packing unit	Price

PEG8160 N_3-PEG(3)-NH-Boc

t-Butyl N-(2-(2-(2-(2-azidoethoxy)ethoxy) ethoxy)ethyl)carbamate



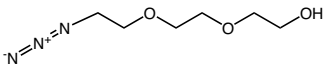
CAS-No. 642091-68-7
Formula $C_{13}H_{26}N_4O_5$
Mol. weight 318,37 g/mol

Product code	Packing unit	Price
PEG8160.0001	1 g	€ 112,00
PEG8160.0005	5 g	€ 400,00
PEG8160.0025	25 g	€ 1.600,00

	Product code	Packing unit	Price

PEG4900 N_3-EEEt-OH

2-[2-(2-Azidoethoxy)ethoxy]ethanol

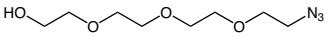


CAS-No. 86520-52-7
Formula $C_6H_{13}N_3O_3$
Mol. weight 175,19 g/mol

Product code	Packing unit	Price
PEG4900.0001	1 g	€ 125,00
PEG4900.0005	5 g	€ 350,00
PEG4900.0025	25 g	€ 1.400,00

PEG3760 N_3-PEG(3)-OH

alpha-Azido-omega-hydroxy tetra(ethylene glycol)

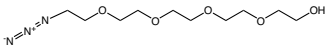


CAS-No. 86770-67-4
Formula $C_8H_{17}N_3O_4$
Mol. weight 219,24 g/mol

Product code	Packing unit	Price
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

PEG5300 N_3-PEG(4)-OH

2-(2-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)ethoxy) ethanol

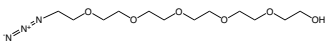


CAS-No. 86770-68-5
Formula $C_{10}H_{21}N_3O_5$
Mol. weight 263,29 g/mol

Product code	Packing unit	Price
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

PEG6720 N_3-PEG(5)-OH

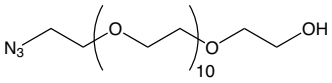
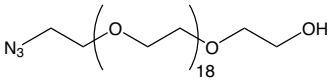
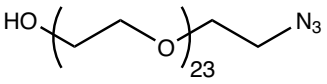
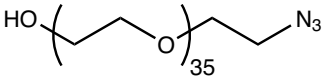
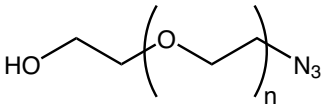
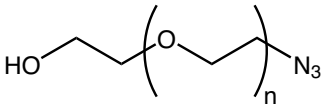
17-Azido-3,6,9,12,15-pentaoxaheptadecan-1-ol



CAS-No. 86770-69-6
Formula $C_{12}H_{25}N_3O_6$
Mol. weight 307,34 g/mol

Product code	Packing unit	Price
PEG6720.0500	500 mg	€ 120,00
PEG6720.0001	1 g	€ 185,00
PEG6720.0005	5 g	€ 650,00
PEG6720.0025	25 g	€ 2.600,00

Prices are in EUR, net, EXW Germany

		Product code	Packing unit	Price
PEG1390 N_3-PEG(12)-OH 35-Azido-3,6,9,12,15,18,21,24,27,30,33-undecaoxa-pentatriacontan-1-ol CAS-No. 73342-16-2 Formula $C_{24}H_{49}N_3O_{12}$ Mol. weight 571,66 g/mol		PEG1390.0100 PEG1390.0001	100 mg 1 g	€ 350,00 € 730,00
PEG1220 N_3-PEG(20)-OH alpha-Azido-omega-hydroxy icosa(ethylene glycol) CAS-No. 1637297-21-2 Formula $C_{40}H_{81}N_3O_{20}$ Mol. weight 924,1 g/mol		PEG1220.0001 PEG1220.0005	1 g 5 g	€ 340,00 € 1.040,00
PEG3770 N_3-dPEG™(24)-OH alpha-Azido-omega-hydroxy 24(ethylene glycol) CAS-No. 73342-16-2 Formula $C_{48}H_{97}N_3O_{24}$ Mol. weight 1100,29 g/mol		PEG3770.0100 PEG3770.1000	100 mg 1 g	€ 460,00 € 1.020,00
PEG3780 N_3-dPEG™(36)-OH alpha-Azido-omega-hydroxy 36(ethylene glycol) CAS-No. 73342-16-2 Formula $C_{72}H_{145}N_3O_{36}$ Mol. weight 1628,92 g/mol		PEG3780.0100 PEG3780.1000	100 mg 1 g	€ 490,00 € 1.190,00
PEG5350 HO-PEG-N_3 (3 kDa) alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight 3000 Da		PEG5350.0500 PEG5350.0001	500 mg 1 g	€ 295,00 € 525,00
PEG5360 HO-PEG-N_3 (5 kDa) alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight 5000 Da		PEG5360.0500 PEG5360.0001	500 mg 1 g	€ 295,00 € 525,00

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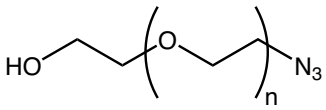
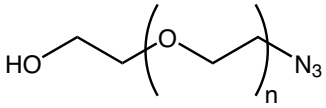
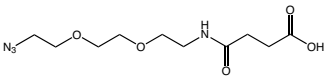
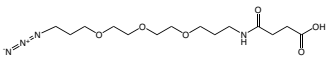
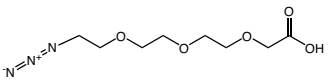
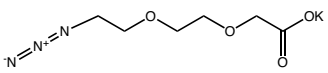
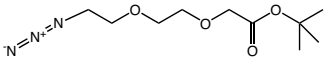
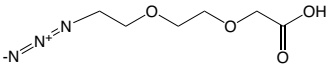
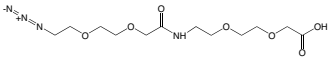
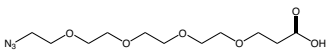
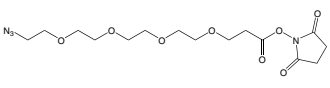
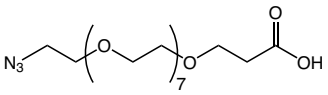
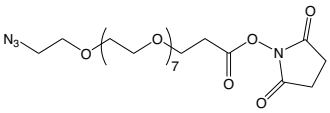
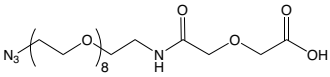
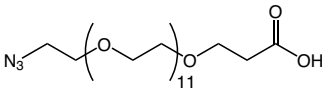
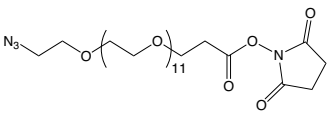
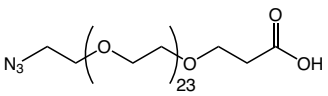
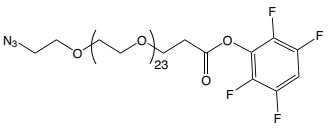
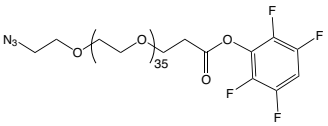
		Product code	Packing unit	Price
PEG5330 **HO-PEG-N_3 (10 kDa)** alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight 10000 Da		PEG5330.0500 PEG5330.0001	500 mg 1 g	€ 340,00 € 565,00
PEG5340 **HO-PEG-N_3 (20 kDa)** alpha-Hydroxy-omega-azido poly(ethylene glycol) Mol. weight 20000 Da		PEG5340.0500 PEG5340.0001	500 mg 1 g	€ 340,00 € 565,00

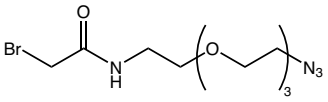
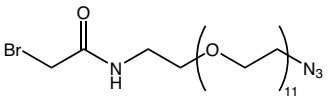
		Product code	Packing unit	Price
PEG5290 **N_3-DOOA-Suc-OH** 4-(2-(2-(2-azidoethoxy)ethoxy)ethylamino)-4-oxobutanoic acid CAS-No. 1189096-56-7 Formula $C_{10}H_{18}N_4O_5$ Mol. weight 274,27 g/mol		PEG5290.0500 PEG5290.0001 PEG5290.0005 PEG5290.0025	500 mg 1 g 5 g 25 g	€ 150,00 € 225,00 € 750,00 € 3.000,00
PEG5170 **N_3-TOTA-Suc** 1-Azido-4,7,10-trioxa-13-tridecaneamine succinamic acid CAS-No. 1993176-74-1 Formula $C_{14}H_{26}N_4O_6$ Mol. weight 346,38 g/mol		PEG5170.0500 PEG5170.0001 PEG5170.0005 PEG5170.0025	500 mg 1 g 5 g 25 g	€ 150,00 € 225,00 € 750,00 € 3.000,00
PEG5400 **N_3-AEEEA*CHA** 11-Azido-3,6,9-trioxaundecanoic acid cyclohexylamine CAS-No. 172531-37-2 net Formula $C_8H_{15}N_3O_5$*$C_6H_{13}N$ Mol. weight 233,22*99,17 g/mol		PEG5400.0500 PEG5400.0001 PEG5400.0005 PEG5400.0025	500 mg 1 g 5 g 25 g	€ 130,50 € 203,00 € 725,00 € 2.900,00

		Product code	Packing unit	Price
PEG7950 N_3-AEEA-OK Potassium 8-azido-3,6-dioxaoctanoate CAS-No. 882518-90-3 net Formula $C_6H_{10}KN_3O_4$ Mol. weight 39,10*188,16 g/mol		PEG7950.0500 PEG7950.1000 PEG7950.5000 PEG7950.9025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
PEG5390 N_3-O2Oc-OtBu 8-Azido-3,6-dioxaoctanoic acid t-butyl ester CAS-No. 251564-45-1 Formula $C_{10}H_{19}N_3O_4$ Mol. weight 245,28 g/mol		PEG5390.0500 PEG5390.0001 PEG5390.0005 PEG5390.0025	500 mg 1 g 5 g 25 g	€ 150,00 € 225,00 € 750,00 € 3.000,00
PEG2780 N_3-O2Oc-OH*CHA [2-(2-azidoethoxy)ethoxy]acetic acid cyclohexylamine salt CAS-No. 2098500-94-6 Formula $C_6H_{11}N_3O_4*C_6H_{13}N$ Mol. weight 189,17*99,17 g/mol		PEG2780.0500 PEG2780.0001 PEG2780.0005 PEG2780.0025	500 mg 1 g 5 g 25 g	€ 81,00 € 126,00 € 450,00 € 1.800,00
PEG2790 N_3-O2Oc-O2Oc-OH 8-(8-Azido-3,6-dioxaoctanoylamido)-3,6-dioxaoctanoic acid CAS-No. 1254054-60-8 Formula $C_{12}H_{22}N_4O_7$ Mol. weight 334,33 g/mol		PEG2790.0250 PEG2790.0500 PEG2790.0001 PEG2790.0005	250 mg 500 mg 1 g 5 g	€ 75,00 € 135,00 € 210,00 € 750,00
PEG2345 N_3-PEG(4)-COOH 15-Azido-4,7,10,13-tetraoxa-pentadecanoic acid CAS-No. 1257063-35-6 Formula $C_{11}H_{21}N_3O_6$ Mol. weight 291,3 g/mol		PEG2345.0100 PEG2345.0250 PEG2345.0001 PEG2345.0005	100 mg 250 mg 1 g 5 g	€ 85,00 € 150,00 € 450,00 € 1.800,00
PEG1400 N_3-PEG(4)-NHS 15-Azido-4,7,10,13-tetraoxa-pentadecanoic acid succinimidyl ester CAS-No. 944251-24-5 Formula $C_{15}H_{24}N_4O_8$ Mol. weight 388,37 g/mol		PEG1400.0100 PEG1400.0001	100 mg 1 g	€ 290,00 € 670,00

		Product code	Packing unit	Price
PEG4170 N_3-PEG(8)-COOH alpha-Azido-omega-(propionic acid) octa(ethylene glycol) CAS-No. 1214319-92-2 Formula $C_{19}H_{37}N_3O_{10}$ Mol. weight 467,51 g/mol		PEG4170.0100 PEG4170.1000	100 mg 1 g	€ 350,00 € 760,00
PEG1405 N_3-PEG(8)-NHS 1-Azido-3,6,9,12,15,18,21,24-octaoxaheptacosan-27-oic acid succinimidyl ester CAS-No. 1204834-00-3 Formula $C_{23}H_{40}N_4O_{12}$ Mol. weight 564,58 g/mol		PEG1405.0100 PEG1405.0001	100 mg 1 g	€ 320,00 € 840,00
PEG2015 N_3-PEG(9)-COOH O-(2-Azidoethyl)-O-[2-(diglycolyl-amino)ethyl] heptaethylene glycol CAS-No. 846549-37-9 Formula $C_{22}H_{42}N_4O_{12}$ Mol. weight 554,59 g/mol		PEG2015.0001 PEG2015.0005	1 g 5 g	€ 410,00 € 1.300,00
PEG4180 N_3-PEG(12)-COOH alpha-Azido-omega-(propionic acid) dodeca(ethylene glycol) CAS-No. 1167575-20-3 Formula $C_{27}H_{53}N_3O_{14}$ Mol. weight 643,72 g/mol		PEG4180.0100 PEG4180.1000	100 mg 1 g	€ 380,00 € 960,00
PEG1395 N_3-PEG(12)-NHS 1-Azido-3,6,9,12,15,18,21,24,27,30,33,36-dodecaoxanonatriacontan-39-oic acid succinimidyl ester CAS-No. 1108750-59-9 Formula $C_{31}H_{56}N_4O_{16}$ Mol. weight 740,79 g/mol		PEG1395.0100 PEG1395.0001	100 mg 1 g	€ 350,00 € 960,00
PEG4190 N_3-dPEG™(24)-COOH alpha-Azido-omega-(propionic acid) 24(ethylene glycol) CAS-No. 1167575-20-3 Formula $C_{51}H_{101}N_3O_{26}$ Mol. weight 1172,35 g/mol		PEG4190.0100 PEG4190.1000	100 mg 1 g	€ 410,00 € 1.190,00

		Product code	Packing unit	Price
PEG7650 N_3-dPEG™(24)-TFP alpha-Azido-omega-(2,3,5,6-tetrafluorophenyl propionate) 24(ethylene glycol) Formula $C_{57}H_{101}F_4N_3O_{26}$ Mol. weight 1320,41 g/mol		PEG7650.0100 PEG7650.0001	100 mg 1 g	€ 410,00 € 1.690,00
PEG7660 N_3-dPEG™(36)-TFP alpha-Azido-omega-(2,3,5,6-tetrafluorophenyl propionate) 36(ethylene glycol) Formula $C_{81}H_{149}F_4N_3O_{38}$ Mol. weight 1849,04 g/mol		PEG7660.0100 PEG7660.0001	100 mg 1 g	€ 490,00 € 2.130,00

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 $-NH_2$ 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
PEG7190 Bromoacetamido-PEG(3)-N_3 Bromoacetamido-tri(ethylene glycol)-azide CAS-No. 940005-81-2 Formula $C_{10}H_{19}BrN_4O_4$ Mol. weight 339,19 g/mol		PEG7190.0100 PEG7190.0001	100 mg 1 g	€ 380,00 € 780,00
PEG7200 Bromoacetamido-PEG(11)-N_3 Bromoacetamido-undeca(ethylene glycol)-azide Formula $C_{26}H_{51}BrN_4O_{12}$ Mol. weight 691,61 g/mol		PEG7200.0100 PEG7200.0001	100 mg 1 g	€ 490,00 € 1.660,00

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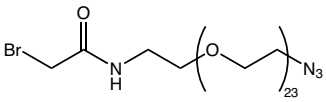
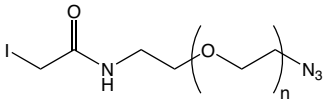
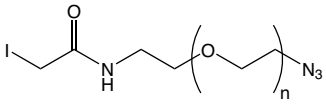
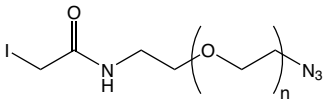
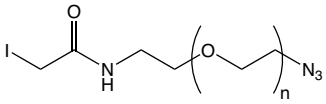
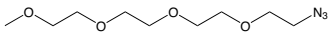
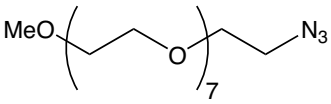
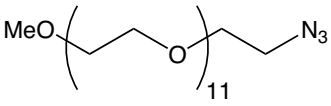
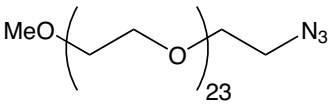
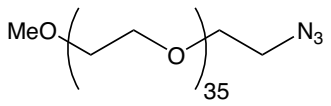
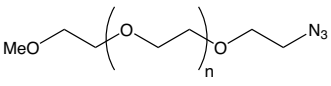
		Product code	Packing unit	Price
PEG7210	**Bromoacetamido-PEG(23)-N_3**			
Bromoacetamido-23(ethylene glycol)-azide		PEG7210.0100	100 mg	€ 550,00
Formula $C_{50}H_{99}BrN_4O_{24}$		PEG7210.0001	1 g	€ 1.720,00
Mol. weight 1220,24 g/mol				
PEG3130	**I-PEG-N_3 (10 kDa)**			
alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 10000 Dalton)		PEG3130.0100	100 mg	€ 270,00
Mol. weight 10000 Da		PEG3130.0500	500 mg	€ 730,00
PEG3140	**I-PEG-N_3 (20 kDa)**			
alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 20000 Dalton)		PEG3140.0100	100 mg	€ 270,00
Mol. weight 20000 Da		PEG3140.0500	500 mg	€ 730,00
PEG3150	**I-PEG-N_3 (3 kDa)**			
alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 3000 Dalton)		PEG3150.0100	100 mg	€ 250,00
Mol. weight 3000 Da		PEG3150.0500	500 mg	€ 700,00
PEG3160	**I-PEG-N_3 (5 kDa)**			
alpha-Iodo-omega-azido poly(ethylene glycol) (PEG-MW 5000 Dalton)		PEG3160.0100	100 mg	€ 250,00
Mol. weight 5000 Da		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
PEG1690 **MeO-dPEG(4)-N_3** 13-Azido-2,5,8,11-tetraoxa-tridecane CAS-No. 606130-90-9 Formula $C_9H_{19}N_3O_4$ Mol. weight 233,26 g/mol		PEG1690.0100 PEG1690.0001	100 mg 1 g	€ 230,00 € 640,00
PEG1705 **MeO-PEG(8)-N_3** 2,5,8,11,14,17,20,23-Octaoxapentacosan-25-amine Formula $C_{17}H_{35}N_3O_8$ Mol. weight 409,48 g/mol		PEG1705.0100 PEG1705.0001	100 mg 1 g	€ 290,00 € 730,00
PEG1660 **MeO-PEG(12)-N_3** 37-Azido-2,5,8,11,14,17,20,23,26,29,32,35-dodecaoxaheptatriacontane CAS-No. 89485-61-0 Formula $C_{25}H_{51}N_3O_{12}$ Mol. weight 585,69 g/mol		PEG1660.0100 PEG1660.0001	100 mg 1 g	€ 350,00 € 840,00
PEG1710 **MeO-PEG(24)-N_3** alpha-Methoxy-omega-azido-24(ethylene glycol) CAS-No. 89485-61-0 Formula $C_{49}H_{99}N_3O_{24}$ Mol. weight 1114,34 g/mol		PEG1710.0100 PEG1710.0001	100 mg 1 g	€ 410,00 € 1.020,00
PEG3430 **MeO-dPEG™(36)-N_3** alpha-Methoxy-omega-azido-36(ethylene glycol) CAS-No. 89485-61-0 Formula $C_{73}H_{147}N_3O_{36}$ Mol. weight 1642,95 g/mol		PEG3430.0100 PEG3430.1000	100 mg 1 g	€ 430,00 € 1.190,00
PEG1219 **MeO-PEG-N_3 (750 Da)** alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 750 Da		PEG1219.0500 PEG1219.0001	500 mg 1 g	€ 250,00 € 440,00

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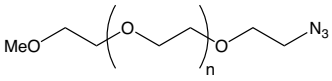
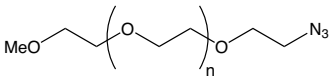
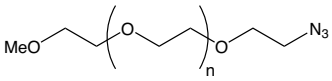
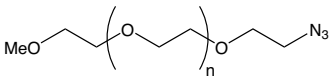
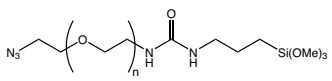
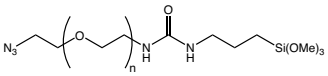
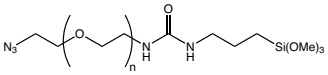
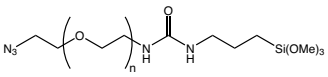
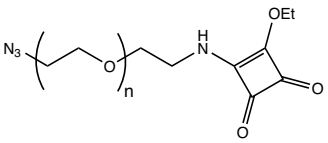
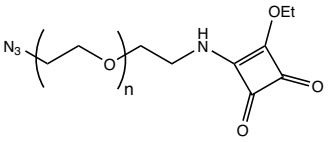
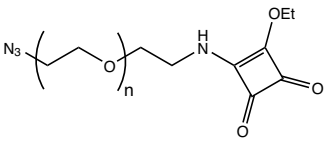
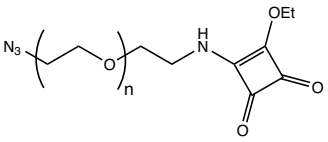
		Product code	Packing unit	Price
PEG1225 MeO-PEG-N_3 (2 kDa) alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 2000 Da		PEG1225.0500 PEG1225.0001	500 mg 1 g	€ 130,00 € 220,00
PEG2040 MeO-PEG-N_3 (5 kDa) alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 5000 Da		PEG2040.0500 PEG2040.0001	500 mg 1 g	€ 130,00 € 220,00
PEG2045 MeO-PEG-N_3 (10 kDa) alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 10000 Da		PEG2045.0500 PEG2045.0001	500 mg 1 g	€ 160,00 € 250,00
PEG2050 MeO-PEG-N_3 (20 kDa) alpha-Methoxy-omega-azido poly(ethylene glycol) Mol. weight 20000 Da		PEG2050.0500 PEG2050.0001	500 mg 1 g	€ 160,00 € 250,00

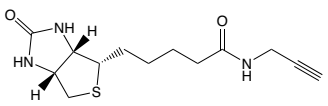
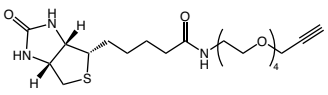
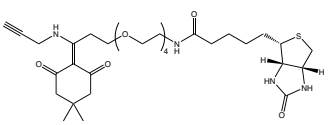
		Product code	Packing unit	Price
PEG4830 Azido-PEG-$Si(OMe)_3$ (3 kDa) alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 3.000 Dalton) Mol. weight 3000 Da		PEG4830.0500 PEG4830.1000	500 mg 1 g	€ 560,00 € 1.000,00

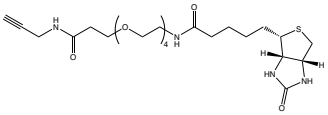
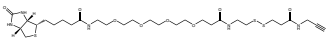
		Product code	Packing unit	Price
PEG4835 Azido-PEG-Si(OMe)$_3$ (5 kDa) alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 5.000 Dalton) Mol. weight 5000 Da		PEG4835.0500 PEG4835.1000	500 mg 1 g	€ 560,00 € 1.000,00
PEG4840 Azido-PEG-Si(OMe)$_3$ (10 kDa) alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 10.000 Dalton) Mol. weight 10000 Da		PEG4840.0500 PEG4840.1000	500 mg 1 g	€ 560,00 € 1.000,00
PEG4845 Azido-PEG-Si(OMe)$_3$ (20 kDa) alpha-Azido-omega-trimethoxysilyl poly(ethylene glycol) (PEG-MW 20.000 Dalton) Mol. weight 20000 Da		PEG4845.0500 PEG4845.1000	500 mg 1 g	€ 560,00 € 1.000,00

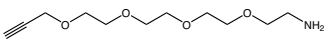
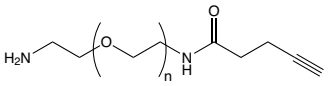
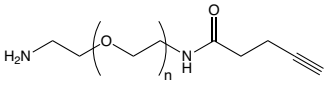
		Product code	Packing unit	Price
PEG6655 N$_3$-PEG-SQA (3 kDa) alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 3000 Dalton) Mol. weight 3000 Da		PEG6655.0500 PEG6655.0001	500 mg 1 g	€ 555,00 € 995,00
PEG6660 N$_3$-PEG-SQA (5 kDa) alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 5000 Dalton) Mol. weight 5000 Da		PEG6660.0500 PEG6660.0001	500 mg 1 g	€ 555,00 € 995,00

		Product code	Packing unit	Price
PEG6645	**N_3-PEG-SQA (10 kDa)** alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 10000 Dalton) Mol. weight 10000 Da	 PEG6645.0500 PEG6645.0001	500 mg 1 g	€ 595,00 € 1.095,00
PEG6650	**N_3-PEG-SQA (20 kDa)** alpha-Azido-omega-squaric acid ethyl ester poly(ethylene glycol) (PEG-MW 20000 Dalton) Mol. weight 20000 Da	 PEG6650.0500 PEG6650.0001	500 mg 1 g	€ 595,00 € 1.095,00

4.4. Alkyne-PEG Derivatives for Click Chemistry

		Product code	Packing unit	Price
RL-3490	**Biotin-Propargylamide** Biotinyl-N-propargylamide CAS-No. 773888-45-2 Formula $C_{13}H_{19}N_3O_2S$ Mol. weight 281,37 g/mol	 RL-3490.0250 RL-3490.0500 RL-3490.1000 RL-3490.5000	250 mg 500 mg 1 g 5 g	€ 100,00 € 180,00 € 280,00 € 1.000,00
PEG4950	**Biotin-PEG(4)-alkyne** 15-[D(+)-Biotinylamino]-4,7,10,13-tetraoxapenta-dec-1-yne CAS-No. 1262681-31-1 Formula $C_{21}H_{35}N_3O_6S$ Mol. weight 457,58 g/mol	 PEG4950.0100 PEG4950.0250 PEG4950.0001	100 mg 250 mg 1 g	€ 175,00 € 350,00 € 1.150,00
PEG7980	**Biotin-PEG(4)-Dde-Alkyne** 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 $C_{32}H_{50}N_4O_8S$ Mol. weight 650,83 g/mol	 PEG7980.0010 PEG7980.0025 PEG7980.0100	10 mg 25 mg 100 mg	€ 250,00 € 415,00 € 1.250,00

		Product code	Packing unit	Price
PEG8010 Biotin-PEG(4)-Alkyne (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 $C_{24}H_{40}N_4O_7S$ Mol. weight 528,66 g/mol		PEG8010.0005 PEG8010.0025 PEG8010.0100	5 mg 25 mg 100 mg	€ 145,00 € 415,00 € 1.250,00
PEG8110 Biotin-PEG(4)-SS-Alkyne 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 $C_{29}H_{49}N_5O_8S_3$ Mol. weight 691,92 g/mol		PEG8110.0025 PEG8110.0100 PEG8110.0500	25 mg 100 mg 500 mg	€ 225,00 € 650,00 € 2.600,00

		Product code	Packing unit	Price
PEG5430 Alkyne-PEG(4)-NH_2 Alkyne-PEG(4)-amine CAS-No. 1013921-36-2 Formula $C_{11}H_{21}NO_4$ Mol. weight 231,29 g/mol		PEG5430.0100 PEG5430.1000	100 mg 1 g	€ 290,00 € 880,00
PEG2960 H_2N-PEG-alkyne (3 kDa) alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight 3000 Da		PEG2960.0500 PEG2960.0001	500 mg 1 g	€ 410,00 € 670,00
PEG2980 H_2N-PEG-alkyne (5 kDa) alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight 5000 Da		PEG2980.0500 PEG2980.0001	500 mg 1 g	€ 410,00 € 670,00

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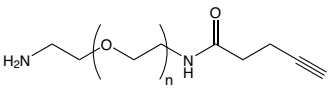
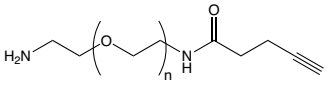
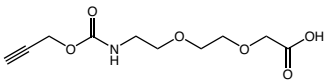
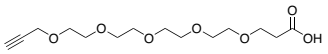
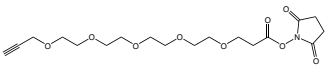
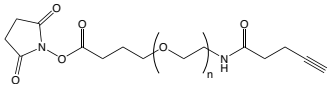
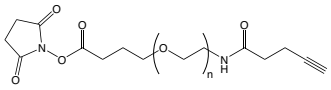
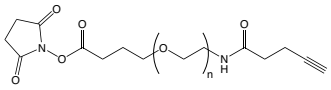
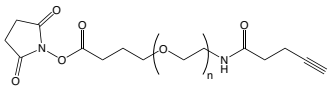
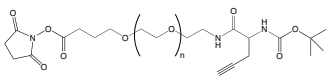
		Product code	Packing unit	Price
PEG2950 H_2N-PEG-alkyne (10 kDa) alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight 10000 Da		PEG2950.0500 PEG2950.0001	500 mg 1 g	€ 440,00 € 730,00
PEG2970 H_2N-PEG-alkyne (20 kDa) alpha-Amino-omega-propargylacetamido poly(ethylene glycol) Mol. weight 20000 Da		PEG2970.0500 PEG2970.0001	500 mg 1 g	€ 440,00 € 730,00

		Product code	Packing unit	Price
PAA1050 Poc-O2Oc-OH*DCHA 8-(Popargylyloxycarbonyl-amino)-3,6-dioxaoctanoic acid dicyclohexylamine Formula $C_{10}H_{15}NO_6$*$C_{12}H_{23}N$ Mol. weight 245,23*181,32 g/mol		PAA1050.0500 PAA1050.0001 PAA1050.0005 PAA1050.0025	500 mg 1 g 5 g 25 g	€ 108,00 € 168,00 € 600,00 € 2.400,00
PEG8170 Propargyl-PEG(5)-COOH 4,7,10,13,16-pentaoxanonadec-18-ynoic acid CAS-No. 1245823-51-1 Formula $C_{14}H_{24}O_7$ Mol. weight 304,34 g/mol		PEG8170.0250 PEG8170.1000 PEG8170.5000	250 mg 1 g 5 g	€ 150,00 € 450,00 € 1.800,00
PEG5410 Alkyne-PEG(4)-NHS Alkyne-PEG(4)-succinimidyl ester CAS-No. 1393330-40-9 Formula $C_{18}H_{27}NO_9$ Mol. weight 401,41 g/mol		PEG5410.0025 PEG5410.0100 PEG5410.1000	25 mg 100 mg 1 g	€ 170,00 € 290,00 € 880,00

	Product code	Packing unit	Price
PEG2860 NHS-PEG-alkyne (3 kDa) alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 3000 Da 	PEG2860.0500 PEG2860.0001	500 mg 1 g	€ 410,00 € 670,00
PEG2880 NHS-PEG-alkyne (5 kDa) alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 5000 Da 	PEG2880.0500 PEG2880.0001	500 mg 1 g	€ 410,00 € 670,00
PEG2850 NHS-PEG-alkyne (10 kDa) alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 10000 Da 	PEG2850.0500 PEG2850.0001	500 mg 1 g	€ 440,00 € 730,00
PEG2870 NHS-PEG-alkyne (20 kDa) alpha-Succinimidyl ester-omega-propargylacetamido poly(ethylene glycol) Mol. weight 20000 Da 	PEG2870.0500 PEG2870.0001	500 mg 1 g	€ 440,00 € 730,00

	Product code	Packing unit	Price
PEG2910 NHS-PEG(NH-Boc)-alkyne (3 kDa) alpha-Succinimidyl ester-omega-(N-t-Butyloxycarbonyl-L-propargyl-glycinyl) poly(ethylene glycol) Mol. weight 3000 Da 	PEG2910.0500 PEG2910.0001	500 mg 1 g	€ 550,00 € 970,00

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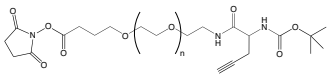
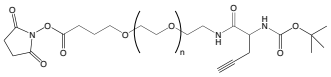
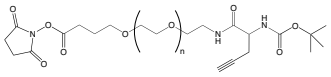
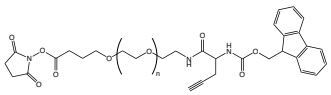
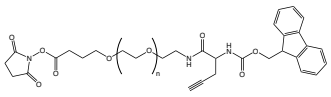
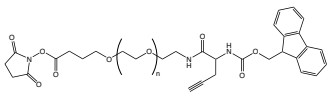
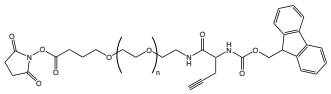
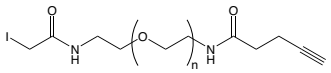
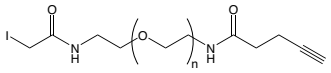
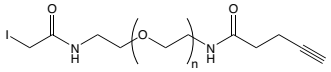
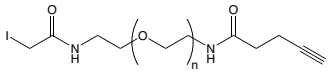
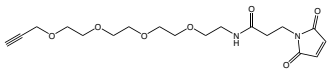
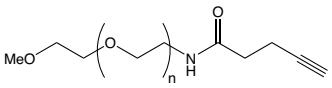
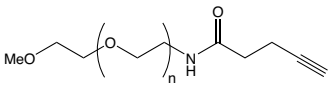
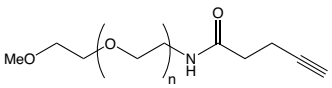
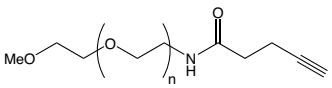
		Product code	Packing unit	Price
PEG2930	**NHS-PEG(NH-Boc)-alkyne (5 kDa)** alpha-Succinimidyl ester-omega-(N-t-Butyloxy-carbonyl-L-propargyl-glycinyl) poly(ethylene glycol) Mol. weight 5000 Da		PEG2930.0500 PEG2930.0001	500 mg 1 g	€ 550,00 € 970,00
PEG2900	**NHS-PEG(NH-Boc)-alkyne (10 kDa)** alpha-Succinimidyl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

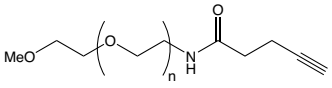
		Product code	Packing unit	Price
PEG2925 **NHS-PEG(NH-Fmoc)-alkyne (20 kDa)** alpha-Succinimidyl ester-omega-(N-(9-Fluorenylmethyloxycarbonyl)-L-propargyl-glycinyl) poly(ethylene glycol) Mol. weight 20000 Da		PEG2925.0500 PEG2925.0001	0,5 g 1 g	€ 610,00 € 1.040,00

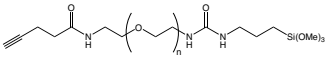
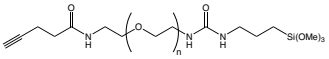
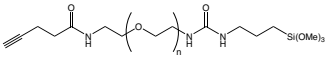
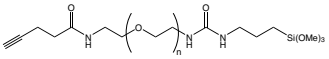
Maleimides are frequently used for conjugation to free thiol groups (e.g. from Cysteine). However, maleimides also react with other functional groups such as OH or NH_2, potentially leading to the formation of impurities. The iodo group reacts more specifically with thiols, resulting in much cleaner conjugates.

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

	Product code	Packing unit	Price
PEG5440 Alkyne-PEG(4)-mal Alkyne-PEG(4)-maleimide CAS-No. 1609651-90-2 Formula $C_{18}H_{26}N_2O_7$ Mol. weight 382,41 g/mol		PEG5440.0025 PEG5440.0100 PEG5440.1000	25 mg 100 mg 1 g	€ 170,00 € 290,00 € 880,00

	Product code	Packing unit	Price
PEG2840 MeO-PEG-alkyne (750 Da) alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 750 Dalton) CAS-No. 1993176-75-2 Mol. weight 750 Da		PEG2840.0500 PEG2840.0001	500 mg 1 g	€ 250,00 € 440,00
PEG2810 MeO-PEG-alkyne (2 kDa) alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 2000 Dalton) Mol. weight 2000 Da		PEG2810.0500 PEG2810.0001	500 mg 1 g	€ 130,00 € 220,00
PEG2830 MeO-PEG-alkyne (5 kDa) alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 5000 Dalton) Mol. weight 5000 Da		PEG2830.0500 PEG2830.0001	500 mg 1 g	€ 130,00 € 220,00
PEG2800 MeO-PEG-alkyne (10 kDa) alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 10000 Dalton) Mol. weight 10000 Da		PEG2800.0500 PEG2800.0001	500 mg 1 g	€ 160,00 € 250,00

		Product code	Packing unit	Price
PEG2820	**MeO-PEG-alkyne (20 kDa)**			
alpha-Methoxy-omega-propargylacetamido poly(ethylene glycol) (PEG-MW 20000 Dalton)		PEG2820.0500	500 mg	€ 160,00
		PEG2820.0001	1 g	€ 250,00
Mol. weight 20000 Da				

		Product code	Packing unit	Price
PEG4810	**Alkyne-PEG-Si(OMe)$_3$ (3 kDa)**			
alpha-Propargylacetamido-omega-trimethoxy-silyl poly(ethylene glycol) (PEG-MW 3.000 Dalton)		PEG4810.0500	500 mg	€ 560,00
		PEG4810.1000	1 g	€ 1.000,00
Mol. weight 3000 Da				
PEG4815	**Alkyne-PEG-Si(OMe)$_3$ (5 kDa)**			
alpha-Propargylacetamido-omega-trimethoxy-silyl poly(ethylene glycol) (PEG-MW 5.000 Dalton)		PEG4815.0500	500 mg	€ 560,00
		PEG4815.1000	1 g	€ 1.000,00
Mol. weight 5000 Da				
PEG4820	**Alkyne-PEG-Si(OMe)$_3$ (10 kDa)**			
alpha-Propargylacetamido-omega-trimethoxy-silyl poly(ethylene glycol) (PEG-MW 10.000 Dalton)		PEG4820.0500	500 mg	€ 560,00
		PEG4820.1000	1 g	€ 1.000,00
Mol. weight 10000 Da				
PEG4825	**Alkyne-PEG-Si(OMe)$_3$ (20 kDa)**			
alpha-Propargylacetamido-omega-trimethoxy-silyl poly(ethylene glycol) (PEG-MW 20.000 Dalton)		PEG4825.0500	500 mg	€ 560,00
		PEG4825.1000	1 g	€ 1.000,00
Mol. weight 20000 Da				

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

4.5. Poly(Amino Acids) for Click Chemistry

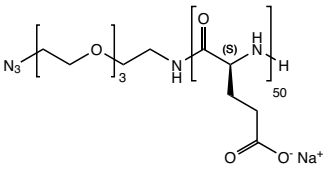
		Product code	Packing unit	Price
PGA1125	**N_3-PGA(20)** Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 3000Da) Mol. weight 3000 Da	PGA1125.0000		please inquire

	Product code	Packing unit	Price

PGA1130 N_3-PGA(50)

Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 7500Da)

Mol. weight 7500 Da

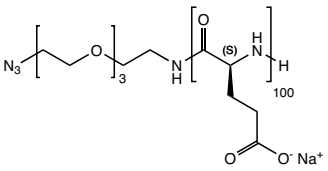


PGA1130.0000 — please inquire

PGA1135 N_3-PGA(100)

Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 15000Da)

Mol. weight 15000 Da

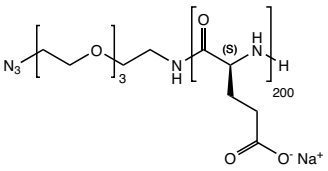


PGA1135.0000 — please inquire

PGA1140 N_3-PGA(200)

Azido-ethyltri(ethylene glycol)-poly(L-glutamic acid) sodium salt (MW 30000Da)

Mol. weight 30000 Da



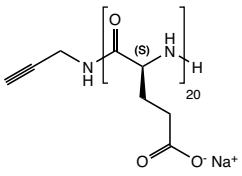
PGA1140.0000 — please inquire

	Product code	Packing unit	Price

PGA1085 Prg-PGA(20)

Propargyl-poly(L-glutamic acid) sodium salt (MW 3000Da)

Mol. weight 3000 Da

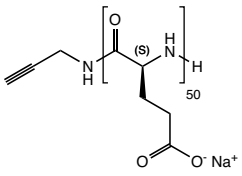


PGA1085.0000 — please inquire

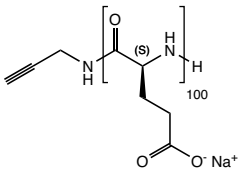
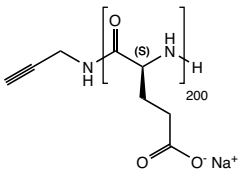
PGA1090 Prg-PGA(50)

Propargyl-poly(L-glutamic acid) sodium salt (MW 7500Da)

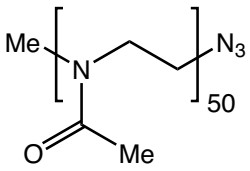
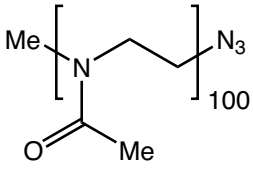
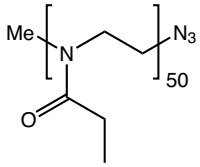
Mol. weight 7500 Da

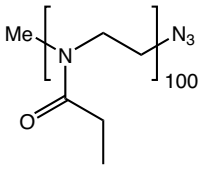
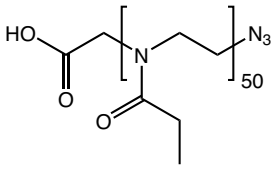
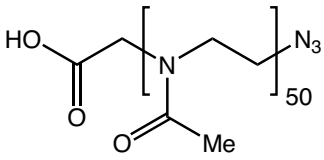


PGA1090.0000 — please inquire

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

4.6. Poly(2-Oxazolines) for Click Chemistry

		Product code	Packing unit	Price
POX1200 Me-PMeOx(50)-N_3 alpha-Methyl-poly(2-methyl-2-oxazoline)-omega-azide (n=50) CAS-No. 26375-28-0 Formula $CH_3(C_4H_7NO)50N_3$ Mol. weight 4300 Da		POX1200.0250 POX1200.0001 POX1200.0005	250 mg 1 g 5 g	€ 275,00 € 750,00 € 3.000,00
POX1210 Me-PMeOx(100)-N_3 alpha-Methyl-poly(2-methyl-2-oxazoline)-omega-azide (n=100) CAS-No. 26375-28-0 Formula $CH_3(C_4H_7NO)100N_3$ Mol. weight 8500 Da		POX1210.0250 POX1210.0001 POX1210.0005	250 mg 1 g 5 g	€ 275,00 € 750,00 € 3.000,00
POX2200 Me-PEtOx(50)-N_3 alpha-Methyl-poly(2-ethyl-2-oxazoline)-omega-azide (n=50) CAS-No. 25805-17-8 Formula $CH_3(C_5H_9NO)50N_3$ Mol. weight 5000 Da		POX2200.0250 POX2200.0001 POX2200.0005	250 mg 1 g 5 g	€ 250,00 € 650,00 € 2.750,00

		Product code	Packing unit	Price
POX2210 Me-PEtOx(100)-N_3 alpha-Methyl-poly(2-ethyl-2-oxazoline)-omega-azide (n=100) CAS-No. 25805-17-8 Formula $CH_3(C_5H_9NO)100N_3$ Mol. weight 5000 Da		POX2210.0250 POX2210.0001 POX2210.0005	250 mg 1 g 5 g	€ 250,00 € 650,00 € 2.750,00
POX2250 HOOC-PEtOx(50)-N_3 alpha-Carboxymethyl-poly(2-ethyl-2-oxazoline)-omega-azide (n=50) CAS-No. 25805-17-8 Formula $HOCOCH_2(C_5H_9NO)50N_3$ Mol. weight 5000 Da		POX2250.0000		please inquire
POX1250 HOOC-PMeOx(50)-N_3 alpha-Carboxymethyl-poly(2-methyl-2-oxazoline)-omega-azide (n=50) CAS-No. 26375-28-0 Formula $HOCOCH_2(C_4H_7NO)50N_3$ 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:

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.

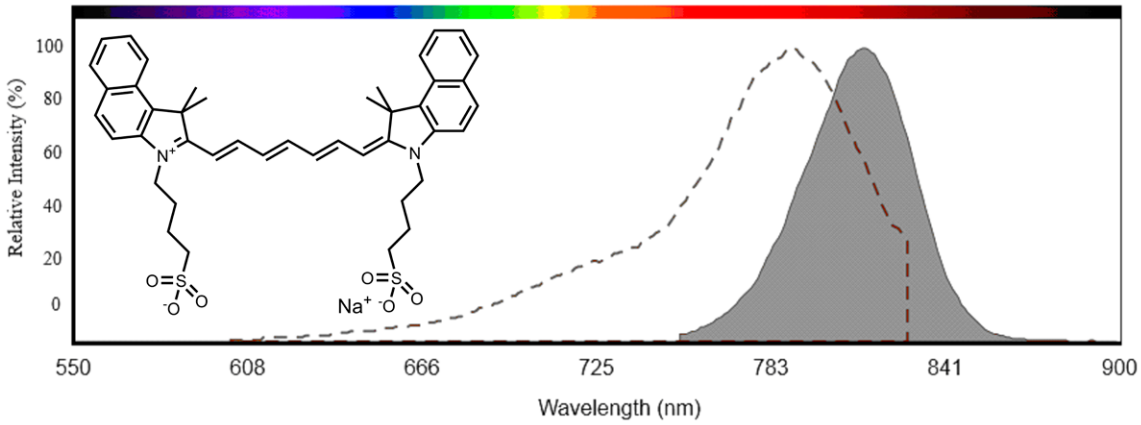


Fig. 17: Absorption and emission spectra of Indocyanine Green.

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.

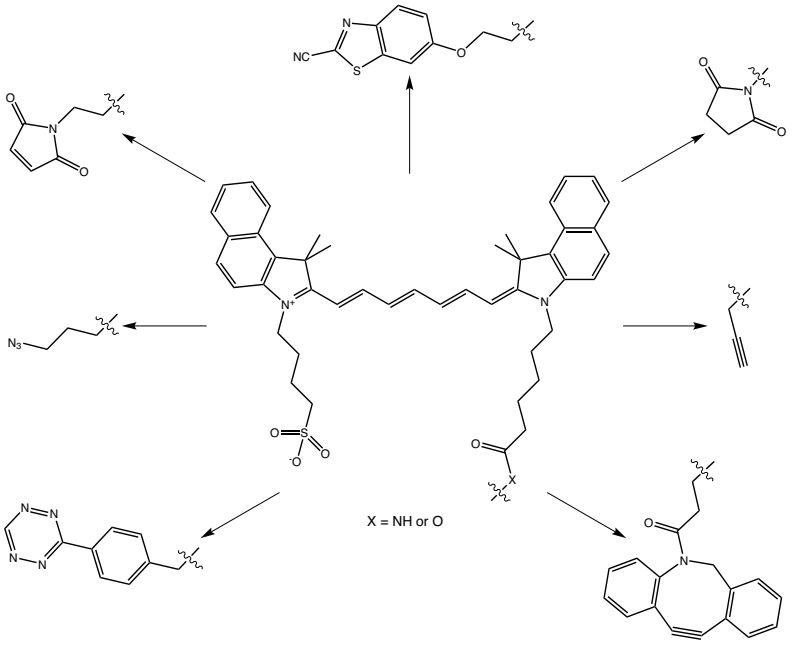
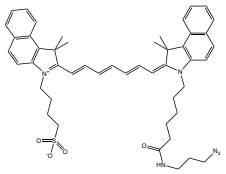
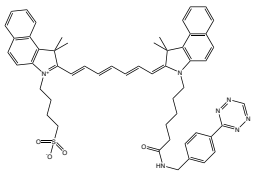
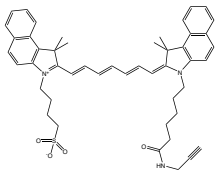
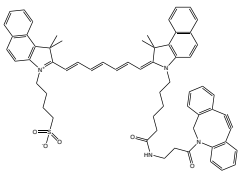


Fig. 18: Functional groups available for conjugation of Indocyanine Green.

ICG:

		Product code	Packing unit	Price
RL-2840 ICG-azide Indocyanine green azide Formula $C_{48}H_{56}N_6O_4S$ Mol. weight 813,06 g/mol		RL-2840.0005 RL-2840.0025	5 mg 25 mg	€ 200,00 € 800,00
RL-2860 ICG-Tz 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
RL-2880 ICG-alkyne 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 RL-2880.0025	5 mg 25 mg	€ 200,00 € 800,00
RL-2870 ICG-DBCO Indocyanine green dibenzoazacyclooctyne Formula $C_{63}H_{64}N_4O_5S$ Mol. weight 989,27 g/mol		RL-2870.0005 RL-2870.0025	5 mg 25 mg	€ 300,00 € 1.200,00

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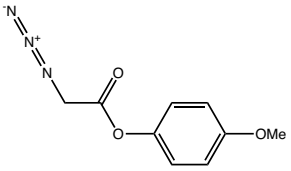
5.2. Clickable Linkers for Selective Protein Labeling

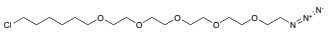
One way to selectively label a protein is to recombinantly express a modified version containing a sequence that selectively reacts with a specific linker type. Two examples of this approach are the His-Tag Acylation and the HaloTag®.

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.

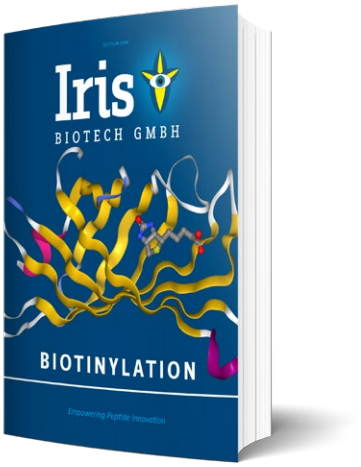
		Product code	Packing unit	Price
RL-3010	**N_3Ac-OPhOMe**			
4-Methoxyphenyl 2-azidoacetate		RL-3010.0250	250 mg	€ 225,00
CAS-No.	2546513-31-7	RL-3010.1000	1 g	€ 625,00
Formula	$C_9H_9N_3O_3$	RL-3010.5000	5 g	€ 2.500,00
Mol. weight	207,19 g/mol			



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
RL-3640	**Halo-PEG(5)-azide**			
1-azido-21-chloro-3,6,9,12,15-pentaoxahenicosane 		RL-3640.0000		please inquire
CAS-No.	1261238-21-4			
Formula	$C_{16}H_{32}ClN_3O_5$			
Mol. weight	381,90 g/mol			

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.

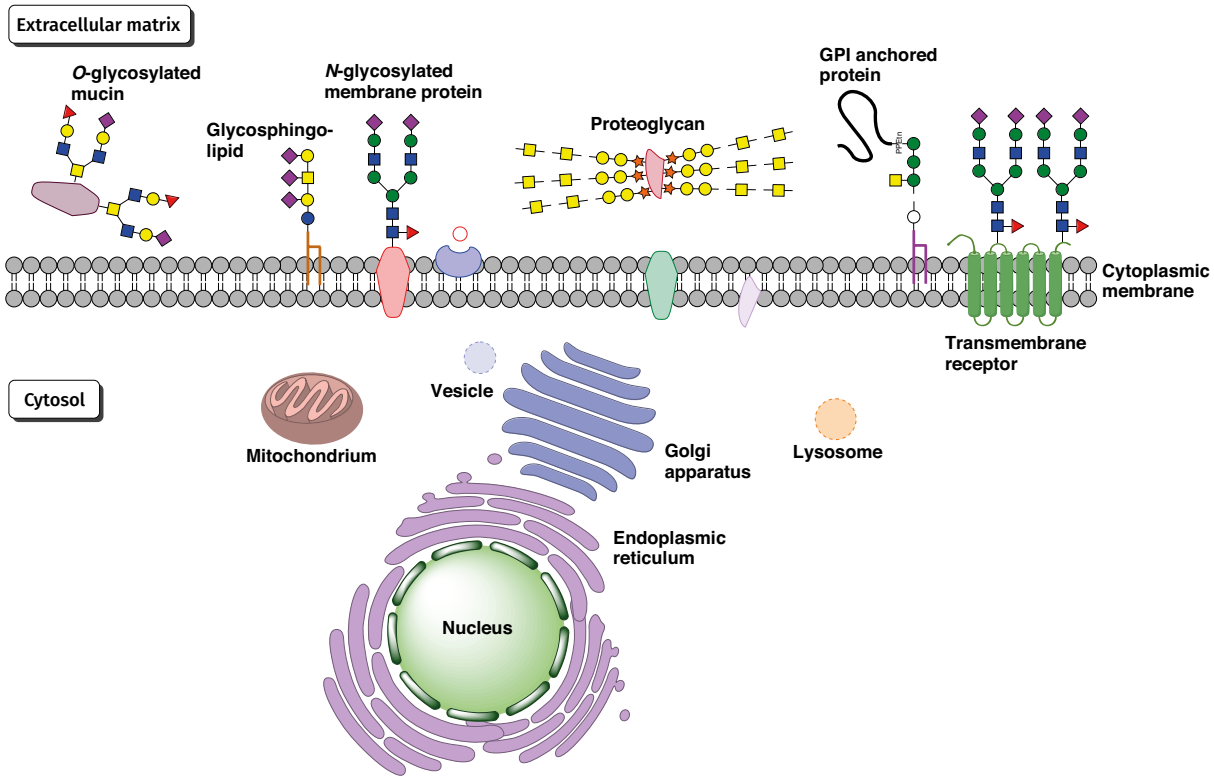
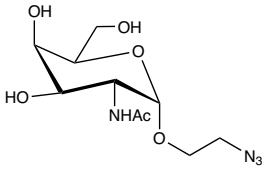
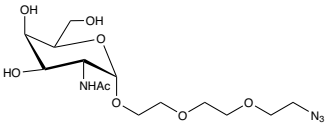
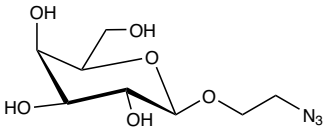
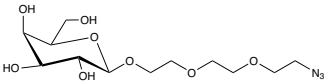
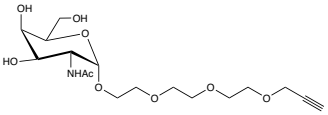
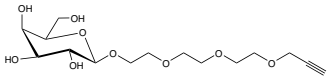


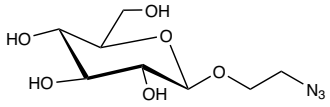
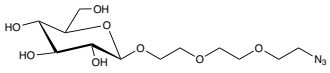
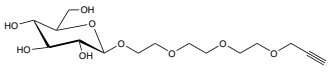
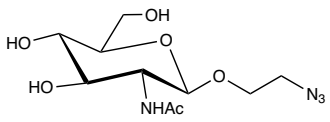
Fig. 19: Simplified representation of a eukaryotic cell and its cell surface glycans.

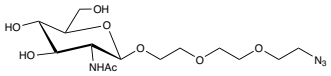
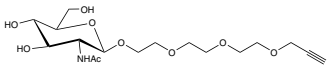
6.1. Galactose Derivatives

		Product code	Packing unit	Price
GBB1445 alpha-GalNAc-N_3 1-O-(2-Azidoethoxy)-2-acetamido-2deoxy-alpha-D-galactopyranoside Formula $C_{10}H_{18}N_4O_6$ Mol. weight 290,27 g/mol		GBB1445.0050 GBB1445.0100 GBB1445.0250 GBB1445.0500	50 mg 100 mg 250 mg 500 mg	€ 675,00 € 950,00 € 1.900,00 € 2.950,00
GBB1370 alpha-GalNAc-TEG-N_3 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-2-acetamido-2deoxy-alpha-D-galactopyranoside CAS-No. 882873-70-3 Formula $C_{14}H_{26}N_4O_8$ Mol. weight 378,38 g/mol		GBB1370.0000		please inquire
GBB1430 beta-Gal-Et-N_3 1-(2-Azidoethoxy)-beta-D-galactopyranose Formula $C_8H_{15}N_3O_6$ Mol. weight 249,22 g/mol		GBB1430.0100 GBB1430.0250 GBB1430.0500 GBB1430.1000	100 mg 250 mg 500 mg 1 g	€ 475,00 € 800,00 € 1.200,00 € 1.750,00
GBB1380 beta-Gal-TEG-N_3 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-beta-D-galactopyranoside Formula $C_{12}H_{23}N_3O_8$ Mol. weight 337,33 g/mol		GBB1380.0100 GBB1380.0250	100 mg 250 mg	€ 1.000,00 € 2.000,00
GBB1375 alpha-GalNAc-TEG-Alkyne 1-O-(2-(2-(2-(Prop-2-ynyloxy)ethoxy)ethoxy)ethoxy)-2-acetamido-2deoxy-alpha-D-galactopyranoside Formula $C_{17}H_{29}NO_9$ Mol. weight 391,41 g/mol		GBB1375.0100 GBB1375.0250 GBB1375.0500 GBB1375.1000	100 mg 250 mg 500 mg 1 g	€ 900,00 € 1.850,00 € 3.150,00 € 5.250,00

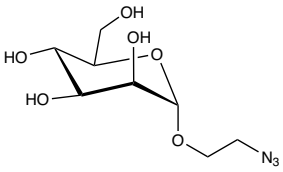
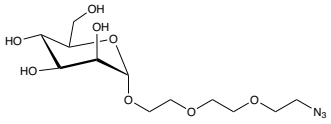
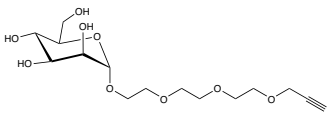
		Product code	Packing unit	Price
GBB1385 beta-Gal-TEG-Alkyne 1-O-(2-(2-(2-(Prop-2-ynyloxy)ethoxy)ethoxy)ethoxy)-beta-D-galactopyranoside Formula $C_{15}H_{26}O_9$ Mol. weight 350,36 g/mol		GBB1385.0000		please inquire

6.2. Glucose Derivatives

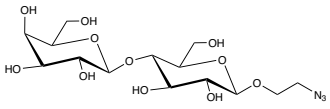
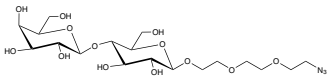
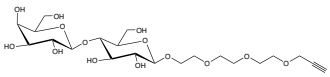
		Product code	Packing unit	Price
GBB1435 beta-Glc-N_3 1-(2-Azidoethoxy)-beta-D-glucopyranose Formula $C_8H_{15}N_3O_6$ Mol. weight 249,22 g/mol		GBB1435.0000		please inquire
GBB1390 beta-Glc-TEG-N_3 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-beta-D-glucopyranoside Formula $C_{12}H_{23}N_3O_8$ Mol. weight 337,33 g/mol		GBB1390.0000		please inquire
GBB1395 beta-Glc-TEG-Alkyne 1-O-(2-(2-(2-(Prop-2-ynyloxy)ethoxy)ethoxy)ethoxy)-beta-D-glucopyranoside CAS-No. 1072903-76-4 Formula $C_{15}H_{26}O_9$ Mol. weight 350,36 g/mol		GBB1395.0000		please inquire
GBB1450 beta-GlcNAc-N_3 1-(2-Azidoethoxy)-2-acetamido-2deoxy-beta-D-galactopyranose Formula $C_{10}H_{18}N_4O_6$ Mol. weight 290,27 g/mol		GBB1450.0000		please inquire

		Product code	Packing unit	Price
GBB1400 **beta-GlcNAc-TEG-N_3** 1-O-(2-(2-(2-Azidoethoxy)ethoxy)ethoxy)-2-acetamido-2deoxy-beta-D-glucopyranoside Formula $C_{14}H_{26}N_4O_8$ Mol. weight 378,73 g/mol		GBB1400.0100 GBB1400.0250 GBB1400.0500	100 mg 250 mg 500 mg	€ 1.000,00 € 1.900,00 € 3.250,00
GBB1405 **beta-GlcNAc-TEG-Alkyne** 1-O-(2-(2-(2-(Prop-2-ynyloxy)ethoxy)ethoxy)ethoxy)-2-acetamido-2deoxy-beta-D-glucopyranoside Formula $C_{17}H_{29}NO_9$ Mol. weight 391,41 g/mol		GBB1405.0250 GBB1405.0500 GBB1405.1000	250 mg 500 mg 1 g	€ 1.850,00 € 3.150,00 € 5.250,00

6.3. Mannose Derivatives

		Product code	Packing unit	Price
GBB1440 **alpha-Man-N_3** 1-(2-Azidoethoxy)-alpha-D-mannopyranose Formula $C_8H_{15}N_3O_6$ Mol. weight 249,22 g/mol		GBB1440.0100 GBB1440.0250 GBB1440.0500 GBB1440.1000	100 mg 250 mg 500 mg 1 g	€ 550,00 € 800,00 € 1.400,00 € 2.100,00
GBB1420 **alpha-Man-TEG-N_3** 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 GBB1420.0250	100 mg 250 mg	€ 950,00 € 1.575,00
GBB1425 **alpha-Man-TEG-Alkyne** 1-O-(2-(2-(2-(Prop-2-ynyloxy)ethoxy)ethoxy)ethoxy)-alpha-D-mannopyranoside Formula $C_{15}H_{26}O_9$ Mol. weight 350,36 g/mol		GBB1425.0100 GBB1425.0250 GBB1425.0500	100 mg 250 mg 500 mg	€ 750,00 € 1.350,00 € 1.900,00

6.4. Lactose Derivatives

		Product code	Packing unit	Price
GBB1455 beta-Lac-EO-N_3 2-Azidoethyl 4-O-beta-D-galactopyranosyl-beta-(1->4)-D-glucopyranoside Formula $C_{14}H_{25}N_3O_{11}$ Mol. weight 411,36 g/mol		GBB1455.0100 GBB1455.0250 GBB1455.0500 GBB1455.1000	100 mg 250 mg 500 mg 1 g	€ 650,00 € 1.100,00 € 1.600,00 € 2.600,00
GBB1410 beta-Lac-TEG-N_3 (2-(2-(2-Azidoethoxy)ethoxy)ethyl) 4-O-beta-D-galactopyranosyl-beta-(1->4)-D-glucopyranoside Formula $C_{18}H_{33}N_3O_{13}$ Mol. weight 499,47 g/mol		GBB1410.0000		please inquire
GBB1415 beta-Lac-TEG-Alkyne 2-[2-[2-(2-propyn-1-yloxy)ethoxy]ethoxy]ethyl 4-O-beta-D-galactopyranosyl-beta-(1->4)-D-glucopyranoside Formula $C_{21}H_{36}O_{14}$ 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 isrespected.

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 theproduct 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

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.

Notes

Empowering Peptide Innovation

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