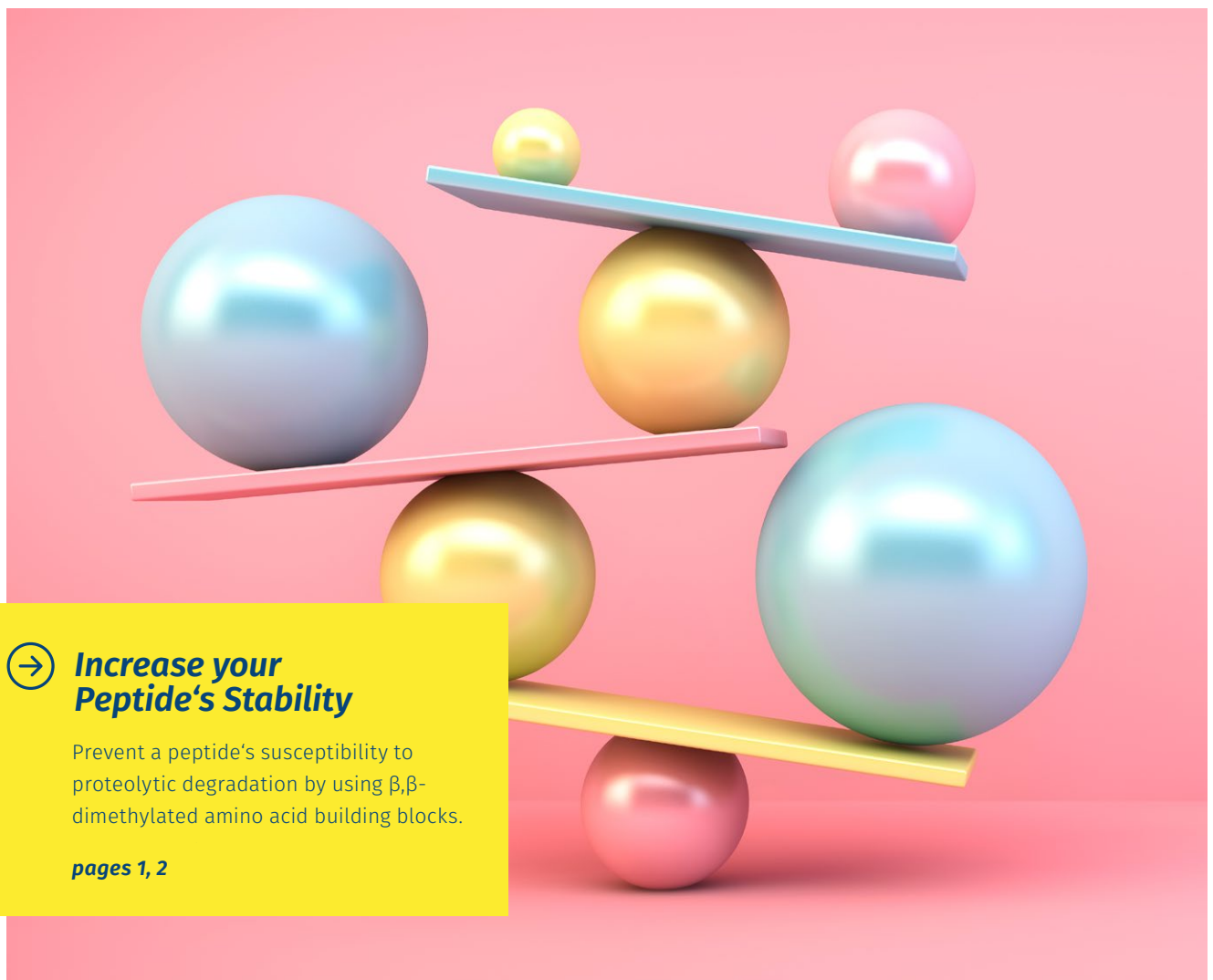




Iris
Biotech

β,β -DIMETHYL

Amino Acids



→ **Increase your Peptide's Stability**

Prevent a peptide's susceptibility to proteolytic degradation by using β,β -dimethylated amino acid building blocks.

pages 1, 2

Resistance towards degradation by proteases.

pages 1, 2

Maintained biological activity and secondary structure.

pages 1, 2

Simple chemical introduction via solid-phase peptide synthesis.

pages 1, 2



Version: IF5_3

β,β-Dimethyl

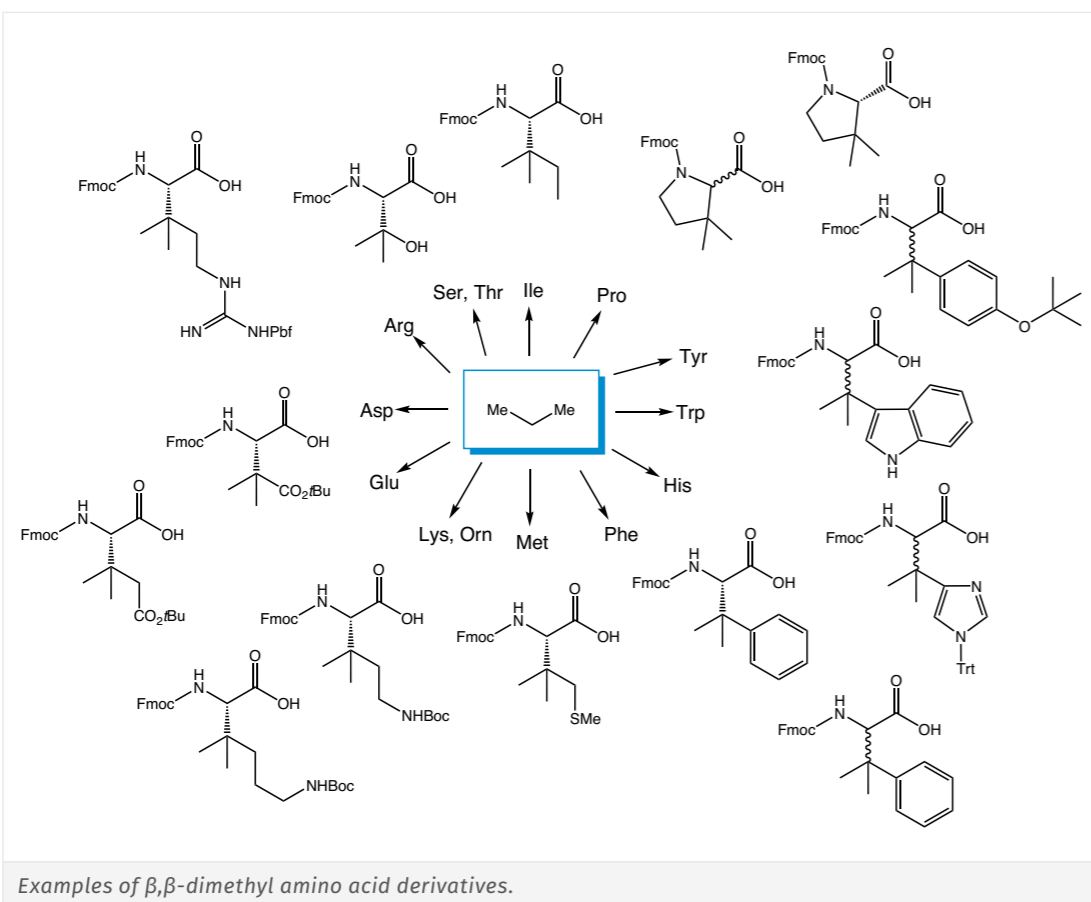
Amino Acids

The application of peptides as therapeutic agents has significantly increased over the last years bolstered by improvements in peptide manufacturing. Recent commercial successes, e.g., of GLP-1 analogs such as Liraglutide and Semaglutide, encouraged the development of peptides as therapeutic agents and large-scale synthesis of peptide APIs. However, their inherent susceptibility to proteolytic degradation resulting in rapid elimination *in vivo* has significantly impeded their broader use. Thus, the stability of peptides and especially their half-life during circulation is becoming increasingly important.

Research showed that already the simple synthetic, time-efficient addition of β,β-dimethyl amino acids represents a helpful strategy.



Iris Biotech offers a variety of β,β-dimethyl amino acids suitable for incorporation during SPPS.



It is reported that the incorporation of β,β-amino acid analogues at the P1' position, directly C-terminal of the enzyme cleavage site, rendering peptides highly resistant to serine protease degradation without significantly impacting their biological activity or secondary structure, as shown by circular dichroism and receptor activation in comparison to their "original" counterparts. This includes stability towards dipeptidyl peptidase IV (DPP IV), dipeptidyl peptidase 8 (DPP 8), fibroblast activation protein α (FAP α), α-lytic protease (α LP), trypsin, and chymotrypsin.

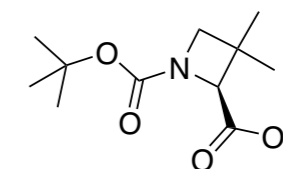
Comparative hydrolysis studies of hexapeptides carrying either the natural amino acid residues leucine or isoleucine at the P1' position or the β,β-dimethylated derivative showed that already after 30 min, more than 70% of AP(Leu)SWS and AP(Ile)SWS were hydrolyzed whereas the modified sequence was completely resistant to DPP IV-mediated cleavage during that time.

Product details

BAA6445 Boc-L-beta,beta-diMe-Aze-OH

(S)-1-(*tert*-butoxycarbonyl)-3,3-dimethylazetidine-2-carboxylic acid

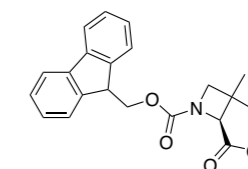
CAS-No. 1932195-22-6
Formula C₁₁H₁₉NO₄
Mol. weight 229,28 g/mol



FAA9400 Fmoc-L-beta,beta-diMe-Aze-OH

(S)-1-(((9H-fluoren-9-yl)methoxy)carbonyl)-3,3-dimethylazetidine-2-carboxylic acid

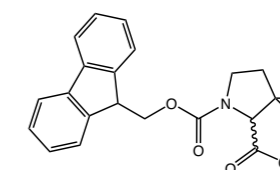
CAS-No. 2231665-66-8
Formula C₂₁H₂₁NO₄
Mol. weight 351,40 g/mol



FAA2630 Fmoc-3,3-dmP-OH (rac)

N-alpha-(9-Fluorenylmethoxycarbonyl)-beta,beta-dimethyl-proline (rac.)

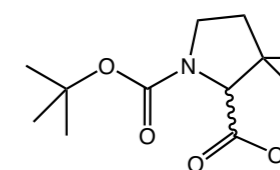
CAS-No. 1310680-20-6
Formula C₂₂H₂₃NO₄
Mol. weight 365,43 g/mol



BAA2860 Boc-3,3-dmP-OH (rac)

N-alpha-*t*-Butyloxycarbonyl-beta,beta-dimethyl-proline (rac.)

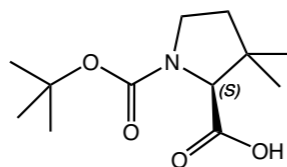
CAS-No. 143979-40-2
Formula C₁₂H₂₁NO₄
Mol. weight 243,30 g/mol



BAA2870 Boc-3,3-dmP-OH (S)

N-alpha-t-Butyloxycarbonyl-beta,beta-dimethyl-L-proline

CAS-No. 174060-98-1
Formula C₁₂H₂₁NO₄
Mol. weight 243,30 g/mol



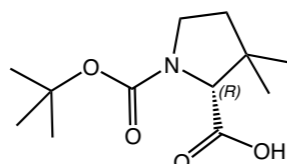
Product details



BAA6435 Boc-3,3-dmP-OH (R)

(R)-1-(tert-butoxycarbonyl)-3,3-dimethylpyrrolidine-2-carboxylic acid

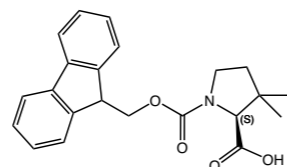
CAS-No. 1645565-12-3
Formula C₁₂H₂₁NO₄
Mol. weight 243,30 g/mol



FAA2640 Fmoc-3,3-dmP-OH (S)

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-L-proline

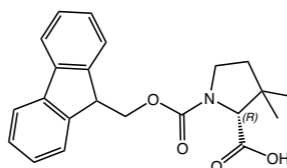
CAS-No. 1982344-79-5
Formula C₂₂H₂₃NO₄
Mol. weight 365,43 g/mol



FAA9355 Fmoc-3,3-dmP-OH (R)

(R)-1-(((9H-fluoren-9-yl)methoxy)carbonyl)-3,3-dimethylpyrrolidine-2-carboxylic acid

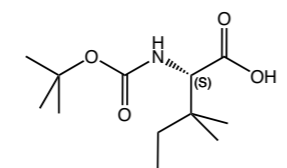
CAS-No. 2381009-82-9
Formula C₂₂H₂₃NO₄
Mol. weight 365,43 g/mol



BAA3310 Boc-beta-Me-L-Ile-OH

(S)-2-(t-butyloxycarbonylamino)-3,3-dimethylpentanoic acid

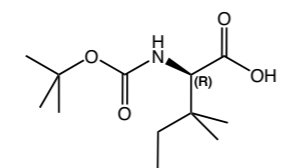
CAS-No. 161479-50-1
Formula C₁₂H₂₃NO₄
Mol. weight 245,32 g/mol



BAA3300 Boc-beta-Me-D-Ile-OH

(R)-2-(t-butyloxycarbonylamino)-3,3-dimethylpentanoic acid

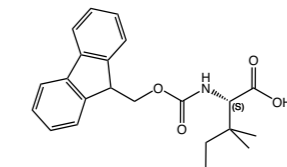
CAS-No. 161479-51-2
Formula C₁₂H₂₃NO₄
Mol. weight 245,32 g/mol



FAA2620 Fmoc-beta-Me-L-Ile-OH

(S)-2-(((9H-fluoren-9-yl)methoxy)carbonylamino)-3,3-dimethylpentanoic acid

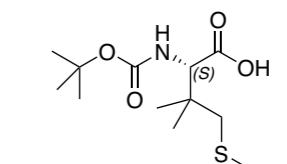
CAS-No. 1227750-73-3
Formula C₂₂H₂₅NO₄
Mol. weight 367,44 g/mol



BAA6440 Boc-L-beta,beta-diMe-Met-OH

(S)-2-((tert-butoxycarbonyl)amino)-3,3-dimethyl-4-(methylthio)butanoic acid

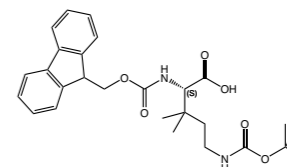
Formula C₁₀H₁₉NO₄S
Mol. weight 249,33 g/mol



FAA2710 Fmoc-beta,beta-diMe-L-Orn(Boc)-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-N-delta-t-butyloxycarbonyl-L-ornithine

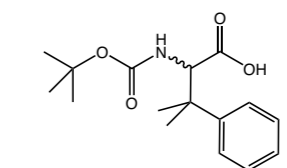
CAS-No. 2248110-20-3
Formula C₂₇H₃₄N₂O₆
Mol. weight 482,57 g/mol



BAA2880 Boc-beta,beta-diMe-Phe-OH*DCHA (rac)

N-alpha-t-Butyloxycarbonyl-beta,beta-dimethyl-phenylalanine (rac.) dicyclohexylamine salt

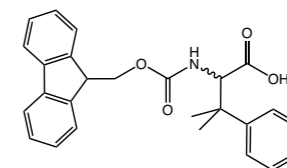
CAS-No. 144643-84-5 (net)
Formula C₁₆H₂₃NO₄*C₁₂H₂₃N
Mol. weight g/mol



FAA2650 Fmoc-beta,beta-diMe-Phe-OH (rac)

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-phenylalanine (rac.)

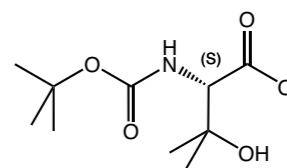
CAS-No. 1310680-19-3
Formula C₂₆H₂₅NO₄
Mol. weight 415,48 g/mol



BAA2840 Boc-beta,beta-diMe-L-Ser-OH

N-alpha-t-Butyloxycarbonyl-beta,beta-dimethyl-L-serine

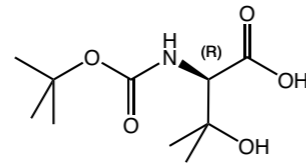
CAS-No. 102507-13-1
Formula C₁₀H₁₉NO₅
Mol. weight 233,26 g/mol



BAA2850 Boc-beta,beta-diMe-D-Ser-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-D-serine

CAS-No. 288159-40-0
Formula C₁₀H₁₉NO₅
Mol. weight 233,26 g/mol



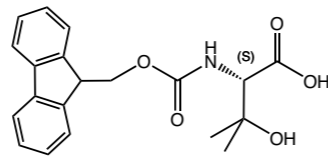
Product details

Product details

FAA2600 Fmoc-beta,beta-diMe-L-Ser-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-L-serine

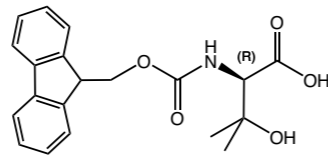
CAS-No. 1217603-41-2
Formula C₂₀H₂₁NO₅
Mol. weight 355,38 g/mol



FAA2610 Fmoc-beta,beta-diMe-D-Ser-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-D-serine

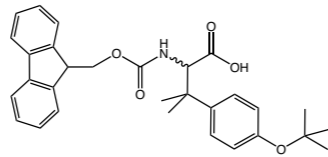
CAS-No. 884880-39-1
Formula C₂₀H₂₁NO₅
Mol. weight 355,38 g/mol



FAA2660 Fmoc-beta,beta-diMe-Tyr(tBu)-OH (rac)

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-O-t-butyl-tyrosine (rac.)

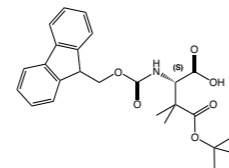
CAS-No. 2446027-07-0
Formula C₃₀H₃₃NO₅
Mol. weight 487,59 g/mol



FAA2670 Fmoc-beta,beta-diMe-L-Asp(OtBu)-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-L-aspartic acid beta-t-butyl ester

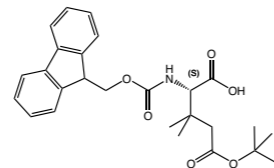
CAS-No. 1392219-11-2
Formula C₂₅H₂₉NO₆
Mol. weight 439,51 g/mol



FAA2690 Fmoc-beta,beta-diMe-L-Glu(OtBu)-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-L-glutamic acid gamma-t-butyl ester

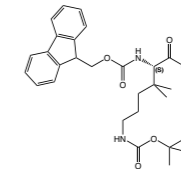
CAS-No. 2083621-64-9
Formula C₂₆H₃₁NO₆
Mol. weight 453,53 g/mol



FAA2700 Fmoc-beta,beta-diMe-L-Lys(Boc)-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-beta,beta-dimethyl-N-epsilon-t-butyloxycarbonyl-L-lysine

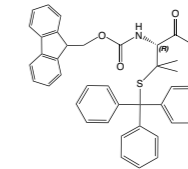
CAS-No. 2250436-41-8
Formula C₂₈H₃₆N₂O₆
Mol. weight 496,60 g/mol



FAA1587 Fmoc-L-Pen(Trt)-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-S-trityl-L-penicillamine

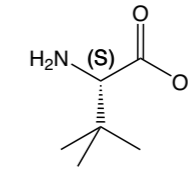
CAS-No. 201531-88-6
Formula C₃₉H₃₅NO₄S
Mol. weight 613,78 g/mol



HAA1134 H-L-Tle-OH

t-Leucine

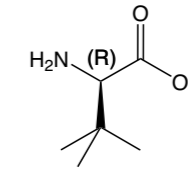
CAS-No. 20859-02-3
Formula C₆H₁₃NO₂
Mol. weight 131,18 g/mol



HAA1514 H-D-Tle-OH

D-t-Leucine

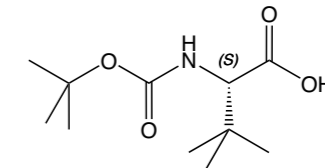
CAS-No. 26782-71-8
Formula C₆H₁₃NO₂
Mol. weight 131,18 g/mol



BAA1137 Boc-L-Tle-OH

N-alpha-t-Butyloxycarbonyl-L-t-leucine

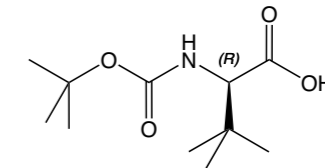
CAS-No. 62965-35-9
Formula C₁₁H₂₁NO₄
Mol. weight 231,28 g/mol



BAA1379 Boc-D-Tle-OH

N-alpha-t-Butyloxycarbonyl-D-t-leucine

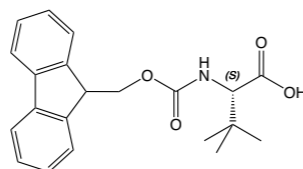
CAS-No. 124655-17-0
Formula C₁₁H₂₁NO₄
Mol. weight 231,28 g/mol



FAA1748 Fmoc-L-Tle-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-L-t-leucine

CAS-No. 132684-60-7
Formula C₂₁H₂₃NO₄
Mol. weight 353,42 g/mol



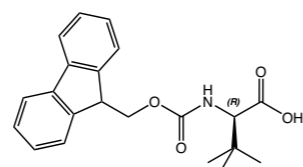
Product details



FAA7080 Fmoc-D-Tle-OH

N-alpha-(9-Fluorenylmethyloxycarbonyl)-D-t-leucine

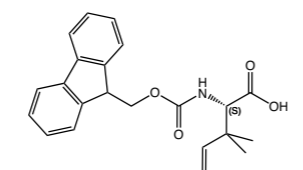
CAS-No. 198543-64-5
Formula C₂₁H₂₃NO₄
Mol. weight 353,42 g/mol



FAA5040 2-(Fmoc-amino)-3,3-diMe-pent-4-enoic acid (S)

(S)-2-(9-Fluorenylmethyloxycarbonyl)amino-3,3-dimethylpent-4-enoic acid

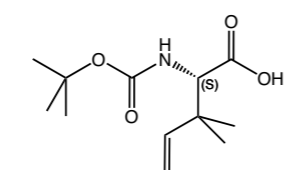
CAS-No. 1310680-41-1
Formula C₂₂H₂₃NO₄
Mol. weight 365,42 g/mol



BAA3330 2-(Boc-amino)-3,3-diMe-pent-4-enoic acid (S)

(S)-2-(t-butyloxy)carbonylamino-3,3-dimethylpent-4-enoic acid

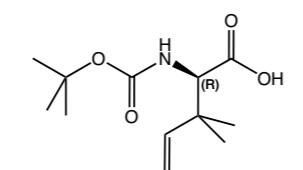
CAS-No. 676629-90-6
Formula C₁₂H₂₁NO₄
Mol. weight 243,3 g/mol



BAA3320 2-(Boc-amino)-3,3-diMe-pent-4-enoic acid (R)

(R)-2-(t-butyloxy)carbonylamino-3,3-dimethylpent-4-enoic acid

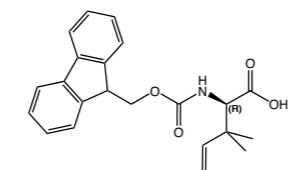
CAS-No. 854250-89-8
Formula C₁₂H₂₁NO₄
Mol. weight 243,3 g/mol



FAA5030 2-(Fmoc-amino)-3,3-diMe-pent-4-enoic acid (R)

(R)-2-(9-Fluorenylmethyloxycarbonyl)amino-3,3-dimethylpent-4-enoic acid

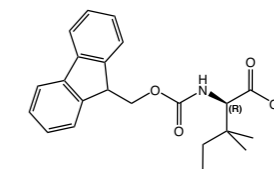
CAS-No. 1310680-35-3
Formula C₂₂H₂₃NO₄
Mol. weight 365,42 g/mol



FAA2625 Fmoc-beta-Me-D-Ile-OH

(R)-2-(((9H-fluoren-9-yl)methoxy)carbonylamino)-3,3-dimethylpentanoic acid

CAS-No. 1310680-40-0
Formula C₂₂H₂₅NO₄
Mol. weight 367,44 g/mol



Product details

References:

- *A General Method for Making Peptide Therapeutics Resistant to Serine Protease Degradation: Application to Dipeptidyl Peptidase IV Substrates*; K. R. Heard, W. Wu, Y. Li, P. Zhao, I. Woznica, J. H. Lai, M. Beinborn, D. G. Sanford, M. T. Dimare, A. K. Chiluwal, D. E. Peters, D. Whicher, J. L. Sudmeier, W. W. Bachovchin; *J. Med. Chem.* 2013; **56(21)**: 8339-8351. <https://doi.org/10.1021/jm400423p>
- *Synthesis and Biological Activity of Analogues of the Antimicrotubule Agent N,beta,beta-Trimethyl-L-phenylalanyl-N1-[(1S,2E)-3-carboxy-1-isopropylbut-2-enyl]-N1,3-dimethyl-L-valinamide (HTI-286)*; A. Zask, G. Birnberg, K. Cheung, J. Kaplan, C. Niu, E. Norton, R. Suayan, A. Yamashita, D. Cole, Z. Tang, G. Krishnamurthy, R. Williamson, G. Khafizova, S. Musto, R. Hernandez, T. Annable, X. Yang, C. Discafani, C. Beyer, L. M. Greenberger, F. Loganzo, S. Ayral-Kaloustian; *J. Med. Chem.* 2004; **47**: 4774-4786. <https://doi.org/10.1021/jm040056u>
- *Total synthesis of the large non-ribosomal peptide polytheonamide B*; M. Inoue, N. Shinohara, S. Tanabe, T. Takahashi, K. Okura, H. Itoh, Y. Mizoguchi, M. Iida, N. Lee; S. Matsuoka; *Nat. Chem.* 2010; **2**: 280-285. <https://doi.org/10.1038/nchem.554>

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