

FT-FM8442



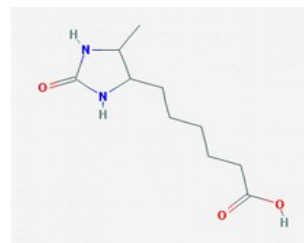
DesthioBiotins

Products Description

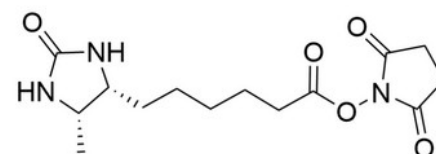
Analog of d-Biotin eliciting reversible binding with (strept)avidins, for:

- Biotinylation of biomolecules (proteins, reporter molecules,...) for **both detection and separation techniques**
- Purification with mild conditions (prevents denaturation of purified proteins)
- Pull-down assays studies (ligand / receptors, enzyme / substrates, DNA/DNA or DNA/protein)

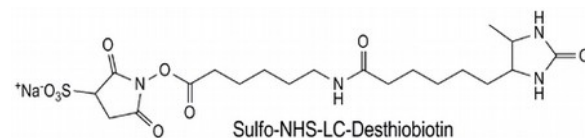
Name: DesthioBiotin (Dethiobiotin)
Catalog number: d-Desthiobiotin, (+)-Dethiobiotin, dethio-, 5-Methyl-2-oxo-4-imidazolidinehexanoic acid, (4R,5S)-dethiobiotin, 6-(5-methyl-2-oxoimidazolidin-4-yl)hexanoic acid
 FM8442, 500mg
Formula : CAS: 533-48-2 ; **M.W.= 214.27**
 Store: +4°C_L) Soluble in DMSO, DMF, 0.1N hydrochloric acid.



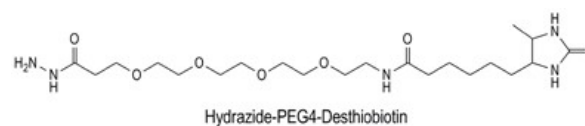
Name: NHS-DesthioBiotin
Catalog number: 116291, 50mg 116292, 100mg 1162914, 1mg
Formula : CAS: 80750-24-9; MW: **311.34**
 Net Mass Addition: 197.13 Spacer 9.7A
 Store at -20°C_(M) Soluble in DMSO, DMF (not soluble in water)
 Uncharged. Cell permeant.
 Reacts with amines at pH7-9 - covalently label primary amines (-NH₂) of proteins or other aminated molecules.



Name: NHS-LC-DesthioBiotin
Catalog number: 116301, 5x1mg (M)
Formula : N-Hydroxysuccinimidoiminobiotin trifluoroacetamide
 MW: **526.55**
 Store at -20°C_(M) Net Mass Addition: 310.20 Spacer 17.3A
 Soluble in DMSO, DMF



Name: Hydrazide PEG₄ - DesthioBiotin
Catalog number: 116341, 5x1mg (K)
Formula : MW: **475.59** ; CAS:
 Net Mass Addition: 457.26 Spacer: 31.22A
 Store at -20°C_(M) Soluble in DMSO, DMF and aqueous buffer

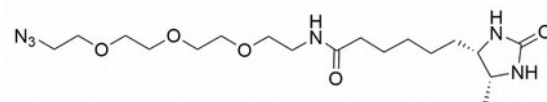


Name: Azide -PEG₃ - DesthioBiotin
Catalog number: FZ8441,25mg FZ8443,100mg

FT-FM8442

Formula : CAS:1306615-47-3; MW: **414.51**
Soluble in DMSO, DMF

Store at -20°C(M)



Ask also Azide---Desthiobiotin (8Y1111); CAS: 1951424-99-9

Name: **Amine – PEG₃ - Desthiobiotin**

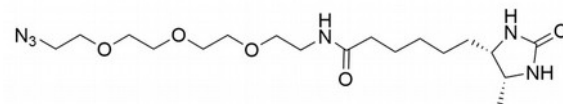
Catalog number: 1I6400, 5x1mg 1I6401, 5mg

Formula : CAS: -; MW: **432.55**

Net Mass Addition: 431.55 Spacer 28.8A

Store: +4°C(L)

Sufficient For: 5 uses to label a total of 4mg of IgG using typical conditions



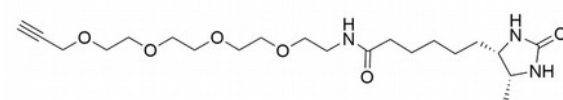
Name: **Alkyne – PEG₄ - Desthiobiotin**

Catalog number: 8X7021, 10mg 8X7023, 100mg

Formula : MW: **427.55** ; CAS: 1951424-89-7

Soluble in DMSO, DMF

Store: +4°C(L)



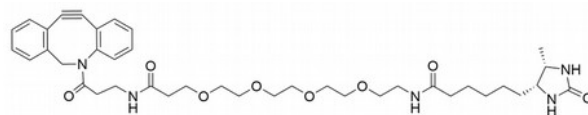
Name: **DBCO – PEG₄ - Desthiobiotin**

Catalog number: 8Y1241, 10mg 8Y1243, 100mg

Formula : **719.89** ; CAS: 2032788-37-5

Soluble in DMSO, DMF

Store: +4°C(L)



Technical information

Due to the extremely high affinity of biotin towards streptavidin, the biotinylated molecule/streptavidin-interaction is essentially irreversible under physiological conditions. Desthiobiotin however, binds less tightly to streptavidin, hence desthiobiotinylated molecules are easily eluted from the complex in the presence of excess Biotin.

- **Desthiobiotin** is a single-ring, sulfur-free analog of biotin that binds to streptavidin with nearly equal specificity but less affinity than biotin ($K_d = 10^{11}$ vs. 10^{15} M, respectively). Desthiobiotinylated proteins can be eluted readily and specifically from streptavidin affinity resin using mild conditions based on competitive displacement with free biotin. These soft-release conditions for desthiobiotin helps in pull-down experiments with biological samples to minimize co-purification of endogenous biotinylated molecules, which are not eluted with free biotin. It used non-denaturing conditions, unlike certain other label and reporter or tag systems. The desthiobiotin once coupled to a target, is an ideal tag or reporter hapten when using native or recombinant proteins that are not expressed with a fusion tag, for both detection and purification purposes.
- **PEG** (EPG, PEO) is a short polyethylene glycol that carries hydrophilicity. This property is transferred to labeled molecule.
- The Desthiobiotin can be introduced into biomolecules by conventional chemistry.
 - For example **Desthiobiotin** can be coupled to oligonucleotides at the 3'-end, 5'-end and internally at any thymidine residue. It can also be coupled to proteins and peptides through amines (using EDC [FT-52005A](#)), but a shorter procedure is recommended using NHS functionalized desthiobiotin.
 - **NHS** activated Desthiobiotin reagent allows direct conjugation to amine containing molecules. NHS and Sulfo-NHS-activated desthiobiotin reagents react efficiently with primary amine groups ($-NH_2$) to form stable amide bonds. The buffer should be free of primary amines (e.g., Tris-HCl) with pH between 7-9 (achievable

FT-FM8442

by dialysis or other desalting method). See protocols in technical sheets [FT-R2027A](#) for conjugation to proteins, that include several primary amines in the side chain of lysine (K) residues and the N-terminus of each polypeptide.

Dissolve NHS-Desthiobiotin and Sulfo-NHS-LC-Desthiobiotin in organic solvents such as dimethylsulfoxide (DMSO) or dimethylformamide (DMF) just before use. Unused solution will remain stable at -20°C for 2 months when stored with desiccant. Do not use old organic solvents, because they may become contaminated with trace amounts of water after long-term storage.

- **Azide** activated Desthiobiotinide can be used for the labeling of terminal Alkyne- and strained Alkyne (e.g. DBCO)-labeled biomolecules via Cu(I)-catalyzed Alkyne-Azide (CUAAC) or Cu(I)-free strain-promoted Alkyne-Azide Click Chemistry (SPAAC) reaction, respectively.

- **Hydrazide** group (-NH-NH₂) reacts specifically to carbonyls (aldehydes and ketones) in slightly acidic conditions, resulting in a hydrazone linkage. It allows notably to conjugate macromolecules at carbohydrate groups that have been oxidized to form aldehydes.

For example Sialic acid, a common sugar component of protein polysaccharides, is easily oxidized with 1mM sodium periodate (NaIO₄). Other sugar groups can be oxidized effectively with 5-10mM sodium periodate. Oxidation of sugar moieties from glycoproteins such as polyclonal antibodies generates aldehyde groups, which enable labeling to be directed away from polypeptide domains that are important for protein function. Thanks to PEG spacer, antibodies modified with Hydrazide-PEG₄-Desthiobiotin have decreased levels of aggregation when stored in solution over time.

The hydrazone linkage can be further reduced to stable secondary amine bonds using sodium cyanoborohydride (#05777). The reaction is more efficient in the presence of aniline (#IUF41). Alternatively, hydrazides can be conjugated to carboxylic acids using EDC carbodiimide chemistry.

- **Alkyne and DBCO** groups reacts specifically with Azide functionalized molecules to yield a stable bond. See the technical notice [NT-ClickC](#) for more information about the click reaction (advantages like bioorthogonality, and protocols).

References:

Hirsch, J., et al. (2002). Easily reversible desthiobiotin binding to streptavidin, avidin, and other biotin-binding proteins: uses for protein labeling, detection, and isolation. *Analytical Biochemistry* 308: 343-357.

Hofmann, K., et al. (1982). Avidin binding of carboxyl-substituted biotin and analogues. *Biochemistry* 21: 978-984.

Related documents and products

Ask for fluorescent Desthiobiotins (XEU500)

See [BioSciences Innovations catalogue](#) and [e-search tool](#).

Other biotins

[IminoBiotins FT-39375A](#) (2-IminoBiotin, -NHS, -Hydrazide)

[d-Biotin FT-10685A](#) (and other amine or carboxyl derivatives), PEO-Biotins UPR2027A

[Immobilized biotins FT-39071A](#)

[DCBO reagents \(SPAAC click chemistry\) PH-BB014d.pdf](#)

Biotinylated antibodies, peptides,...

Desalting tools: CelluSep Dialysis, Gelfiltration columns

Rev.T03E-P06E