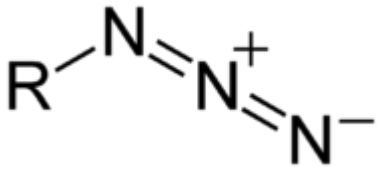
Click chemistries

Back to NT-XLfctl

■ Click Chemistry (Azide / acetylene reaction)

0. Azides (for Click chemistries – CuCAAC, SPAAC, TTCOA,…)

The **azide** chemical group is highly stable under many conditions (and low reactive toward chemicals from buffers, usual material and biological compounds), while it is very reactive and highly selective in its reactivity toward certain (biorthogonal) functional groups. This makes azide functionality tremendously attractive especially where other conjugating functionality have to be used very cautiously due to their limited stability, or require careful control of variables like pH in order to insure high yielding reactions.



Azides are popular for their participation in the "click reaction", and Staudinger ligation. They can participate to other kind of reactions as well.

Azides can react in:
• Alkyne/Azide standard Click chemistry – CuAAC,
including by advanced Azide structures improve the click reaction with Alkynes:
PicolylAzide
AzidePlus
• CycloOctynes (DBCO,BCN)/Azide for Copper-free Click chemistry – SPAAC

Azides

Below is an overview of key reagents:
Azides (Crosslinkers, Fluorescent, Biotin, Pegylated) | Picolyl-Azide (improves reaction)

See a list of Azide reagents[0]: Azide (+ fluorescent labels: Cyanine, CF488/568/647, FAM, BrDIPY, …), (linkers: +mPEG, …) (crosslinkers: +Amine, Carboxyl Acid, NHSuc ester, Azide, Alkyne, AminoOxy, Hydrazide,…) (+PEO_n, PEG_x) (ligands: + Biotin/Desthiobiotin, Agarose, …)

AZIDE reagents – for Pegylation by Click Chemistry

FLUORESCENT Azide reagents for Click Chemistry:
• Superior **FluoProbes dyes, activated by** –Azide (protocol), i.e. FP488-Azide #YE4970
• Conventional **CyDyes dyes, activated by Azide** , i.e. Cy3 azide FP-EV0900 and Cy5- Azide FP-EV0910
• Classic dyes such as **FAM, R110, JOE TAMRA,** and **ROX**, activated by azide.

BIOTIN Azide reagents for Click Chemistry:
• Biotin – Azide conjugates, such as Biotin-PEG azide FJ6751 and Desthiobiotin-PEG azide FZ8440

Other reagents for Click Chemistry:

$mPEG_x$-N_3 #WT9980	**See FT-DZ3531**
Aminooxy-PEO_4 azide #FZ8700	**See FT-JV2290**

And more AminoOxy and Aldehyde crosslinkers (for Oxime chemistry).

Picolyl-Azides

Picolyl-Azides of fluorescent dyes improves greatly Click fluorescent labeling of terminal Alkyne and/or decrease Cu(I) levels and corolar deleterious effects.

Compared with a standard azide, the picolyl azide moiety has a chelating effect that raises the effective concentration of copper at the reaction site that lead to an strong increase of signal intensity (up to 40-fold!). It allows for at least a tenfold reduction in the concentration of the copper catalyst without sacrificing the efficiency of labeling.
Conversely, picolyl azide labeling reagent allows the modulation of copper levels in the click reaction by varying the amounts of $CuSO_4$ and copper protectant (chelator), thus minimizing the deleterious effects of copper without sacrificing reaction efficiency a copper-chelating motif to raise the effective concentration of Cu(I) at the reaction site.
Picolyl azide can be used not only for click chemistry of standard Alkynes, but also for strained Alkynes (e.g DBCO-labeled molecules) via(Cu(I)-free strain-promoted Alkyne-Azide Click Chemistry - SPAAC).

In summary, the introduction of a picolyl moiety into an azide probe leads to a substantial increase in the sensitivity of alkyne Click-conjugation or detection. This will be of special value for the detection of low abundance targets or where significant increase in signal intensity is desired.

PicolylAzide reagents

See a list of PicolylAzide reagents(): Picolyl (+ fluorescent labels: Cyanine, CF488/568/647, FAM, BrDIPY, …), (linkers: +mPEG, …) (crosslinkers: +Amine, Carboxyl Acid, NHSuc ester, Azide, Alkyne, AminoOxy, Hydrazide,…) (+PEO_n, PEG_x) (ligands: + Biotin/Desthiobiotin, Agarose, …)

1. Alkyne/Azide standard Click chemistry – CuAAC

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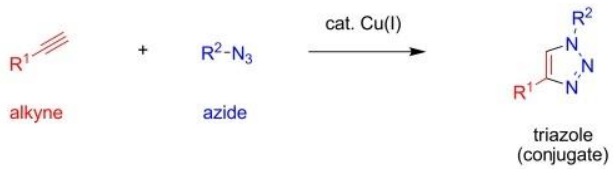
A versatile and reliable conjugation chemistry for linking covalently in very mild conditions

The original Click reactions relies on The Cu(I) catalyzed [3+2] azide-alkyne cycloaddition (CuAAC).

Chemistry

The Click chemistry involves the reaction between an **azide** and an **alkyne** (i.e. acetylene), forming a covalent chemical bond.



This process has unprecedented tolerance and reliability. It is pH-independent, and it can be carried out in water at ambient temperature. It is **100% biocompatible**, and can be performed even in living cells! It applies to conjugation and solid phase immobilization.

Note: both azido and acetylenic groups are nearly never encountered in natural biomolecules. Hence, the reaction is **highly bioorthogonal and specific**.

This chemistry has become an invaluable tool in biochemical research[1,2], because it is remarkably efficient and specific thanks to the abiotic nature of the required azide and alkyne functionalities.

Applications

Compared to standard chemistries targeting chemical groups found in biomolecules, the Click reaction can be applied even in the presence of groups found in biological samples (biorthogonality). This however requires that azide and alkyne partnering groups can be introduced in biomolecules, typically DNA and protein, or in xenobiotic compounds (drugs, surfaces,…). This is done by biochemistry (use of crosslinker and modifiers), during the chemical synthesis or biosynthesis (use of building blocks). Virtually any biomolecules can be involved. Labeling with small molecules, such as fluorescent dyes, biotin, and other groups can be readily achieved. Click chemistry allow for complex molecules conjugations such as ADC (Ab-dug ot toxin or radiochemical ou radio or lumi-labels), immunoPCR probes (oligo-protein), multifuntionalised surfaces, resins or gels,…

The only needed things are azido- and alkyne-reagents and/or labeled dyes, biomolecules and surfaces.
Interchim BioScience provides a variety of reagents, notably in the Uptima range, including Azide-, Alkyne- (and DBCO-, BCN-) functionnalized crosslinkers and linker/modifiers, and activated fluorescent dyes, biotin, nanoparticules. Please ask alos for activated lipids, dextrans, ligands or bioactive compounds, that can be prepared on custom.

Limitations and alternatives
Despite the efficiency of the click reaction, and the abiotic nature of the azide functionality, the presence of copper is a hindrance for bioorthogonal labeling in living systems. To that point, alternative methods are CycloOctynes (DBCO,BCN)/Azide for Copper-free Click chemistry – SPAAC and Tetrazine/TCO chemistry. See also Oxime ligation and Staudinger ligation.

Alkyne reagents
Alkynes can react in:
Alkyne/Azide standard Click chemistry – CuAAC
CycloOctynes (DBCO)/Azide for Copper-free Click chemistry – SPAAC
Tetrazine-Alkyne Ligation

See a list of Azide reagents(): Alkyne (+ fluorescent labels: Cyanine, CF488/568/647, FAM, BrDIPY, …), (linkers: +mPEG, …) (crosslinkers: +Amine, Carboxyl Acid, NHSuc ester, Azide, Alkyne, AminoOxy, Hydrazide,…) (+PEO_n, PEG_x) (ligands: + Biotin/Desthiobiotin, Agarose, …)

Azide reagents
See above

FLUORESCENT reagents for CuAAC Click Chemistry:
• Superior **FluoProbes dyes**, activated by Azide(YE4970), Alkyne(YE4970) or DBCO(-).
• Conventional **CY$_{anine}$ dyes**, activated by Azide(HO7250), Alkyne(1A6320) or DBCO(DQP790) or Tetrazine·(WXS720)
• Great **AF dyes**, **BrDIPY**[FPBDP_] (activated by Azide(AXCJ91) or PicolylAzide(AYH9B1), Alkyne(AXCECA) or DBCO(B432L1).
• Great neutral dyes **BrDIPY**[FPBDP_] (activated by Azide()
• Classic dyes such as **FAM, R110, JOE TAMRA,** and **ROX**, activated by Azide, Alkyne or DBCO or BCN.
+CF Dyes[PH]; FluoLid[PH]; Seta Dyes[PH]; IRDyes[PH]

BIOTIN reagents for CuAAC Click Chemistry:
• Biotin – Azide conjugates, such as Biotin-PEG azide FJ6751 and Desthiobiotin-PEG azide FZ8440
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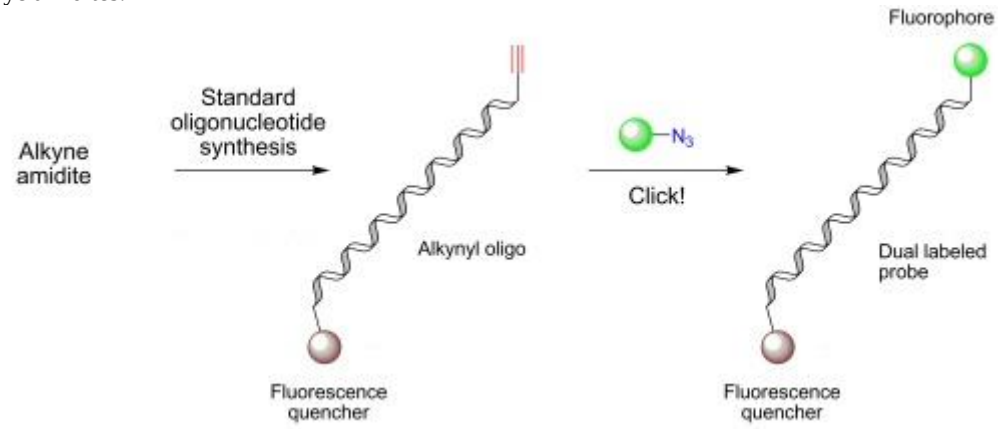
Alkyne reagents – for Pegylation by CuAAC Click Chemistry
mPEG$_x$-Alkyne#FO2480 **See FT-DZ3531**

Copper-chelating ligands that improve efficiency and biocompatibility of CuAAC :
Click chemistry catalalyzers and activator
See Click Chemistry catalysts (APIFZB):
TBTA
THPTA «
BTTAA «
BTTES
BTTP
Ascorbic Acid «

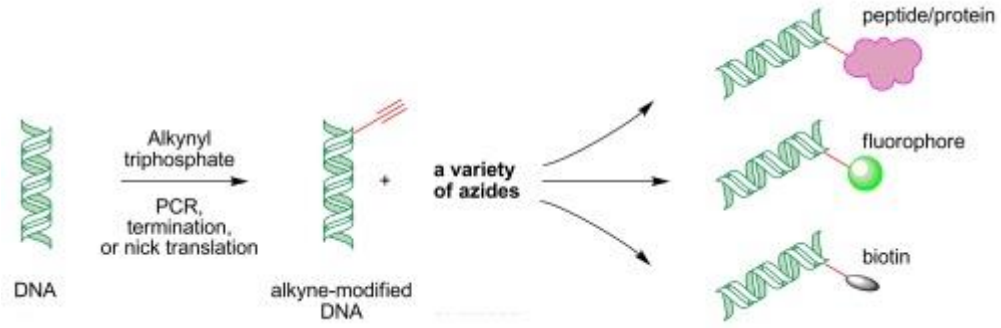
+

Click Chemistry labeling of nucleic acids

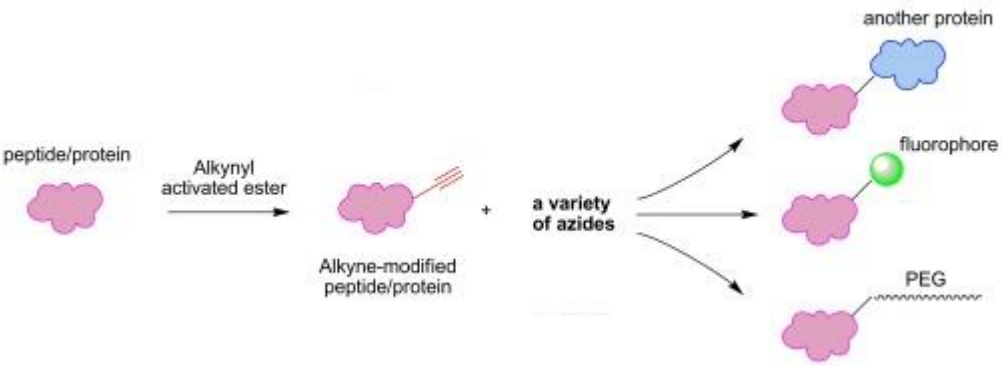
- **Fluorescent labeled oligonucleotides & dual-labeled probes for real-time PCR.** We provide alkyne phosphoramidites[±] for easy synthesis of alkyne modified oligos, and fluorescent dye azides. Based on Click Chemistry, this technology provides significant advantages over labeling via activated esters or fluorescent dye amidites.



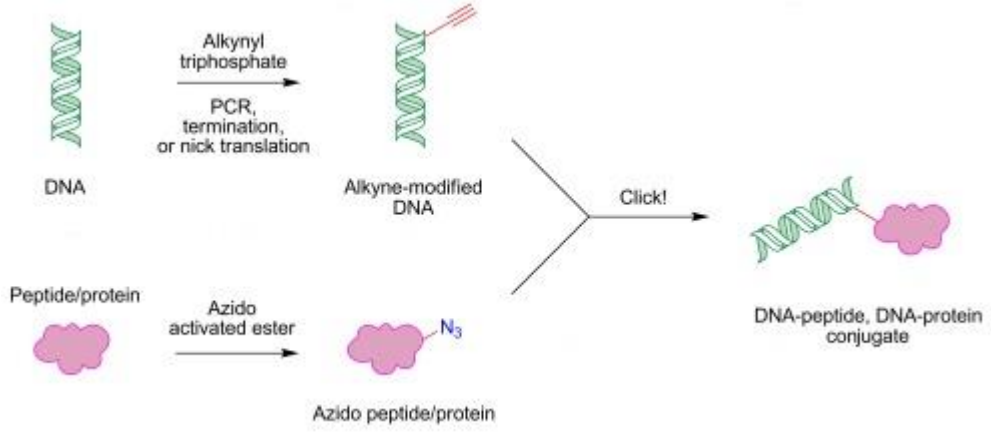
- **Fluorescent & biotinylated DNA.** Use alkynyl triphosphates for the incorporation of alkyne in DNA by PCR, termination, or nick translation. You can thereafter label DNA with any dye or biotin in your lab, without need in specific labeled triphosphates!



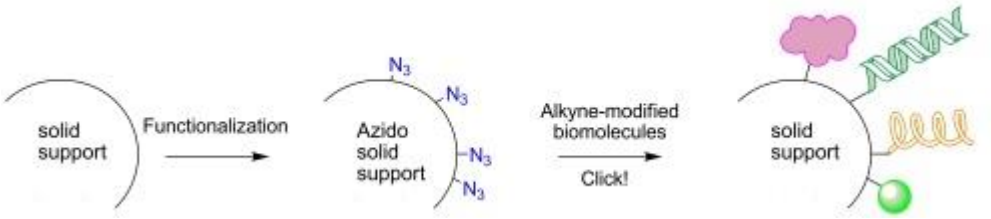
- **Fluorescent peptides, proteins, and antibodies.** We provide alkyne and azide activated esters for the modification of proteins and peptides with either azide or alkyne. You can use alkyne- or azido-modified proteins for the preparation of conjugates with DNA, reporter groups and solid surfaces.



- **Peptide-oligonucleotide conjugates.** We provide azido activated ester for the labeling of peptides, and alkyne amidites for the synthesis of alkyno oligos.



- **Biomolecules immobilized on nearly any solid phase.** We would be glad to consult you on the modification of solid surfaces, provide you with custom solid phases, and guide you to success!



- **Click Chemistry auxiliary reagents & catalysts** are available.

•Other clickable reagents

(*ne pas faire de sous catég, renvoyer plutôt a des % sur la 2m reactivité particulier*)

Propargyl	cf Alkyne (le proargyl semble l'alkyne avec C ?4
CycloOctynes	cf infra SPAAC/BDCO
CycloNonynes	cf infra SPAAC/BCN

nearly any other conjugates you can imagine can be done by Click Chemistry: contact us

2. CycloAlkynes/Azide for Copper-free Click chemistry – SPAAC

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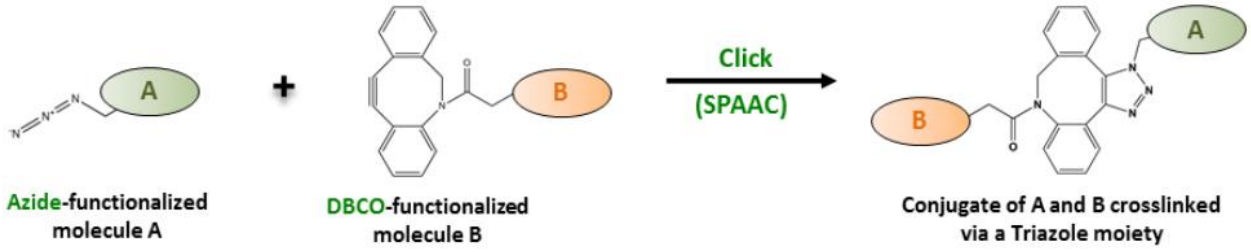
Features:
•Faster detection of small-sized Azides compared to CuAAC reactions (see 2.)
•Copper free and thus non-toxic
•No catalyst or accessory reagents and thus no extensive optimization of assay conditions required
•Suitable for dual-labeling approaches in combination with Tetrazine -trans-Cyclooctene Ligation

Principle:

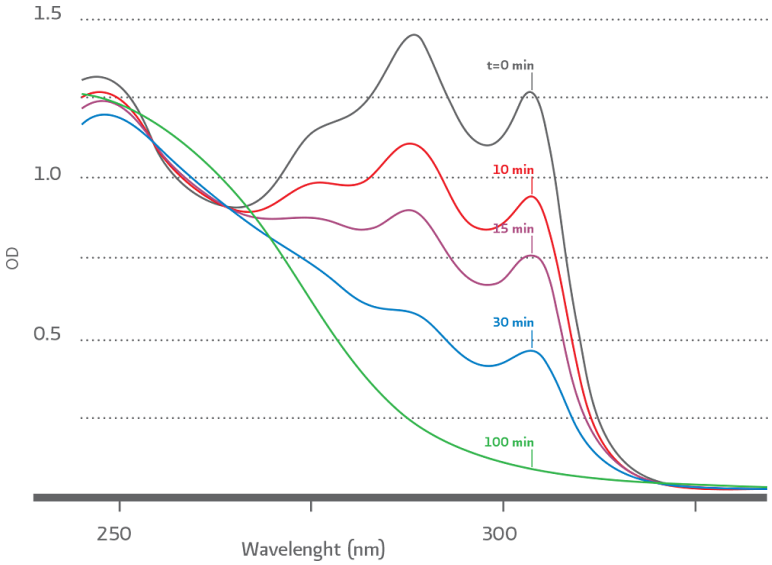


(***Figure 1***). Schematic representation of a SPAAC ligation reaction.[CIK201904]

The strain promoted alkyne-azide cycloaddition, also termed as the Cu-free click reaction, is a bioorthogonal reaction utilizing a pair of reagents, cyclooctynes and azides that exclusively and efficiently react with each other while remain inert to naturally occurring functional groups such as amines (***Figure 1***). SPAAC enables labeling a wide variety of biomolecules without any auxiliary reagents in an aqueous and otherwise complex chemical environment through the formation of a stable triazole.
Among the large number of known cyclooctynes (DIFO, BCN, DIBAC, DIBO, ADIBO), the so-called **DBCO** (dibenzocyclooctynes, or Azadibenzylcyclooctyne ADIBO = DIBAC) compounds comprise a class of reagents that possesses reasonably fast kinetics and good stability in aqueous buffers with sufficient hydrophilicity[ref13,14]. Within physiological temperature and pH ranges, the DBCO group will not react with amines or hydroxyls that are naturally present in many biomolecules. Additionally, reaction of the DBCO group with the azide group is significantly faster than with sulfhydryl groups (–SH, thiol).

Unlike many other cyclooctynes, DBCO reagents possess an embedded chromophore that allows for the simple and non–destructive spectroscopic identification of DBCO – containing compounds. This chromophore can also be used for spectroscopic estimation of total incorporated DBCO molecules into a biopolymer.

Another important feature of DBCO compounds is that the **progress of SPAAC ligation can be followed in real time by simple UV – Vis spectroscopy**. As the "click reaction" progresses the signature an absorbance band at 310 nm disappears as illustrated ***Figure 1b***



(***Figure 1b***). Progress of SPAAC ligation reaction followed by UV–Vis spectroscopy.

+

Limitations:
SPAAC has modest kinetics (e.g. 0.3 to 2.3 $M^{-1}s^{-1}$), so for low biomolecule concentrations (e.g. < 5 µM) one might see alternative method, such a Tetrazine/TCO Ligation.

NT-XLclic
Available CycloAlkyne groups:
CycloOctyne: DBCO see below DBCO reagents
CycloNonyne: BCN see below BCN reagents

DBCO (dibenzocyclooctyne) and **BCN** (bicyclo[6.1.0]nonyne) reacts with azide,
by CycloOctynes (DBCO)/Azide for Copper-free Click chemistry – SPAAC (and Alkyne/Azide standard Click chemistry – CuAAC)

DBCO reagents

See a list of DBCO reagents: DBCO (+ fluorescent labels: Cyanine, CF488/568/647, FAM, BrDIPY, …), (linkers: +mPEG, …) (crosslinkers: +Amine, Carboxyl Acid, NHSuc ester, Azide, Alkyne, AminoOxy, Hydrazide,…) (ligands: + Biotin/Desthiobiotin, Agarose, …)

FT-DQP580	**Linkers, i.e. DBCO-COOH #DQP580**

•Fluorescent dyes – DBCO conjugates
See technical sheets

FT-	**FluoProbes® dyes – DBCO - i.e. #**
FT-	**CYanine® dyes – DBCO - i.e. #**
FT-	**AFDyes® dyes – DBCO - i.e. #**

•Biotin – DBCO
See technical sheets

FT-	**i.e. Biotin DBCO**

•MTS - DBCO
See technical sheets

FT-0C3640	**MTS – DMSO reagents, i.e. MTSEA-DBCO #0C3640**

•Other DBCO reagents
Please ask at InterBiotech

BCN reagents

See a list of BCN reagents: ()

•CF® dye – BCN conjugates
CF® dye with BCN, an alternative to fluorescently labeled DIBO and DBCO, reacts with azide to form 1,2,3-triazole by copper-free 1,3-dipolar Huisgen cycloaddition. This copper-free bioorthogonal reaction allows reaction with live cells or cell extracts when there are concerns about native protein function loss with copper.

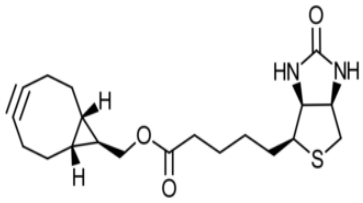
CF dyes are exceptionally bright and photostable, making it the perfect dye for fluorescence detection. The following CF dyes are available with BCN.
note: CF®500 BCN and CF®650 BCN are membrane-permeant for intracellular copper-free reaction with azide.

CF®405M BCN	**408/452 nm**	**92114, 0.5 mg**
CF®405S BCN	**404/431 nm**	**92113, 0.5 mg**
CF®440 BCN	**440/515 nm**	**96070, 0.5 mg**
CF®488A BCN	**490/515 nm**	**92075, 0.5 mg**
CF®500 BCN	**500/510 nm**	**96026, 0.5 mg**
CF®568 BCN	**562/583 nm**	**92076, 0.5 mg**
CF®594 BCN	**593/614 nm**	**92077, 0.5 mg**
CF®640R BCN	**642/662 nm**	**92078, 0.5 mg**
CF®650 BCN	**650/670 nm**	**96027, 0.5 mg**
CF®680R BCN	**680/701 nm**	**92079, 0.5 mg**

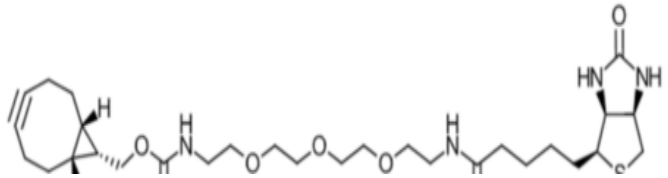
•Biotin - BCN
Biotin a convenient tag for labeling and purification purposes.

Biotin BCN	**92169**
BCN-Biotin (exo)	**CP-6047**
BCN-PEG3-Biotin (endo)	**CP-6107**
BCN-PEG3-Biotin (exo)	**CP-6108**

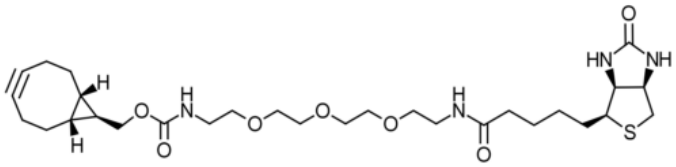
CP-6047 BCN-Biotin (exo)



CP-6107 BCN-PEG3-Biotin (endo)



CP-6108 BCN-PEG3-Biotin (exo)



•MTS - BCN

MTS group is sulfhydryle reactive.

MTS-BCN	**96023**

•Other BCN reagents

Please ask at InterBiotech+

•Ask BCN reagents

endo-BCN-PEO$_n$-acid (n=2/3/4/8/12)	Inquire+
endo-BCN-EO$_n$-NHS ester (n=2/3/4/8/12)	Inquire+
endo-BCN-EO$_n$-PFP ester()	Inquire+
endo-BCN-EO$_n$-t-butyl ester ()	Inquire+
endo-BCN-PEG-alcohol (n=2)	Inquire+
endo-BCN-PEG-Boc-Amine ()	Inquire+
endo-BCN-PEG-malimide ()	Inquire+
bis-PEG-endo-BCN(n=23)	Inquire+
Boc-Gly-PEG-endo-BCN ()	Inquire+
endo-BCN-PEG-peptide ()	Inquire+
exo-BCN-PEG-Boc-Amine ()	Inquire+

• See FT-KV6941 **Check availability [Inquire]+ i.e.:**

Click-easy® BCN N-hydroxysuccinimide ester I **KV6941-LK 4320**

A state-of-the-art cyclooctyne for catalyst free strain-promoted, copper-free azide-alkyne cycloadditions. Functionalize Amino-Allyl nucleotides.

Click-easy® BCN N-hydroxysuccinimide ester II **1E0471-LK 4330**

A state-of-the-art cyclooctyne for catalyst free strain-promoted, copper-free azide-alkyne cycloadditions. Functionalize Amino-Allyl nucleotides.

5'-Click-easy® BCN CEP I **1E0481-BA0372 , 100Mg, 250µg**

A phosphoramidite for the installation of a strained cyclooctyne (BCN) into an oligonucleotide for subsequent copper-free click elaboration.

5'-Click-easy® BCN CEP II **1E0491-BA 0373**

a phosphoramidite for the installation of a strained cyclooctyne (BCN) into an oligonucleotide for subsequent copper-free click elaboration.

More about BCN-Azide reaction – protocols, applications

Use in Oligo Synthesis:

Ask+

Dissolve the phosphoramiditein acetonitrile at concentrations recommended by the synthesizer manufacturer. Couplingshould be carried outusing standard instrumentDMT on protocols, and coupling efficiency is >98% with standard coupling times.Cleavage from the solid support and deprotection can be carried out under standard conditions.

References

1) (a) Rostovtsev, V. V.; Green, L. G.; Fokin, V. V.; Sharpless, K. B. Angew. Chem., Int. Ed. 2002, 41, 2596. (b) Tornøe, C. W.; Christensen, C.; Meldal, M. J. Org. Chem. 2002, 67, 3057.
2) (a) Sletten, E. M.; Bertozzi, C. R. Angew. Chem., Int. Ed. 2009, 48, 6974. (b) Tron, G. C.; Pirali, T.; Billington, R. A.; Canonico, P. L.; Sorba, G.; Genazzani, A. A. Med. Res. Rev. 2007, 28, 278. (c) Moses, J. E.; Moorhouse, A. D. Chem. Soc. Rev. 2007, 36, 1249.
3) Dommerholt, J.; Schmidt, S.; Temming, R.; Hendricks, L.J.A.; Rutjes, F.P.J.T.; van Hest, J.C.M.; Lefeber, D.J.; Friedl, P.; van Delft. F.L. Angew. Chem., Int. Ed. 2010, 49, 9422-9425.

See a list of DBCO reagents: BCN (BiCycloN)

BCN—Acid, -NHS, PFP Ester, -tbut Ester, Hydroxyl, Amine, -BCN, boc-Amine Inquire
+

Protocols

See the technical sheet

3. Tetrazine-Alkene Ligation

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Features:
•High-speed CLICK reaction that is ideally suited for in vivo cell labeling & low concentration applications
•Copper free and thus non-toxic
•No catalyst or accessory reagents and thus no extensive optimization of assay conditions required
•Suitable for dual-labeling approaches in combination with the strain-promoted Azide -DBCOreaction[17] .

Principle:

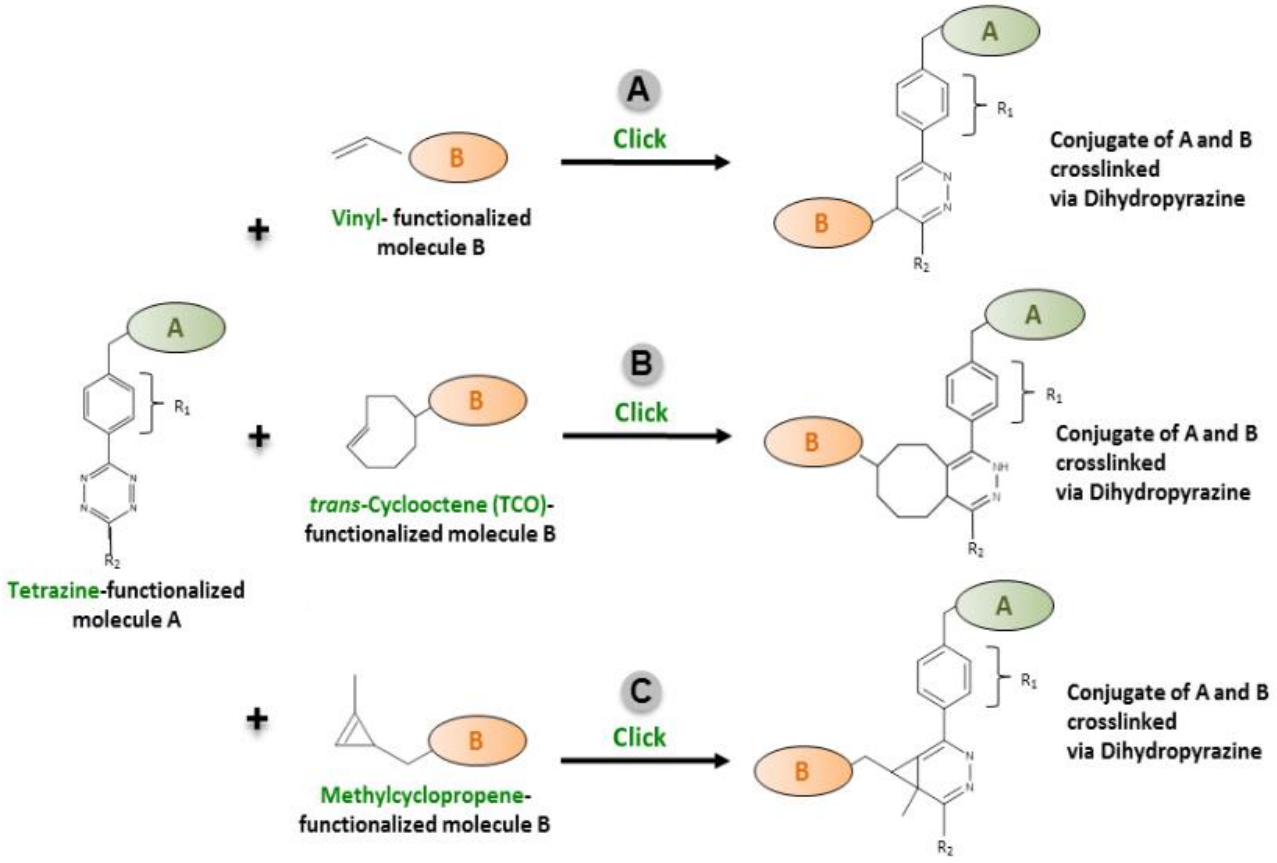


Figure 2: Principle of Tetrazine-Alkene Ligation.
A) Tetrazine - Vinyl Ligation.
B) Tetrazine - trans-Cyclooctene (TCO) Ligation.
C) Tetrazine –Methylcyclopropene Ligation. R1= Phenyl, R2= H or CH_3
A numberof structurally varied alkene and tetrazine derivatives have been developed that strongly differ in terms of reaction kinetics and stability. TCO has been selected (as strained alkene) since it possesses the highest reactivity towards tetrazine[18,19]. Methylcyclopropene (strained alkene)[21 - 24] and Vinyl[25] (terminal alkene) possess excellent substrate properties for enzymatic applications due to their small size.

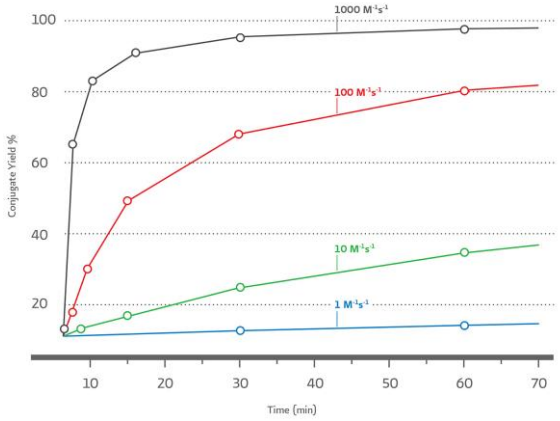
The Tetrazine - Alkene Ligation constitutes a non-toxic biomolecule labeling method of unparalleled speed that is ideally suited for in vivo cell labeling and low concentration applications. A Tetrazine -functionalized molecule A reacts with a terminal or strained Alkene - functionalized molecule B, via an inverse–demand Diels–Alder cycloaddition reaction, thereby forming a stable conjugate A-B via a Dihydropyrazine bond (*Fig. 4*).

The combination of ultrafast kinetics, selectivity, and long–term aqueous stability makes TCO–Tetrazines the ideal pair in low concentration applications such as protein–protein conjugations.

The reactivity of the tetrazine derivatives towards TCO is determined by the substituents in the 3 position (Fig. 4, R1) and 6 position (Fig. 4, R2). Two Tetrazine versions with different reactivities and stability characteristics have been selected that meet specific application requirements. **Tetrazine** (R1=phenyl,R2=H) reagents are the ideal choice if a rapid reaction kinetic is the key aspect, whereas **6-Methyl-Tetrazine**(R1=phenyl,R2=CH_3) reagents are ideally suited if an improved chemical stability is required [18].

TCO ligation is reaction of choice when low biomolecule concentrations (e.g. < 5 µM) render SPAAC poorly efficient due to modest kinetics (e.g. 0.3 to 2.3 $M^{-1}s^{-1}$), and where copper–catalyzed alkyne–azide cycloaddition click reaction might compromise system viability.

Reactivity can be defined by the second order rate constant for the bioorthogonal reactant pairs. The higher the 2nd order rate constant for product formation, the more efficient the conjugation at low reactant concentrations within reasonable time scales, at near neutral pH, and without having to use a large excess of either biomolecule. The relationship between2nd order rate constants ($M^{-1}s^{-1}$) for bioorthogonal reactants at 10 µM and the percent conjugate yield over time is illustrated in (*Figure 2b*).



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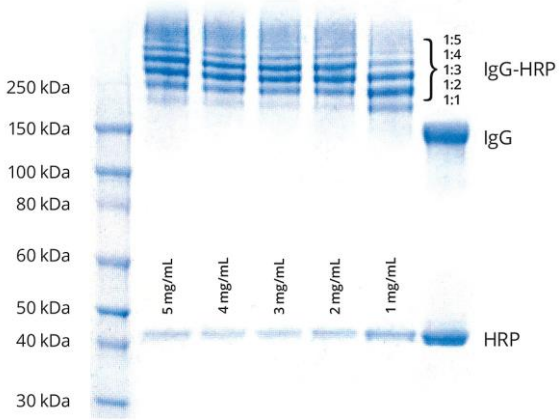
(***Figure 2b***). Simulation of 2nd order reactions at 10 µM reactants

Example Application

Five Goat IgG samples (100 µL at 5 mg/mL, 4 mg/mL, 3 mg/mL, 2 mg/mL and 1 mg/mL) were labeled in BupH buffer (pH 7.5) using a 20–fold molar excess of Tetrazine–PEG5–NHS ester. Similarly, 0.1 mL HRP (500 µg) at 5.0 mg/mL in BupH buffer (pH 7.5) was labeled using a 20–fold molar excess TCO-PEG4-NHS ester for 60 min. After removal of excess reagents and determining each protein concentrations 3-fold excess of HRP–TCO was added to IgG–Tetrazine at 5 mg/mL, 4 mg/mL, 3 mg/mL, 2 mg/mL and 1 mg/mL. After 60 minutes, an aliquot (1 µL) from each conjugation reaction was analyzed by SDS–PAGE.



(***Figure 2c***). Simulation of 2nd order reactions at 10 µM reactants

Tetrazine reagents

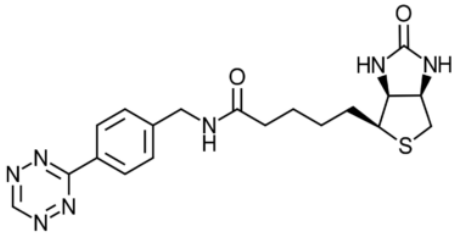
Tetrazines can react in:

- Tetrazine-Alkyne Ligation
- AminoOxy/Aldehyde Ligation (Oxime Chemistry)

See a list of Tetrazine reagents: TCO, Tetrazine (+ fluorescent labels: Cyanine, CF488/568/647, FAM, BrDIPY, …), (linkers: +mPEG, …) (crosslinkers: +Amine, Carboxyl Acid, NHSuc ester, Azide, Alkyne, AminoOxy, Hydrazide,…) (ligands: + Biotin/Desthiobiotin, Agarose, …)

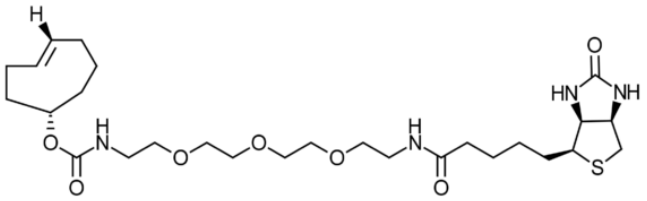
•Tetrazine and TCO Biotins

CP-6688 Tetrazine-biotin

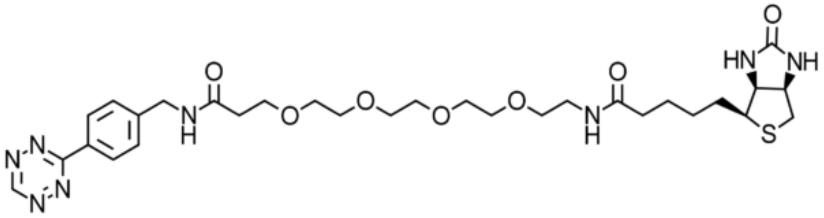


NT-XLclic

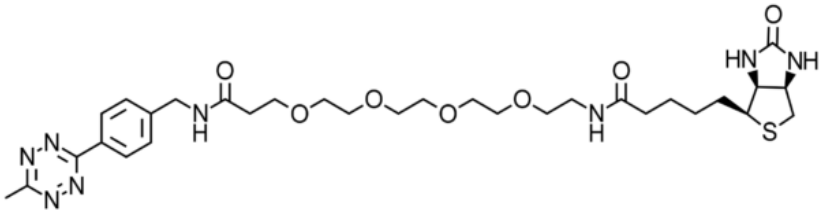
CP-6014 TCO-PEG3-Biotin



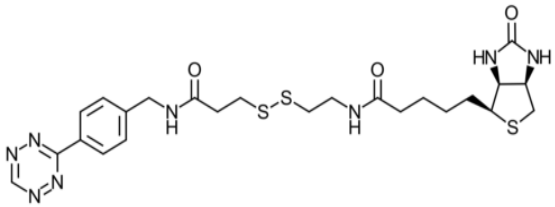
CP-6001 Tetrazine-PEG4-biotin



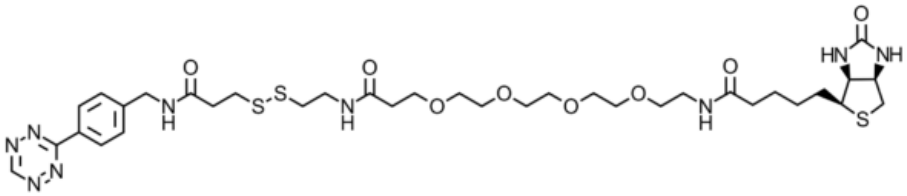
CP-6027 Methyltetrazine-PEG4-biotin



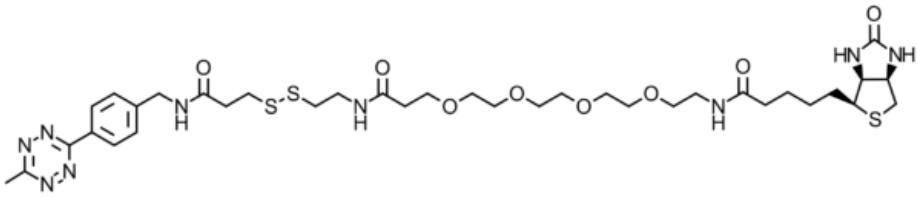
P-6081 Tetrazine-SS-Biotin



CP-6082 Tetrazine-SS-PEG4-Biotin



CP-6083 Methyltetrazine-SS-PEG4-Biotin



Applications

[PH-BB098j] Clickable Cholines for Metabolic Labeling of PhosphoLipids

4. AminoOxy/Aldehyde Ligation (Oxime Chemistry)

(introduire le schema + principes)

AminoOxy reagents

AminoOxy can react in:

NT-XLclic
AminoOxy/Aldehyde Ligation (Oxime Chemistry)

See
Aminooxy-PEO$_4$ azide #FZ8700 **See FT-JV2290**
And more AminoOxy and Aldehyde crosslinkers (for Oxime chemistry
a dual purpose linker: Acylation of the oxyamine end affords a hydroxamic acid that bears a PEG-linked azide group. Hydroxamic acids have long been known to be useful as carboxylic acid mimics. Thus, it allows the introduction of the TEG-azide functionality while retaining comparable acidity to the original carboxylic acid. Alternatively, it is possible for the oxyamine end to condense with an aldehyde, affording an oxime that bears a PEG-linked azide group. Subsequently, the azide group is available for use in a variety of well-known ligation paradigms. See FT-JV2290

Aldehyde reagents
Aldehyde can react in:
AminoOxy/Aldehyde Ligation (Oxime Chemistry)
With Amines, and many other groups.

Aldehyde-PEG$_x$	**see**
Aldehyde-PEO$_n$	**see**
Aldehyde-azides	**See FT-JV2290 (Oxime chemistry reagents)**

Related documents
[PH-BB060q] PH-Fluorescent-Click-Labeling Kits-CIK.doc
[PH-BB014c] ClickChemistry(Alkyne+Azide AAC reaction)).doc
[PH-BB014d] Cu-free-ClickChemistry(DBCO-Azide=SPAAC).doc
[PH-BB014n] Cu-free-ClickChemistry(BCN-Azide=SPAAC).doc

More technical information and ordering information
Ask Interbiotech@interchim.com for any question about these protective agents.