

Diol Biotin Probes

Diol Biotin Probes are novel sodium periodate (NaIO_4) cleavable biotinylation reagents for labeling alkyne- or azide-containing molecules. Biotinylated protein targets can be selectively captured through conventional affinity biotin - streptavidin purification, and released under mild buffer conditions with a 10 mM sodium periodate solution for subsequent identification by mass spectrometry, ELISA, dot blot, or Western blot applications.

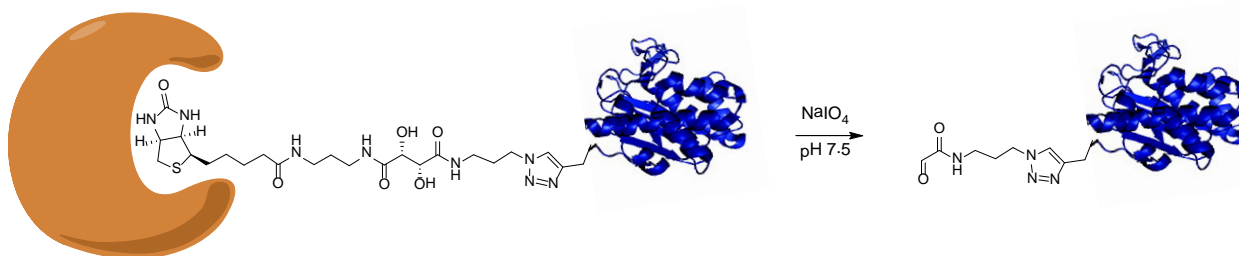


Figure 1. Schematic representation of diol biotin probe cleavage.

Enrichment Protocol for Diol Biotin Probes

This section contains general protocols using cell lysates. These protocols may be used as a starting point for optimization of your particular click chemistry procedures. The auxiliary reagents and complete kits can be ordered from Click Chemistry Tools.

Procedure for Click Reaction

- Prepare the following click solutions:
 - 100 mM THPTA ligand in aqueous buffer or water
 - 20 mM CuSO_4 in water
 - 300 mM sodium ascorbate in water
 - 2.5 mM alkyne or azide labeling reagent in water or DMSO
- For each azide or alkyne- modified protein lysate sample, add the following to a 1.5 mL microfuge tube, then vortex briefly to mix.
 - 50 μL protein lysate (1-5 mg/mL) in protein extraction buffer
 - 90 μL PBS buffer
 - 20 μL of 2.5 mM corresponding azide (or alkyne) detection reagent in DMSO or water

3. Add 10 μL of 100 mM THPTA solution, vortex briefly to mix.
4. Add 10 μL of 20 mM CuSO_4 solution, vortex briefly to mix.
5. Add 10 μL of 300 mM sodium ascorbate solution to initiate click reaction, vortex briefly to mix.
6. Protect reaction from light and allow click reaction to incubate for 30 minutes at room temperature.
7. Proteins in lysate are now click labeled and ready for downstream processing and/or analysis.

Procedure for Capture of Biotin Labeled Proteins

The capture protocol provided is optimized for our high capacity streptavidin agarose (Click Chemistry Tools, cat# 1051). The typical range for biotin labeled protein is 20-200 μg of total protein per 100 μL of settled resin. This can be scaled up or down, depending on the amount of biotin labeled protein to be captured on the resin.

1. Thoroughly mix and vortex the high capacity streptavidin agarose resin to resuspend. Transfer the desired volume of resin to a 1.7 mL microfuge tube. Use a P200 pipette with a cut tip to ensure that the resin is transferred properly.
2. Centrifuge the resin at 500 x g for 2 min to pellet the resin.
3. Carefully remove and discard the storage buffer (contains Kathon as preservative).
4. Resuspend the pellet in an equal volume of PBS (50% slurry in TBS). Vortex to mix thoroughly. Centrifuge at 500 x g for 2 min. Carefully remove and discard the wash buffer. Repeat this wash step 2 additional times.
5. After equilibration into PBS, add required volume of biotin labeled proteins (see above). The volume ratio of settled resin:labeled protein should not exceed 2:1 (for example, if using 100 μL of settled resin, do not use less than 50 μL of protein solution). After addition of biotin labeled proteins, vortex briefly and incubate for 0.5-2 hrs at room temperature with agitation.
6. After incubation, centrifuge at 500 x g for 2 min. Retain the supernatant (flow through) for analysis by UV/VIS and/or SDS-PAGE.
7. Wash the resin by the addition of 1% SDS in PBS (use a volume equal to or greater than the volume of resin). Vortex briefly to resuspend the pellet. Centrifuge at 500 x g for 2 min. Carefully remove and discard the supernatant. Repeat this wash step two additional time.
8. Wash the resin by the addition of PBS. Centrifuge at 500 x g for 2 min. Carefully remove and discard the supernatant. Repeat this wash step two additional times.
9. The resin now contains bound biotin labeled protein and is ready for cleavage/elution.

Procedure for Cleavage

1. Resuspend the washed resin in cleavage buffer (100 mM Sodium Phosphate + 10 mM NaIO₄). Note: periodate solutions should be made immediately prior to addition to resin. This solution should be covered from light.
2. Incubate at room temperature with agitation for 20 min at room temperature, covered from light.
3. Collect the eluant by centrifugation or with an empty spin column.
4. Optional: You may quench excess of NaIO₄ by the addition of 20 mM ethylene glycol or glucose.
5. Wash the resin with PBS one to three times. Retain eluant for analysis.

Samples Preparation for Gel Analysis

1. Add 600 µL methanol to 200 µL reaction mixture, vortex briefly.
2. Add 150 µL chloroform, vortex briefly.
3. Add 400 µL dH₂O, vortex briefly.
4. Centrifuge for 5 minutes at 13,000-20,000 x g, carefully remove upper aqueous layer without disturbing interface layer containing proteins. Note-upper aqueous layer may either be colorless or contain color depending on detection reagent.
5. Add 450 µL methanol, vortex briefly.
6. Centrifuge for 5 minutes at 13,000-20,000 x g to pellet protein. Carefully, remove and discard supernatant.
7. Add 450 µL methanol, vortex briefly. Repeat step 6.
8. Open the lid to microfuge tube and allow protein pellet to air-dry for at least 15 minutes.
9. Cap and store labeled sample at -20°C until ready for use.

Selected Publications

1. Yang Y., *et al.* (2013). Cleavable Trifunctional Biotin Reagents for Protein Labeling, Capture, and Release. *Chem. Commun.*, **49**:5366-06.
2. Kalbacher H., *et al.* (2013). A Periodate-Cleavable Linker for Functional Proteomics under Slightly Acidic Conditions: Application for the Analysis of Intracellular Aspartic Proteases. *J. Proteome Res.*, **12**(1):199-207.
3. Yang Y., *et al.* (2013). A Simple and Efficient Cleavable Linker for Chemical Proteomics Applications. *Mol Cell Proteomics*, **12**(1):237-244.