INSTRUCTIONS

Sodium *meta*-Periodate

20504 1161.4

Number	Description
20504	**Sodium *meta*-Periodate,** 25g Molecular Weight: 213.89 Formula: $NaIO_4$ CAS # 7790-28-5 ACS Reagent Grade white, crystalline powder **Storage:** Upon receipt store at room temperature.

Introduction

Thermo Scientific™ Sodium *meta*-Periodate is a mild oxidant for converting *cis*-glycol groups in carbohydrates to reactive aldehyde groups, which may then be targeted in detection or chemical conjugation procedures. Carbohydrate groups in glycoproteins are excellent sites for modification or cross-linking reactions because they allow the conjugation reaction to be directed away from amino acids in the polypeptide chain that may be critical for protein activity. Sodium *meta*-periodate cleaves bonds between adjacent carbon atoms that contain hydroxyl groups (*cis*-glycols), creating two aldehyde groups that are spontaneously reactive to amine- and hydrazide-activated labeling or cross-linking reagents.

Certain sugar groups are more susceptible to oxidation (cleavage) by periodate, affording the possibility of adjusting the amount of periodate to cleave particular sugars in the polysaccharide chains. For example, 1mM sodium *meta*-periodate oxidized only the bond between adjacent hydroxyls of sialic acid, a common terminal sugar residue in glycoprotein polysaccharides. On the other hand, treatment with >10mM sodium *meta*-periodate ensures oxidation of many sugar residues, including galactose and mannose.

The generated aldehydes can be used in two basic types of coupling reactions. Primary amines will form Schiff bases with aldehydes that can be stabilized to secondary amine bonds by reduction with sodium cyanoborohydride (Thermo Scientific™ AminoLink™ Reductant, Product No. 44892). Alternatively, hydrazide-activated molecules will spontaneously react with aldehydes to form fairly stable hydrazone linkages; addition of sodium cyanoborohydride will increase reaction efficiency and bond stability. For specific detection and cross-linking procedures involving periodate-oxidized polysaccharides, consult the instructions for the products listed in the Related Thermo Scientific Products Section of these instructions.

Procedure for Periodate Oxidation of Glycoprotein Carbohydrates

A. Additional Materials Required

- Oxidation Buffer: 0.1M sodium acetate buffer, pH 5.5. Neutral buffers, such as sodium phosphate, pH 7.0, can be used but are not as efficient for oxidation as slightly acidic conditions. Avoid buffers containing primary amines (e.g., Tris) or sugars, which will compete with the intended oxidation and subsequent reactions.
- Glycoprotein Solution: 0.5-10mg/mL of glycoprotein in oxidation buffer
- Dialysis cassette or desalting column (see Related Thermo Scientific Products) to purify oxidized glycoprotein from excess periodate
- Amber vial or reaction vessel that can be protected from light

B. Procedure

Note: Steps 2 and 3 are light-sensitive and must be performed in an amber vial or wrapped in foil.

1. Dissolve 0.5-10mg glycoprotein (e.g., polyclonal antibody) in 1ml of oxidation buffer.
2. Weigh 2.1mg of sodium *meta*-periodate into an amber vial and add 1ml of glycoprotein solution, gently swirling the vial until the powder dissolves (results in 10mM periodate). Alternatively, dissolve 4.3mg of periodate in 1mL of oxidation buffer (20mM periodate) and then add 1mL of glycoprotein solution.

   Note: To oxidize only sialic acid groups, add 50µL of 20mM periodate to 1mL of glycoprotein for a final concentration of 1mM periodate.
3. Protect sample from light and incubate for 30 minutes at room temperature.
4. Desalt or dialyze the sample to remove the sodium *meta*-periodate. Maintain the oxidized sample in an amine-free buffer until the intended experimental reactions with aldehyde groups have been completed.

Related Thermo Scientific Products

88941	**GlycoLink™ Immobilization Kit**
53149	**UltraLink™ Hydrazide Resin**
28020	**EZ-Link™ Biocytin Hydrazide,** 25mg
21339	**EZ-Link Biotin Hydrazide,** 100mg
21360	**EZ-Link Biotin-PEG$_4$-Hydrazide,** 50mg
22106	**EMCH,** *N*-(ε-maleimidocaproic acid)hydrazide, 50mg
22111	**KMCH,** *N*-(κ-maleimidoundecanoic acid)hydrazide, 50mg
22305	**MPBH,** 4-(4-*N*-maleimidophenyl)butyric acid hydrazide, 50mg
22301	**PDPH,** 3-(2pyridyldithio)proprionyl hydrazide, 50mg

General Reference

Hermanson, G.T. (1996). Bioconjugate Techniques, Academic Press. p. 114-116. (Available as Product No. 20002).

Product References

Kumar, P.G., et al. (2001). The autoimmune regulator (AIRE) is a DNA-binding protein. J Biol Chem 276:41357-64.

Li, C., et al. (2004). Molecular assembly of cystic fibrosis transmembrane conductance regulator in plasma membrane. J Biol Chem 279:24673-84.

Prince, L.S., et al. (1994). Rapid endocytosisis of the cystic fibrosis transmembrane conductance regulator chloride channel. PNAS 91:5192-6.

Visintin, A., et al. (2003). Lysines 128 and 132 enable lipopolysaccharide binding to MD-2, leading to toll-like receptor-4 aggregation and signal transduction. J Biol Chem 278:48313-20.