



[Curr Opin Struct Biol.](#) 2003 Oct;13(5):631-6.

Dynamic interplay between O-GlcNAc and O-phosphate: the sweet side of protein regulation.

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Abstract

Beta-O-linked N-acetylglucosamine (O-GlcNAc) is an abundant modification of cytosolic and nuclear proteins that occurs in metazoans. O-GlcNAc is dynamically processed by a unique set of enzymes that actively add and remove the modification. Functionally, O-GlcNAc appears to regulate protein stability, subcellular localization and protein-protein interactions. The modification often acts in a reciprocal manner to O-phosphate modifications of proteins and together they can synergistically control the activity of many cellular processes. Recently, O-GlcNAc has been demonstrated to play a significant role in diseases such as diabetes, cancer and neurodegeneration. For example, the increased levels of O-GlcNAc that occur in diabetes are associated with decreased insulin responsiveness in adipocytes.

PMID: 14568619 [PubMed - indexed for MEDLINE]