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Sommario/riassunto	Hundreds post-translational modifications (PTM) were characterized among which a large variety of glycosylations including O-GlcNAcylation. Since its discovery, O-GlcNAcylation has emerged as an unavoidable PTM widespread in the living beings including animal and plant cells, protists, bacteria and viruses. In opposition to N- and O-glycosylations, O-GlcNAcylation only consists in the transfer of a single N-acetylglucosamine moiety through a beta-linkage onto serine and threonine residues of proteins confined within the cytosol, the nucleus and the mitochondria. The O-GlcNAc group is provided by UDP-GlcNAc, the end-product of the hexosamine biosynthetic pathway located at the crossroad of cell metabolisms making O-GlcNAcylation a PTM which level tightly reflects nutritional status; therefore regulation of cell homeostasis should be intimately correlated to lifestyle and environment. Like phosphorylation, with which it can compete, O-GlcNAcylation is reversible. This versatility is managed by OGT (O-GlcNAc transferase) that transfers the GlcNAc group and OGA (O-GlcNAcase) that removes it. Also, like its unsweetened counterpart, O-GlcNAcylation controls fundamental processes, e.g. protein fate, chromatin topology, DNA demethylation and, as recently revealed,

circadian clock. Deregulation of O-GlcNAc dynamism may be involved in the emergence of cancers, neuronal and metabolic disorders such as Alzheimer's or diabetes respectively. This Research Topic in Frontiers in Endocrinology is the opportunity to celebrate the thirtieth anniversary of the discovery of "O-GlcNAc" by Gerald W. Hart.