

Review

Trivial nomenclature of gluco-hexose in Portuguese language and other Latin based languages

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Portuguese is ranked seventh among the world's languages in number of native speakers (over 200 million) and the universe of all Latin “daughter languages” is over 700 million people (e.g. Spanish, French, Italian and Romanian). There is confusion in Portuguese language and other Latin based languages about the use of the trivial nomenclature of gluco-hexose that sometimes is written as “glucose” other times as “glicose”. Because of that, there are implications in the nomenclature of several compounds and it is our objective to review and discuss the scientific base behind the use of this trivial name. An elucidative example is the existence of two different enzyme names: glycosylceramidase (EC 3.2.1.62) and glucosylceramidase (EC 3.2.1.45). We can conclude that in Portuguese and other Latin derived languages, it is recommended the use “glucose” to refer gluco-hexose. The term “glicose” (in English, glycose) also can be utilised but with another sense that means any monosaccharide as a structural residue.

Key words: Biochemical nomenclature, glycose, glucose.

INTRODUCTION

Historical perspective

In the beginning of the XIX century sugars were named according to its source, e.g. grape sugar for glucose, and sugarcane for saccharose. The name glucose, which is derived from the Greek “glycos” meaning sweet, was used for the first time in 1838 (McNaught, 1996). In 1866 Kekulé proposed the name “dextrose” because glucose is dextrorotatory. In the opposite side and for the similar reason, levulose (laevorotatory) was the name for fructose, the fruit sugar, in German “*fruchtzucker*”. The consensus to add the suffix -ose on the end of sugar names (derived from its source) appeared in the same epoch (McNaught, 1996), and explains for example, the name of the polysaccharide cellulose (combination of “*cellule*” plus ose) or the name of the disaccharide

lactose (combination of “*lact*” (Latin word for milk) plus ose).

The following selected transcriptions are presented to illustrate and help to understand the initial confusion on the use of glycose or glucose terms. Monneret (1857) said that glucose and glycose are synonyms. The same opinion had been expressed by Edwards (1862) and in a footnote added:

“Dumas brought together under a single name glycose the sugars from starch, grape, honey and diabetes”. Finally, Day (1860) in a margin note wrote: “Grape sugar or glycose” and in the text says: “grape-sugar, known also as glucose (which ought to be written glycose)”.

In the Portuguese language a significant number of authors use the word “glicose” to refer the trivial name of one determined aldohexose acyclic that the systematic name is gluco-hexose. The Greek word that give “glico” is “*γλυκο*” (“*ΓΛΥΚΟ*” in capital letters) that means sweet (the letter υ, upsilon, equivalent in our alphabet to *i* or *y*,

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although sometimes translated as *u*). *Gluco* is the prefix to the configuration of four consecutive asymmetric centers and originate in the trivial name glucose (IUBMB, 1992a). Other configurational prefix names such as *erythro*, *threo*, *arabino*, *lyxo*, *ribo*, *xylo* etc. have a similar origin (IUPAC, 1971; Campos, 1987; IUBMB, 1992a). The use of these prefixes is not restricted to carbohydrates but it is also used in other molecules (IUPAC-IUB, 1977) as for example, in the systematic name of the sphinganine (*D-erythro-2-amino-1,3-octadecanediol*).

GLYCOSE IS NOT GLUCOSE

The Portuguese trivial name “glicose” for gluco-hexose could be confused with a class of carbohydrates called monosaccharides. Any non-specified monosaccharide can be designated as glicose (in Portuguese “glicose”) and its polymer (polysaccharide) is denominated glycan (in Portuguese “glicano”) using the suffix -ose or -an, whatever the case. The word polysaccharide indicates a polymer of glucose residues (equal or different monosaccharides) joined by glycosidic bonds. Xylan is the name of a particular glycan consisting of xylose units joined by glycosidic bonds while cellulose (glucose polymer) is a particular glycan with a systematic name (1→4)-β-D-glucopyranan (McNaught, 1996). The oligosaccharides (unbranched and acyclical) can be named glycosyl[glycosyl]_nglycose or glycosyl[glycosyl]_nglycosides regarding the fact that they have or have not a free hemiacetal group respectively (McNaught, 1996; IUPAC-IUB, 1982).

There are several terms based on the word glicose as for example: glycosyl, glycoside, glycosidase (also called glycoside hydrolase) and glycosyltransferase. In the nomenclature of enzymes the use of the prefix glyco- or gluco- has different meanings. For instance, glycosylceramidase (EC 3.2.1.62) has a broad substrate specificity which contrasts with glucosylceramidase (EC 3.2.1.45) that only accepts glucose as a substrate as well as galactosylceramidase (EC 3.2.1.46) that catalyzes the conversion of galactose (IUBMB, 1992b). A similar pattern, based on the substrate specificity, usually distinguishes glucanase from glycanase (Gilkes et al., 1991). Finally, in the context of aminoacids metabolism, the terms glycogenic or glucogenic means respectively glycogen- or glucose-forming aminoacids (D’Andrea, 2000).

In summary, to prevent confusions and according to published recommendations from the joint commission on biochemical nomenclature (McNaught, 1996), the trivial name D-glucose should be used to name the D-glucohexose molecule and the word glicose (in Portuguese “glicose”) for monosaccharide synonymous as structural residue. These conclusions are also extensive to other Latin based languages.

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