

Glycated or glycosylated hemoglobin?

A necessary term correction

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Dear Editor:

In reference to the “Syndrome and Glycemia” article (Pinzón, 2019) published in the Medical Misquotes section, we would like to contribute some considerations on the terminology used to describe HbA1c (1). The article mentions the term “glycosylated hemoglobin,” while current evidence supports the use of “glycated hemoglobin” or “glycohemoglobin” as more accurate terms (2).

This distinction is essential, as “glycation” correctly describes the non-enzymatic biochemical process (Maillard reaction) through which glucose binds to hemoglobin. In contrast, “glycosylation” refers to a glycosyltransferase-mediated enzymatic process which forms glycosidic bonds in glycoproteins and does not correspond to HbA1c’s mechanism of formation (2,3). International organizations like the *International Union of Pure and Applied Chemistry* (IUPAC), *Federación Internacional de Química Clínica* (IFCC) and *Unión Internacional de Bioquímica* (IUB) recommend using “glycated hemoglobin” or “glycohemoglobin” to emphasize the non-enzymatic nature of this reaction (3).

Regarding the “gluc-” versus “glyc-” prefixes, while both are accepted, IUPAC recommends “gluc-” for specific references to glucose (4). However, medical dictionaries as well as DeCS/MeSH descriptors record both terms as synonymous.

This term confusion has historical roots, as “glycosylated” was used in the 70s, before the non-enzymatic mechanism was clarified, and it persists due to literal translations of “glycosylated hemoglobin” from English to Spanish (5).

Terminological precision is crucial in medical communication. We suggest standardizing the use of “glycated hemoglobin” in future publications, in accord with the current international guidelines.

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ANSWER

Dear doctors:

I appreciate your interest and interesting contributions regarding the origin of this commonly used medical term.

It is true that the biochemical process of “glycation” refers to post-translational modification of the protein

amine groups due to the action of reducing sugars, through the binding of these primary amine groups from the amino acids, peptides and proteins to the carbonyl group of a reducing sugar, without this being an enzymatic reaction. Hemoglobin glycation occurs inside the red blood cells,

whose walls are permeable to monosaccharide molecules. This reaction is not exclusive to hemoglobin but rather occurs in most of the body's proteins and has clinical relevance in some diabetic complications.

For historical reasons, this etymological error has been perpetuated and even popularized over time - in both Spanish and English - leading to the term "glycosylated hemoglobin" being registered as valid in some medical dictionaries and several clinical textbooks.

Of course, this does not preclude promoting a change to the correct term: glycated hemoglobin, based on the considerations discussed, as you suggest.

Sincerely,

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