

Glycated hemoglobin

Glycated hemoglobin (old name glycosylated hemoglobin) is formed by a non-enzymatic reaction between hemoglobin and blood glucose. The reaction is irreversible.

Glycated hemoglobin levels, therefore, reflect blood glucose levels throughout the life of the erythrocyte, about **120 days**, and are used to assess the success of diabetes treatment/compensation in the **4 - 8 weeks before** the examination. We most often determine the stable fraction of HbA_{1c}.

Terminology

- Glycated hemoglobin - the sum of carbohydrate adducts at the N-terminus or ε amino groups of lysine in hemoglobin.
- HbA₁ - the sum of various minor hemoglobin fractions (glycated), including HbA_{1c}, HbA_{1a1/a2}, HbA_{1b1/b2/b3}, HbA_{1d1/d2/d3} and HbA_{1e}.
- HbA_{1c} - glucose adduct of valine at the N-terminus of β-globin; corresponds to the so-called stable ketoamine (N- [1-deoxyfructosyl] hemoglobin).

Glycated hemoglobin can be determined by ion-exchange chromatography followed by spectrophotometry.

Evaluation

The amount of glycated hemoglobin is expressed in % of total hemoglobin or now in **mmol/mol** according to the IFCC (International Federation of Clinical Chemistry).

Reference limits

- in healthy adults up to 39 mmol/mol, (2.8 – 4.0%)^[1]
- In diabetics, HbA_{1c} concentrations of up to 45 mmol/mol (4.5 %) indicate excellent diabetes compensation, up to 60 mmol/mol (6.0 %) of acceptable and higher values of unsatisfactory diabetes compensation.^[2]

References

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Sources

1. ČEŠKA, Richard and Tomáš ŠTULC, et al. *Internal*. 2nd edition. TRITON, 2022. 870 pp. ISBN 978-80-7387-885-6.
2. ↑ Recommended diagnostic and treatment procedures for general practitioners. *Diabetes mellitus*. 2005. Also available from URL < <https://www.svl.cz/files/files/Doporucene-postupy-2003-2007/Diabetes-mellitus.pdf> >.
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2. Doporučený diagnostický a léčebný postup pro všeobecné praktické lékaře (CZ). *Diabetes mellitus*. 2005. Available from <<https://www.svl.cz/files/files/Doporucene-postupy-2003-2007/Diabetes-mellitus.pdf>>.

