
Stefano Ferri, Ph.D.,1 Seungsu Kim, M.Eng.,1 Wakako Tsugawa, Ph.D.,1,2 and Koji Sode, Ph.D.1,2

Abstract

Glycated proteins, particularly glycated hemoglobin A1c, are important markers for assessing the effectiveness of diabetes treatment. Convenient and reproducible assay systems based on the enzyme fructosyl amino acid oxidase (FAOD) have become attractive alternatives to conventional detection methods. We review the available FAOD-based assays for measurement of glycated proteins as well as the recent advances and future direction of FAOD research. Future research is expected to lead to the next generation of convenient, simple, and economical sensors for glycated protein, ideally suited for point-of-care treatment and self-monitoring applications.


Author Affiliations: 1Department of Biotechnology, Graduate School of Engineering, Tokyo University of Agriculture and Technology, Koganei, Japan; and 2Department of Technology Risk Management, Graduate School of Technology Management, Tokyo University of Agriculture and Technology, Tokyo, Japan

Abbreviations: (1,5-AG) 1,5-anhydro-D-glucitol, (f-ε-Lys) fructosyl ε-lysine, (f-α-Val) fructosyl valine, (f-α-Val-His) fructosyl valyl histidine, (FAD) flavin adenine dinucleotide, (FAOD) fructosyl amino acid oxidase, (FPOX) fructosyl peptide oxidase, (A1C) glycated hemoglobin A1c, (HPLC) high-performance liquid chromatography, (mPMS) methoxy-5-methyl phenazinium methyl sulfate

Keywords: biosensing, fructosyl amino acid oxidase, glycated proteins, hemoglobin A1c, A1C, point-of-care treatment

Corresponding Author: Koji Sode, Ph.D., Department of Technology Risk Management, Graduate School of Technology Management, Tokyo University of Agriculture and Technology, 2-24-16 Nakamachi, Koganei-shi, Tokyo 184-8588, Japan; email address sode@cc.tuat.ac.jp