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Pharmacogenomics: Way Forward to Personalised Medicine

Akhteruzzaman S[1]

[1]Sharif Akhteruzzaman, Professor, Department of Genetic Engineering & Biotechnology, University of Dhaka, Bangladesh

Abstract

Pharmacogenomics is the study of how genetic variations influence an individual's response to drugs. By integrating genomics with pharmacology, pharmacogenomics aims to optimize drug therapy, minimize adverse drug reactions, and enhance therapeutic efficacy. Genetic differences, particularly in genes encoding drug-metabolising enzymes, transporters, and targets, can significantly affect drug absorption, distribution, metabolism, and excretion. The identification of these genetic variants allows for personalised treatment strategies-often termed precision medicine-that tailor drug selection and dosage to each patient's genetic profile. Advances in genotyping technologies, such as next-generation sequencing (NGS), have accelerated the discovery of pharmacogenomic markers and facilitated their clinical application. Despite its promise, challenges remain in integrating pharmacogenomics into routine clinical practice due to issues of cost, limited awareness, and the need for robust clinical validation. Nevertheless, pharmacogenomics represents a transformative approach in modern medicine, promoting safer and more effective treatments. *[J Assoc Clin Endocrinol Diabetol Bangladesh, 2025;4(Suppl 1): S2]*

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Presenting and corresponding author: Prof. Sharif Akhteruzzaman, Professor, Department of Genetic Engineering & Biotechnology, University of Dhaka, Dhaka-1000. Email: sazaman@du.ac.bd