



## Review Article

# Pharmacogenomics

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### ABSTRACT

Pharmacogenomics is an emerging field that investigates how a person's unique genetic makeup affects their response to medications. By analyzing genetic variations, researchers can identify genetic markers that influence drug metabolism, efficacy, and adverse effects. This knowledge allows healthcare providers to personalize medication regimens, optimizing treatment outcomes while minimizing side effects. Pharmacogenomics holds great promise in enhancing drug safety, improving treatment efficacy, and reducing healthcare costs. As our understanding of genetics continues to advance, pharmacogenomics has the potential to revolutionize the practice of medicine by tailoring treatments to individual patients based on their genetic profiles. The hulong-term future of pharmacogenomics-based drug development shows that lead compounds for preclinical pharmacogenomics testing are ideally selected based on the fact that they are metabolized and eliminated by multiple alternative pathways. This review is based on an overview of pharmacogenomics and its relevance in today's scenario.

### INTRODUCTION

Pharmacogenomics is exciting because it helps us understand how our genes influence how we respond to drugs. By analyzing genetic variations, we can determine whether a person is more likely to develop side effects or whether a particular drug is effective for them. This information allows healthcare providers to tailor treatment plans and prescribe medications tailored to the individual and their genetic profile. Pharmacogenomics also helps minimize trial and error in finding the right medication and dosage, leading to better patient

outcomes. This is an exciting field that has the potential to change the way we approach healthcare!

The goal of pharmacogenomics is to personalize medicine and adapt treatment to each individual and their genetic makeup. By understanding the patient and genetic profile, healthcare providers can make more informed decisions about which drugs to prescribe and at what doses. This can lead to more effective treatment results and fewer side effects.

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One of the main advantages of pharmacogenomics is the ability to predict how a person might respond to a particular medication. Certain genetic variations can make people more or less likely to experience side effects or have a positive reaction to a drug. By identifying these genetic markers, healthcare providers can optimize their treatment plans and minimize the risk of side effects.

Pharmacogenomics is particularly important in areas such as cancer therapy, where targeted therapies can be tailored to the patient and genetic profile. By understanding the individual and the specific genetic mutations present in cancer cells, doctors can choose drugs that are likely to be more effective and avoid treatments that may be less beneficial.

In addition to improving treatment outcomes, pharmacogenomics can also help reduce healthcare costs. Appreciating the most.

The term pharmacogenomics has been used since 1959.<sup>1</sup> Pharmacogenomics was first used in relation to phenotypic variation in metabolism and response to certain drugs. This was found to be common in some drug treatments in the late 1950s.<sup>2-4</sup> After only modest success in the 1960s and 1970s, a combination of improved analytical methods, larger drug programs, and people. Gene cloning led to a much better understanding of the genetic basis of this phenotypic variation in the 1980s. As gene cloning has progressed, the term pharmacogenomics has been used in addition to pharmacogenomics to sequence the entire human genome, first used in 1997.<sup>5</sup> Essentially, the two terms are now used interchangeably, although the scope of pharmacokinetics is broader and extends to development of new drugs to target specific disease genes.

By analyzing a person and their genetic information, health professionals can predict how they might respond to certain drugs, helping to tailor treatment plans to improve effectiveness and reduce side effects. This field has the potential to

improve drug selection and dosage, making healthcare more individualized and precise.

## **NEED AND OBJECTIVES**

Pharmacogenomics aims to develop strategies for individualising drug therapy for patient the goal is to optimize drug therapy, with regard to the patient's genotype, to achieve maximum efficiency with minimal adverse effects

Describe personalized medicine and the healthcare benefits it can provide.

List and discuss human genetic variations and their roles in pharmacogenomics.

Discuss pharmacogenomics in drug development as it relates to drug metabolism.

Discuss the role pharmacogenomics has played in developing guidelines and clinical applications of drugs.

## **PLAN OF WORK –**

### **1 Title and Abstract –**

Choose a correct and Right Information title that reflects the scope of review

### **2 Introduction –**

Introduction to Pharmacogenomics acting Of Drug On Genes and its Influence On Genes And Significance of Drug On Genes State the Purpose and Scope Of Review

### **3 Literature Search –**

Its is Based On Literature Search Using Different Academic Database, Journal And Books Collect All Information Organize In Relevant Form

### **4 Benefits of Pharmacogenomics**

There are Short And Long Term Benefits Of Pharmacogenomics on the Basis Of personalized Medicine And Improved Drug Efficacy Implication Of the Genetic Testing For Pharmacogenomics on Drug Research and Development

### **5 Advantages of Pharmacogenomics**

Pharmacogenomics Advantages are Depend On Selection Of Drugs , optimum Dosage , Better treatment outcomes , cost effectiveness

## **CONCLUSION: -**



Pharmacogenomics is a field of research that focuses on how an individual and their genetic makeup can influence their response to drugs. This could revolutionize personalized medicine by tailoring drug therapy to the individual and their genetic profile, improving both drug efficacy and safety. However, the widespread clinical practice of pharmacogenomics continues to face challenges related to cost, availability, and the need for further research and standardization. However, it holds great promise for improving patient outcomes and minimizing side effects in the future.

### REVIEW OF LITERATURE:-

1. Pharmacogenomics : challenges and opportunities DM Roden, RB Altman, NL Benowitz...- *Annals of internal* 2006 –
2. Pharmacogenomics knowledge for personalized medicine M Whirl-Carrillo, EM McDonough...- *Clinical...*,2012
3. .Pharmacogenomics ans individualized drug therapy M Eichelbaum , M ingelman –subdberg.- *Annu. Rev ...*, 2006
4. Recent progress in automatically extracting information from the Pharmacogenomics literature Y Garten, A Coulet, RB Altman - *Pharmacogenomics*, 2010
5. Potential role of Pharmacogenomics in reducing adverse drug reactions
6. KA Philips, DL veenstra, Eoren, JK lee, W sadee ,*Jama* 2001
7. A critical analysis of barriers to the cl implementation of pharmacogenomics RA McKinnon , MB Ward ,MJ Sorich - *Therapeutic and clinical risk...*,2007
8. Drug target Pharmacogenomics : an overview JA Johnson - *American journal of Pharmacogenomics* , 2001
9. Pharmacogenomics and personalized medicine E Cecchin ,G stocco.
10. Cost effectiveness of Pharmacogenomics : a critical and systematic review WB

wrong, JJ Carlson, R Thariani, D L Veenstra- *Pharmacogenomics* 2010

11. Systematic review of Pharmacogenomics and adverse drug reactions in pediatric oncology patients R Conyers , S Devaraj, D Elliot - *pediatric Blood & Cancer*, 2018
12. Pharmacogenomics for primary care : an overview V Rollin son, R Turner, M Pirmohamed - *Genes* ,2020
13. Clinical implementation of Pharmacogenomics for personalized precision medicine: barriers and solution ME Klein , MM Parvez, JG shin-*Journal of pharmaceutical sciences*,2017
14. *Int J Biomed Investig.* Author manuscript; available in PMC 2020 May 28. Published in final edited form as:*Int J Biomed Investig.* 2018; 1(2): 111. Published online 2018

### REFERENCES

1. Thorn CF, Klein TE, Altman RB (2010) Pharmacogenomics and bioinformatics: pharm GKB. *Pharmacogenomics* 11:501–505
2. Mancinelli L, Cronin M, Sadée W. Pharmacogenomics: the promise of personalized medicine. *AAPS PharmSci.* 2000;2(1):E4-E.
3. Roses, A. D. Pharmacogenetics and drug development: the path to safer and more effective drugs. *Nature Rev. Genet.* 5, 645–656 (2004).
4. Roses, A. D. Pharmacogenetics and drug development: the path to safer and more effective drugs. *Nature Rev. Genet.* 5, 645–656 (2004).
5. Haga, S. B., & Burke, W. Using pharmacogenetics to improve drug safety and efficacy. *Journal of the American Medical Association* 291, 2869–2871 (2004)
6. Lauschke, V.M., Milani, L. & Ingelman-Sundberg, M. Pharmacogenomic biomarkers for improved drug therapy—recent progress



- and future developments. *AAPS J.* 20, 4 (2018).
7. Ji, Y., Si, Y., McMillin, G.A. & Lyon, E. Clinical pharmacogenomics testing in the era of next generation sequencing: challenges and opportunities for precision medicine. *Expert Rev. Mol. Diagn.* 18, 411–421 (2018).
  8. Weinshilboum, R., & Wang, L. Pharmacogenomics: Bench to bedside. *Nature Reviews Drug Discovery* 3, 739–748 (2004) doi:10.1038/nrd1497
  9. Roses, A. D. Pharmacogenetics and the practice of medicine. *Nature* 405, 857–865 (2000).
  10. Patel JN. Application of genotype-guided cancer therapy in solid tumors. *Pharmacogenomics*.
  11. . Harris LN, Ismaila N, McShane LM, et al. Use of Biomarkers to Guide Decisions on Adjuvant Systemic Therapy for Women With Early-Stage Invasive Breast Cancer: American Society of Clinical Oncology Clinical Practice Guideline. *J Clin Oncol.* 2016;34
  12. Lee AM, Shi Q, Pavey E, et al. DPYD variants as predictors of 5- fluorouracil toxicity in adjuvant colon cancer treatment (NCCTG N0147) *J Natl Cancer Inst.* 2014;106
  13. Ji, Y., Si, Y., McMillin, G.A. & Lyon, E. Clinical pharmacogenomics testing in the era of next generation sequencing: challenges and opportunities for precision medicine. *Expert Rev. Mol. Diagn.* 18, 411–421 (2018)
  14. Lauschke, V.M., Milani, L. & Ingelman-Sundberg, M. Pharmacogenomic biomarkers for improved drug therapy—recent progress and future developments. *AAPS J.* 20, 4 (2018).
  15. *Int J Biomed Investig.* Author manuscript; available in PMC 2020 May 28. Published in final edited form as: *Int J Biomed Investig.* 2018; 1(2): 111. Published online 2018 .
  16. Wang L, McLeod H, Weinshilboum RM. Genomics and drug response. *N Engl J Med.* 2011
  17. Food and drug administration. Table of Pharmacogenomics Biomarkers in Drug Labelling with Labelling Text
  18. Sorich M, Coory M. Interpreting the clinical utility of a pharmacogenomics marker based observational association studies. *Pharmacogenomics*
  19. *Fertil Steril.* Author manuscript; available in PMC 2019 Jun 1. Published in final edited form as: *Fertil Steril.* 2018.
  20. Ventola CL. Pharmacogenomics in clinical practice: reality and expectations. *P T.* 2016
  21. *Int J Biomed Investig.* Author manuscript; available in PMC 2020 May 28. Published in final edited form as: *Int J Biomed Investig.* 2018; 1(2): 111. Published online 2018 May 27
  22. Cost effectiveness analyses of pharmacological treatments in heart failure Audrey Huili Lim, Nusaibah Abdul Rahim, Jinxin Zhao, S. Y. Amy Cheung and Yu-Wei Lin
  23. *Clin Pharmacol Ther.* Author manuscript; available in PMC 2013 Apr 1. Published in final edited form as: *Clin*
  24. *J Clin Med Res.* 2009 Oct; 1(4): 191–194. Published online 2009 Oct 16

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