PHARMACOGENOMICS

GENOMICS

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DEFINITION

Studies how **the genome** can affect **drug response** in patients by correlating gene expression and/or single nucleotide polymorphisms (SNPs) with drug efficiency or toxicity.
HISTORY AND CONCEPT

- Pythagoras and fava beans—510 BC
- Wilhelm Johannsen—1909
- Friedrich Vogel—1959
- CYP2D6 gene—1987

Genotype
Phenotype
Pharmacogenomics
HISTORY AND CONCEPT

Human Genome Project - 2001

SNPs

Single Nucleotide Polymorphisms

HapMap Project - 2009

Selection of drug treatment according to an individual genetic characteristics

SNP PROFILING
HISTORY AND CONCEPT

“ONE SIZE FITS ALL” VS. PERSONALIZED MEDICINE

- Responds to alternative medication
- Responds to higher dose
- Responds to lower dose
- Responds to normal dose
AIM

Increase the likelihood of **positive outcomes** and optimize drug therapy by selecting the **right drug** and the **right dose**.
EXAMPLE

Cytochrome p450 family

Family of liver enzymes that break down more than 30 types of drugs

Determines how a patient metabolizes certain drugs

Metabolizer status
EXAMPLE

CODEINE
Opioid drug that is used to moderate pain

CYP2D6 enzyme

TOXICITY

METABOLIZATION

NO OPIOID EFFECTS

MORPHINE

Neonates and children

08
PHARMACOGENOMIC TESTING

TESTS INCLUDE PHARMACOKINETICS AND PHARMACODYNAMICS

CAN WE RELY ON PGx TESTS?

Not assessed tests and lack of clinical evidence
FUTURE APPROACH

Future implementation of pharmacogenomics depends on:

- Cost of sequencing
- Validation of PGx tests
- Guidelines

Evidence that pharmacogenomics will be an expanding component of precision medicine.
**CONCLUSIONS**

One size does not fit all

There is an evident growth in Pharmacogenomics testing

Pharmacogenomics is essential to improve the effectiveness of medications.

Despite the challenges that it presents, pharmacogenomics will be very present in diagnosis and prescribing in the future.


THANK YOU FOR YOUR ATTENTION