The cytochrome P450 isoenzyme and some new opportunities for the prediction of negative drug interaction in vivo

Sychev D.A.

Ashraf G.M.

Svistunov A.A.

Maksimov M.L.

Tarasov V.V.

Chubarev V.N.

Otdelenov V.A.

Denisenko N.P.

Barreto G.E.

Aliev G.

Cytochrome (CYP) 450 isoenzymes are the basic enzymes involved in Phase I biotransformation. The most important role in biotransformation belongs to CYP3A4, CYP2D6, CYP2C9, CYP2C19 and CYP1A2. Inhibition and induction of CYP isoenzymes caused by drugs are important and clinically relevant pharmacokinetic mechanisms of drug interaction. Investigation of the activity of CYP isoenzymes by using phenotyping methods (such as the determination of the concentration of specific substrates and metabolites in biological fluids) during drug administration provides the prediction of negative side effects caused by drug interaction. In clinical practice, the process of phenotyping of CYP isoenzymes and some endogenous substrates in the ratio of cortisol to 6?-hydroxycortisol in urine for the evaluation of CYP3A4 activity has been deemed to be a quite promising, safe and minimally invasive method for patients nowadays.

Cytochrome CYP450

Drug interaction

Drug metabolism

Phenotyping

alprazolam

atorvastatin

caffeine

celecoxib

clozapine

codeine

cytochrome P450 1A2

cytochrome P450 2C19

cytochrome P450 2C9

cytochrome P450 2D6

cytochrome P450 3A4

dextromethorphan

diazepam

hexobarbital

losartan

metoprolol

nortriptyline

omeprazole

pantoprazole

paracetamol

phenacetin

phenytoin

pravastatin

propafenone

testosterone

theophylline

tolbutamide

unindexed drug

warfarin

zidovudine

6 beta-hydroxycortisol

cytochrome P450

hydrocortisone

isoenzyme

drug metabolism

drug transformation

enzyme activity

enzyme inhibition

enzyme specificity

human

hydrophilicity

hydrophobicity

in vitro study

in vivo study

phenotype

prediction

protein expression

protein function

Review

single nucleotide polymorphism

analogs and derivatives

biotransformation

drug interaction

metabolism

Biotransformation

Cytochrome P-450 Enzyme System

Drug Interactions

Humans

Hydrocortisone

Isoenzymes

Phenotype