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P117. THE ROLE OF CYP ENZYMES IN DRUG METABOLISM

Hasan ÇOBANKAYA
Hacettepe University, Ankara, TÜRKİYE

Drug metabolism, has become a major pharmacological science with particular relevance to toxicology. Among the major enzyme systems affecting drug metabolism, cytochrome P450 enzymes are dominant. The cytochrome P450 enzymes, abbreviated CYPs (for cytochrome Ps), are a very large group of enzymes that belongs to heme-coupled monooxygenases and catalyze drug, xenobiotic and endogenous compound oxidations, playing a key role in deactivation, activation, detoxification and toxification of most drugs.

The CYPs are encoded by the CYP gene superfamily and there are 12 gene families of functionally related proteins comprising this group of enzymes. So far more than 55 CYP genes have been described in the human genome and these are classified in families and subfamilies. Their naming and classification relate to their degree of amino acid sequence homology. CYPs are found not only in liver but also in the gastrointestinal tract, lung, kidney, skin, placenta, prostate, and other tissues.

CYP enzymes are responsible for metabolism of more than 80% of all commonly prescribed and over-the-counter medications. Since most of the CYP enzyme isoforms are polymorphic in nature, ethnic and inter-individual genetic differences may greatly affect the metabolism of some clinically important drugs. These differences may cause therapeutic failure, adverse drug reactions or even toxicity and death. In case of such drug toxicity events forensic toxicological approaches may be of great value for evaluating the possibilities.

In this study various isoforms of CYP enzymes will be reviewed, common mechanisms of CYP-mediated reactions will be explained and clinically important drug substrates of CYP enzymes will be listed. The factors that influence activity of various CYP enzymes will also be reviewed in this study.