

Introduction to Phase I and II metabolisms

Phase I metabolism

Phase I reactions include oxidation, reduction, and hydrolysis that are catalyzed by several enzymes including cytochrome P450. Phase I reactions convert the parent drug into more polar metabolites through introduction or exposing OH, -SH, or -NH₂ functional groups. This results in activation or inactivation of the parent drug.

Phase II metabolism

Phase II reactions involve conjugation of the drug with endogenous charged compounds such as glutathione, glucuronide, and glycine. The conjugated metabolite has a larger size and increased water solubility, which allows for secretion into the bile or urine. Phase II reactions are catalyzed by transferases that require co-factors (endogenous) for the reactions. For example, glucuronosyltransferase (UGT) transfers UDP-glucuronic acid to the drug to create a conjugated compound. Medications metabolized by UGT include acetaminophen, morphine, lamotrigine, oxazepam, and temazepam.