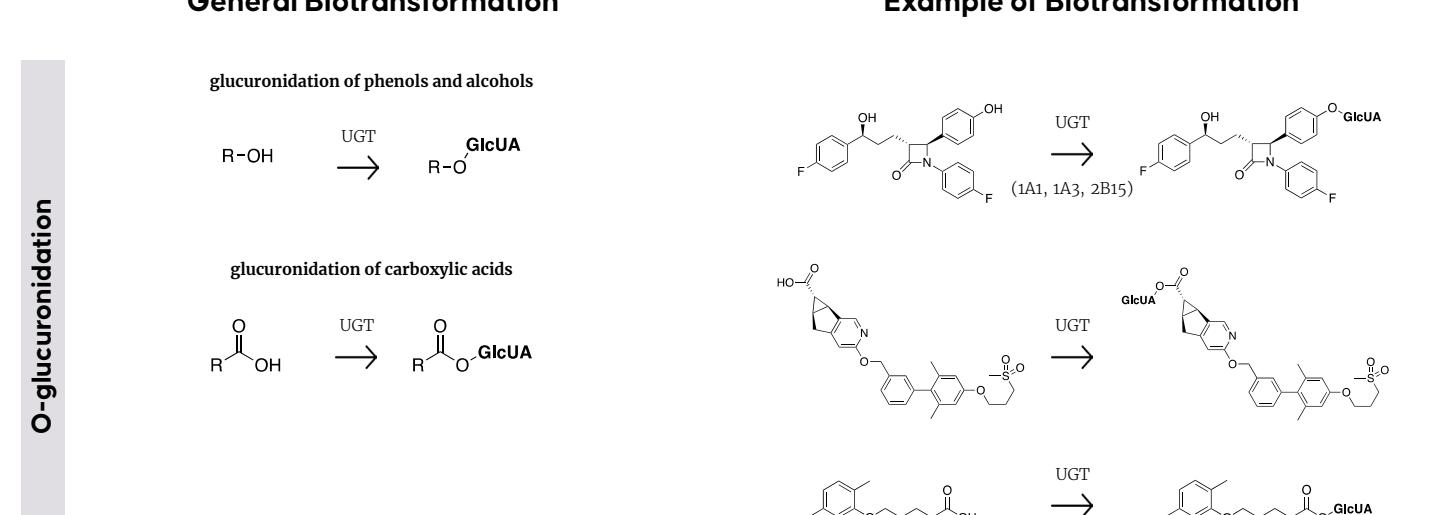


## Phase II Drug Metabolism

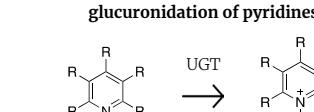
### Glucuronidation



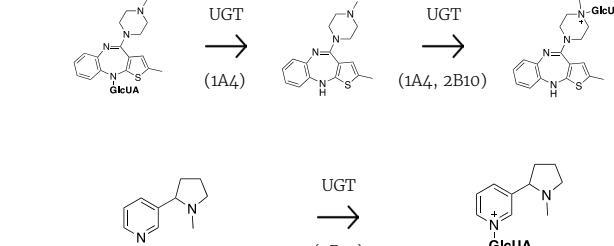
#### General Biotransformation

O-glucuronidation

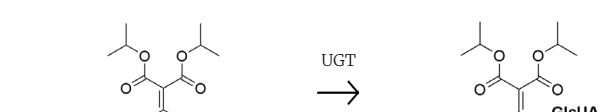
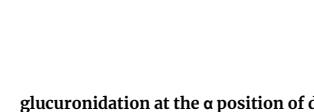
glucuronidation of phenols and alcohols



#### Example of Biotransformation

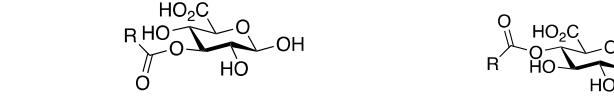


glucuronidation of carboxylic acids

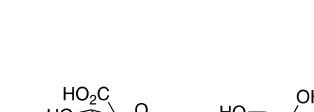


N-glucuronidation

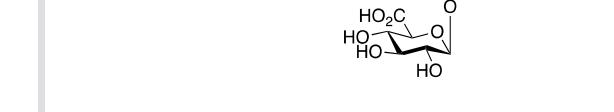
glucuronidation of 1° and 2° amines



glucuronidation of 3° amines

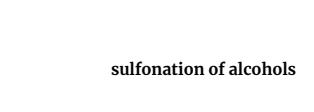


glucuronidation of pyridines

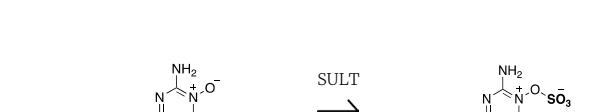


S-glucuronidation

glucuronidation of thiols



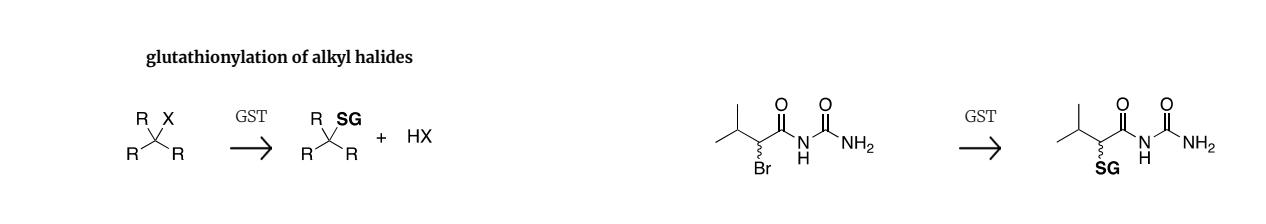
#### Glucuronidation at the $\alpha$ position of diketones



glucuronidation of alkynes

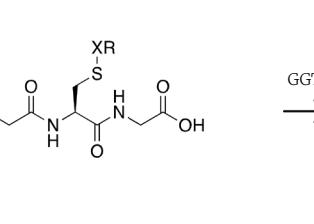


### Glucuronidation, Acyl Migration

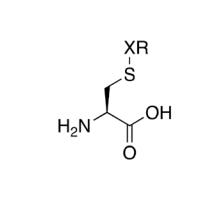


### Diglucuronides

Discrete



Linked



A C-1 linked diglucuronide. C-2, C-3, and C-4 linked diglucuronides are also possible.

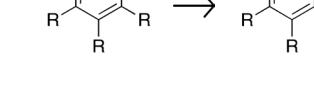
### Sulfonation



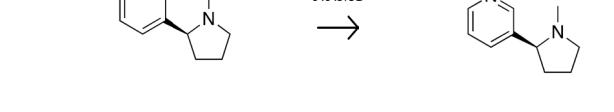
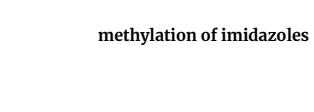
#### General Biotransformation

#### Example of Biotransformation

sulfonation of alcohols



sulfonation of aromatic N-oxides

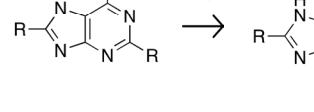


### Glutathione Conjugation

General Biotransformation

#### General Biotransformation

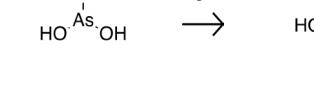
glutathionylation of epoxides



#### Example of Biotransformation



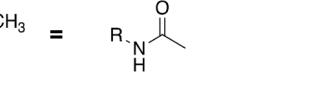
glutathionylation of  $\alpha, \beta$ -unsaturated carbonyls



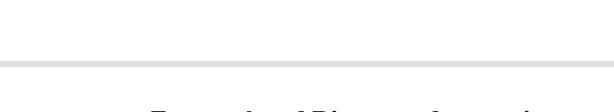
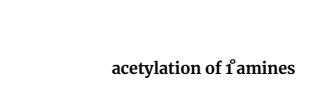
glutathionylation of alkyl halides



glutathionylation of metal halides



glutathionylation of quinone imines



#### Metabolism of Glutathione Conjugates to Mercapturic Acid Conjugates

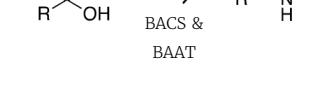


### Methylation

General Biotransformation

#### General Biotransformation

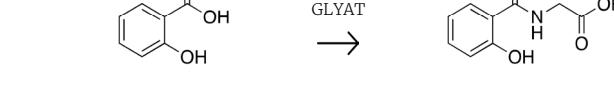
methylation of catechols



#### Example of Biotransformation



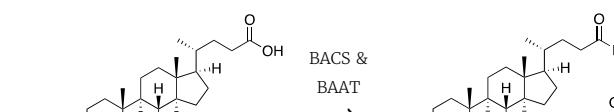
methylation of hydroxyindoles



methylation of  $\alpha$ ,  $\beta$ -amines



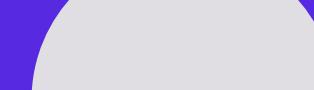
methylation of pyridines



methylation of imidazoles



methylation of thiols



methylation of thiopurines



$\text{As-OH} \xrightarrow{\text{AS3MT}} \text{As-O-CH}_3$



$\text{As-OH} \xrightarrow{\text{AS3MT}} \text{As-O-CH}_3$



### Acetylation



#### General Biotransformation

#### Example of Biotransformation

acetylation of  $\alpha$  amines



acetylation of hydrazines



### Amino Acid Conjugation



#### General Biotransformation

#### Example of Biotransformation

glycine conjugation



glutamine conjugation



taurine conjugation



drug  
hunter

drughunter.com