

ENVR/TOXC 442 Fall 2011

Metabolism of Xenobiotics

I. General Overview

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- **Metabolism:**

Chemical reactions carried out by and in living systems

- Breakdown of organic matter (eg food) to release energy (**catabolism**)
- Construction of cell components (eg carbohydrates, proteins, lipids, nucleic acids, other macromolecules) using energy (**anabolism**)
- Carried out by **enzymes** (+ co-factors)
- Essential to life
- No metabolism = no life

- **Xenobiotic**

Substance foreign (xenos = foreign) to life (bios)

Chemical found in a living system which is not “naturally” present in that organism.

- Drugs (Drug metabolism)
- Environmental pollutants
- Not produced by organism
- Not useful to organism
- Metabolism carried out by **enzymes** (+ co-factors)
- Metabolism serves to eliminate xenobiotics
- Fundamental to toxicology

Why?

- Importance in Pharmacology/Therapeutics
- Importance in Toxicology
- Importance in Environmental Protection
- Need to consider properties (therapeutic and/or toxic) of metabolites as well as those of the parent compound
- Need to know
 - What metabolites are formed
 - Where they are formed
 - Kinetics of formation
 - Kinetics of elimination