Liver detoxification pathways and supportive nutrients

**Toxins**
- Lipid-soluble (nonpolar) toxins are stored in adipose (fat) tissue and contribute to increased/mobilized toxin load with weight loss.

**Reactions**
- Oxidation
- Reduction
- Hydrolysis
- Hydration
- Dehalogenation

**Nutrients Used**
- Riboflavin (Vit A)
- Niacin (Vit B3)
- Pyridoxine (Vit B6)
- Folic acid
- Vitamin B12
- Glutathione
- Branched-chain amino acids
- Flavonoids
- Phospholipids

**Antioxidant Protective Nutrients and Plant Derivatives**
- Carotenes (Vit A)
- Ascorbic acid (Vit C)
- Tocopherols (Vit E)
- Selenium
- Copper
- Zinc
- Manganese
- Coenzyme Q10
- Thiols (found in garlic, onions, cruciferous vegetables)
- Bioflavonoids
- Silymarin
- Pycnogenol

**Intermediary metabolites**
- More polar
- More water-soluble

**Reactions**
- Sulfation
- Glucuronidation
- Glutathione conjugation
- Acetylation
- Amino acid conjugation
- Methylation

**Nutrients Used**
- Glycine
- Taurine
- Glutamine
- N-acetylcycteine
- Cysteine
- Methionine

**Excretory derivatives**
- Serum
- Bile
- Feces/stool
- Kidneys
- Urine

**Endotoxins**
- End products of metabolism
- Bacterial endotoxins

**Exotoxins**
- Drugs (prescriptions, OTC, recreational)
- Chemicals
- Agricultural
  - Food additives
  - Household
  - Pollutants/contaminants
- Microbial

**Secondary tissue damage**