Pharmacology
Review of the Inflammatory Process

Objectives
- Review the chemical reactions that occur during the inflammatory response
- Discuss the role of prostaglandins in the inflammatory response
- Discuss the role of NSAIDS on prostaglandin synthesis
- Discuss the COX-1 – COX-2 pathway

Inflammation
- Localized tissue response to injury or illness
- Produces local sensations
  - swelling
  - redness
  - heat
  - pain

Inflammation
- Initiated by tissue damage
- Tissue damage alters the chemical composition of the interstitial fluid
- The changes in the interstitial environment trigger the complex process of inflammation

Arachidonic Acid
- Produced as a by-product of the inflammatory response
Eicosanoids
- Lipids derived from arachidonic acid
- 2 major classes
  - prostaglandins
  - leukotrienes

Arachidonic Acid Pathway

Prostaglandins
- Chemical messengers
- Produced in most bodily tissues
- They work locally
  - they typically *do not* travel through the circulatory system to reach their target cells
- Referred to as local hormones
- Extremely powerful & effective in small quantities

Prostaglandins
- Released by damaged tissues
  - powerful mediators of the vascular events that occur during the inflammatory process
    - increase vascular permeability
    - increase blood flow through vasodilation
    - produce platelet aggregation
  - stimulate nerve endings to produce the sensation of pain
  - stimulate contraction of smooth muscle (uterus/bronchi)
  - reduce gastric acidity

Role of NSAIDs in the Inflammatory Process
- Inhibit the cyclooxygenase enzyme
  - prevent or reduce the synthesis of prostaglandins
    - inhibit or reduce pain
    - inhibit or reduce swelling
    - increase GI acidity
    - decrease platelet aggregation

Role of NSAIDs in the Inflammatory Process
- Positive effects produced
  - ↓pain
  - ↓inflammation
- Negative side effects
  - ↑gastric upset
    - Often times antacids are prescribed in conjunction with NSAIDs
  - ↑incidence of ulcers
  - possible ↓wound healing

The COX-1 COX-2 Pathway
COX-2 Selective NSAIDs

- Celebrex
- Vioxx

What questions do you have?