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Nonsteroidalanti-inflammatory drugs. Non-selectiveCOXinhibitors.Selective COXinhibitors.

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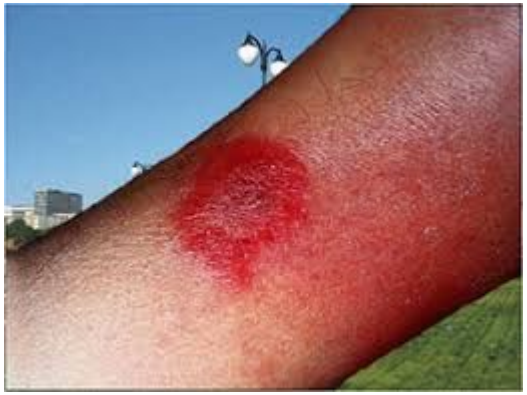
Inflammation



Inflammation is part of the complex biological response of body tissues to harmful stimuli, such as pathogens, damaged cells, or irritants, and is a protective response involving immune cells, blood vessels, and molecular mediators.

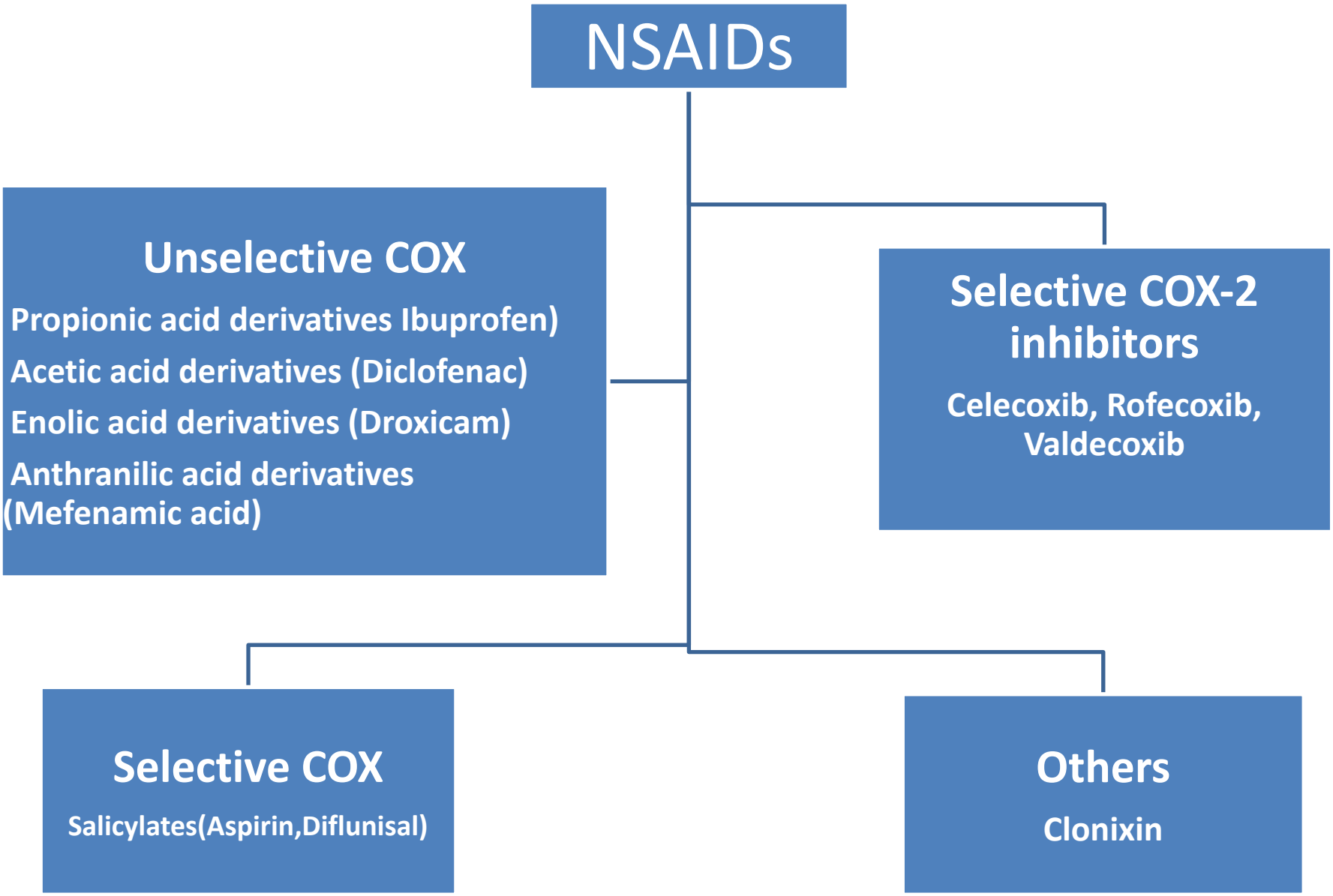
The function of inflammation is to eliminate the initial cause of cell injury, clear out necrotic cells and tissues damaged from the original insult and the inflammatory process, and initiate tissue repair

What is NSAIDs?

Nonsteroidal anti-inflammatory drugs (NSAIDs) are a drug class that reduce pain, decrease fever, prevent blood clots and, in higher doses, decrease inflammation.

Side effects depend on the specific drug, but largely include an increased risk of gastrointestinal ulcers and bleeds, heart attack and kidney disease

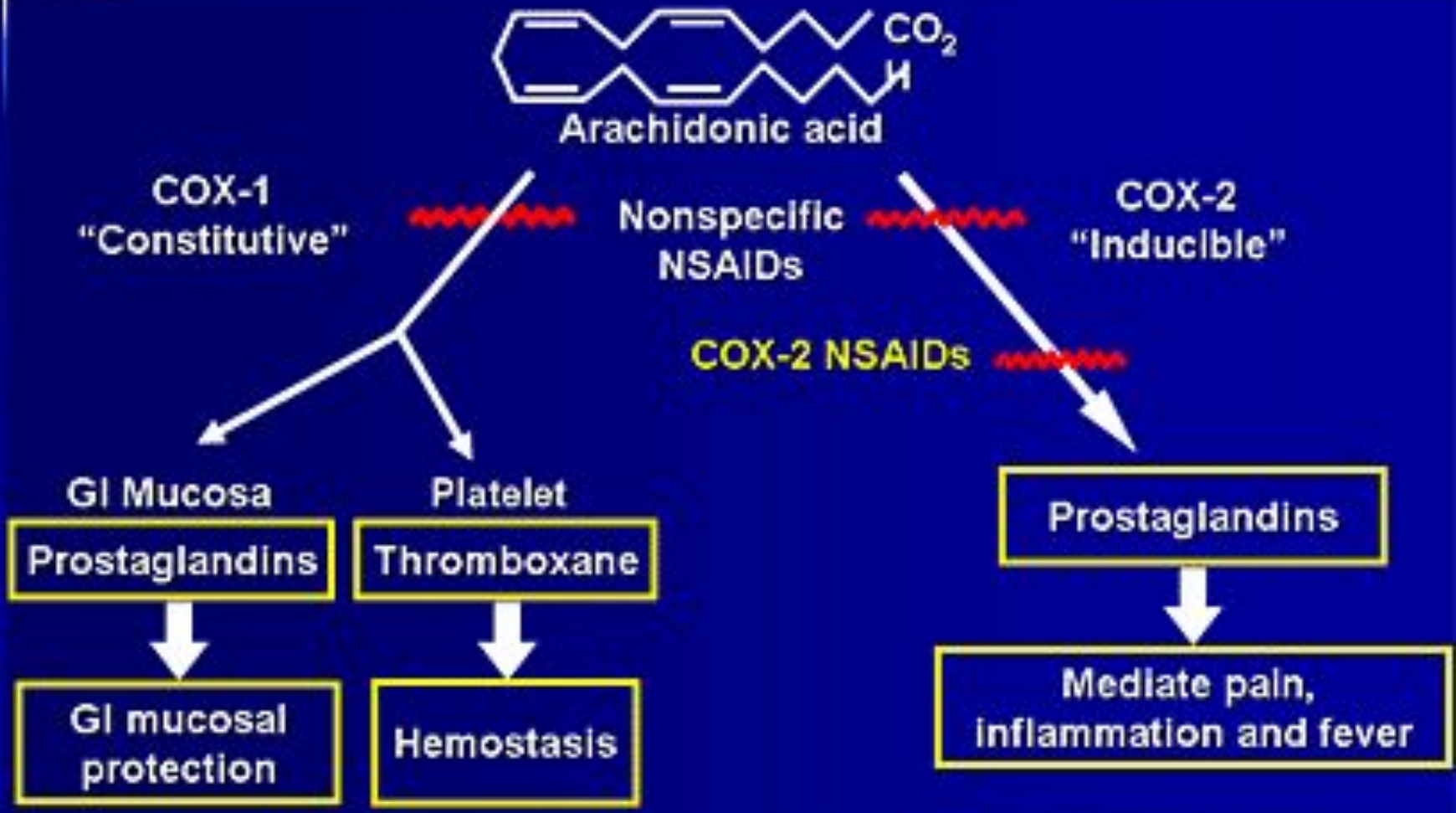
Classification



Mechanism of action

- Most NSAIDs act as nonselective inhibitors of the enzyme cyclooxygenase (COX), inhibiting both the cyclooxygenase-1 (COX-1) and cyclooxygenase-2 (COX-2) isoenzymes. This inhibition is competitively reversible. COX catalyzes the formation of prostaglandins and thromboxane from arachidonic acid (itself derived from the cellular phospholipid bilayer by phospholipase A_2). Prostaglandins act (among other things) as messenger molecules in the process of inflammation.

Mechanism of Action of NSAIDs: New Concept



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Medical uses

- NSAIDs are usually used for the treatment of acute or chronic conditions where pain and inflammation are present.
- NSAIDs are generally used for the symptomatic relief of the following conditions:
  - Osteoarthritis
  - Low back pain
  - Headache
  - Migraine

Adverse effects

- The widespread use of NSAIDs has meant that the adverse effects of these drugs have become increasingly common. Use of NSAIDs increases risk of a range of gastrointestinal (GI) problems, kidney disease and adverse cardiovascular events
- NSAIDs, like all drugs, may interact with other medications. For example, concurrent use of NSAIDs and quinolones may increase the risk of quinolones' adverse central nervous system effects, including seizure.

Adverse effects. Combinational risk

- If a COX-2 inhibitor is taken, a traditional NSAID should not be taken at the same time.
- In addition, people on daily aspirin therapy (e.g., for reducing cardiovascular risk) must be careful if they also use other NSAIDs, as these may inhibit the cardioprotective effects of aspirin.

Adverse effects. Cardiovascular

- NSAIDs, aside from aspirin, increase the risk of myocardial infarction and stroke. This occurs at least within a week of use. They are not recommended in those who have had a previous heart attack as they increase the risk of death.
- NSAIDs aside from (low-dose) aspirin are associated with a doubled risk of heart failure in people without a history of cardiac disease.

Adverse effects. Gastrointestinal

- The main adverse drug reactions associated with NSAID use relate to direct and indirect irritation of the gastrointestinal (GI) tract. NSAIDs cause a dual assault on the GI tract: the acidic molecules directly irritate the gastric mucosa, and inhibition of COX-1 and COX-2 reduces the levels of protective prostaglandins. Inhibition of prostaglandin synthesis in the GI tract causes increased gastric acid secretion, diminished bicarbonate secretion, diminished mucus secretion and diminished trophic effects on the epithelial mucosa.

Adverse effects. Inflammatory bowel disease

- NSAIDs should be used with caution in individuals with inflammatory bowel disease (e.g., Crohn's disease or ulcerative colitis) due to their tendency to cause gastric bleeding and form ulceration in the gastric lining.

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