

Eicosanoids

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- Several Classes of Signal Molecules:
Prostaglandins, Thromboxanes,
Leukotrienes
- Produced In Almost all Tissues
- Wide Range of Responses
- Local Hormones
- Very Potent
- Short Half Life
- Not Stored

Some Functions of the Prostaglandins and Thromboxanes

PGI₂, PGE₂, PGD₂

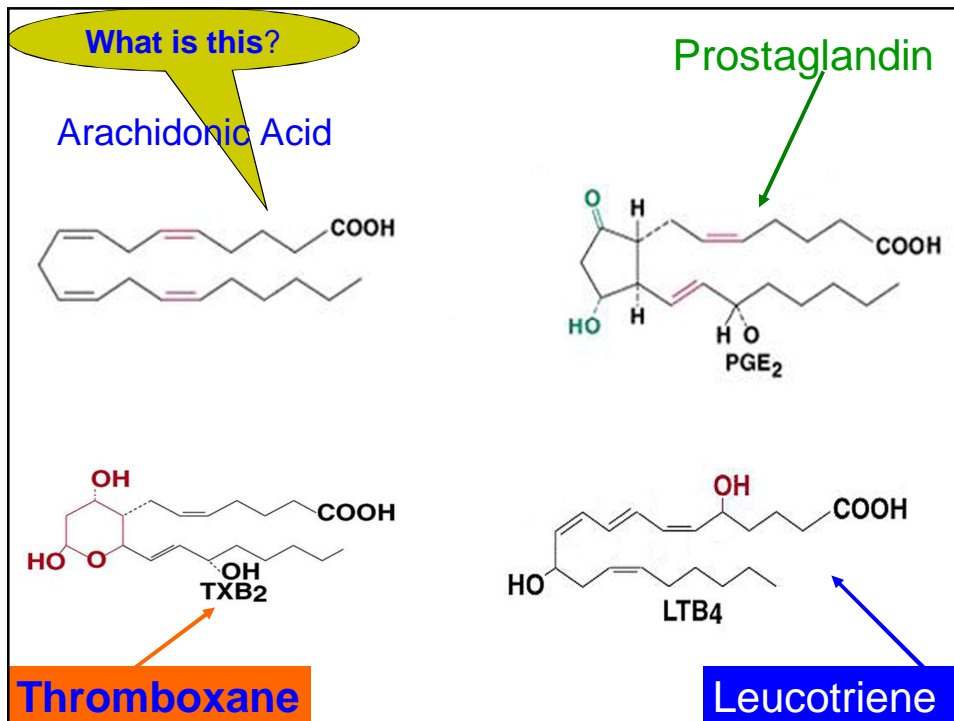
- Increase
 - Vasodilation, cAMP
- Decrease
 - Platelet Aggregation
 - Leucocyte Aggregation
 - Lymphocyte Migration

PGF_{2α} Increases

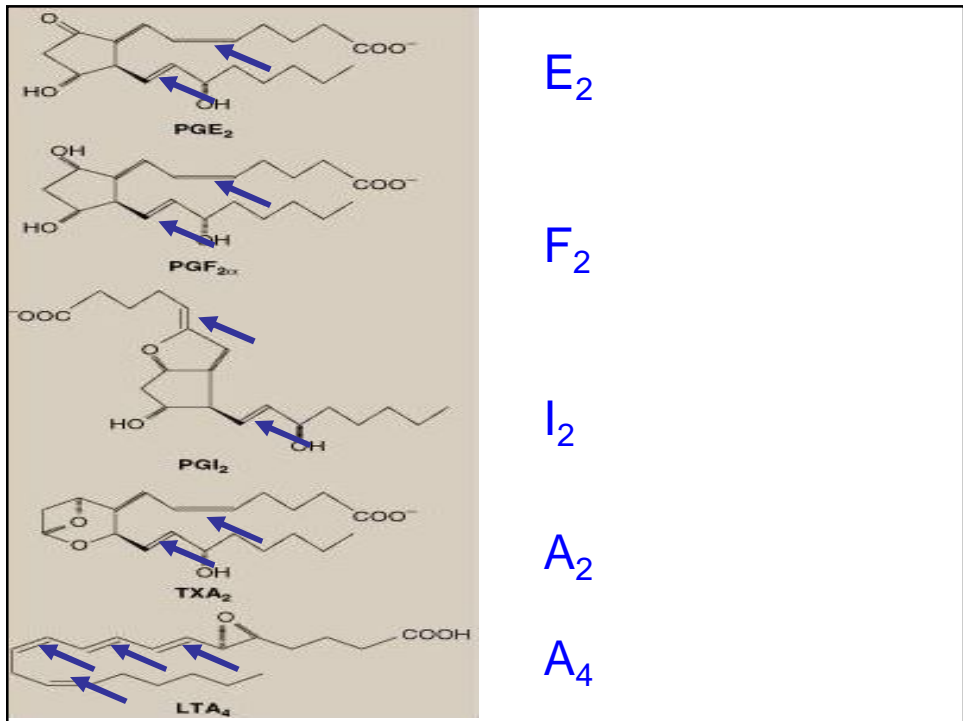
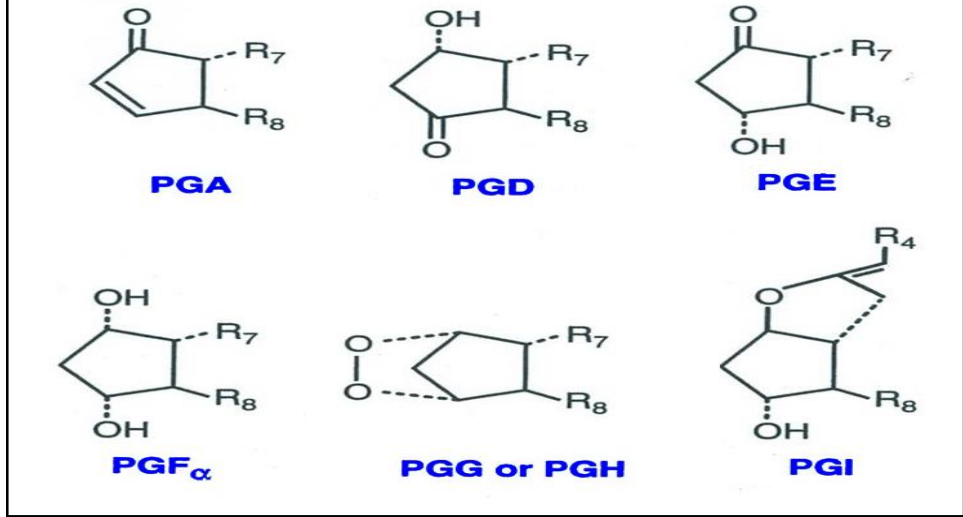
- Vasoconstriction
- Bronchoconstriction
- Smooth Muscle Contraction

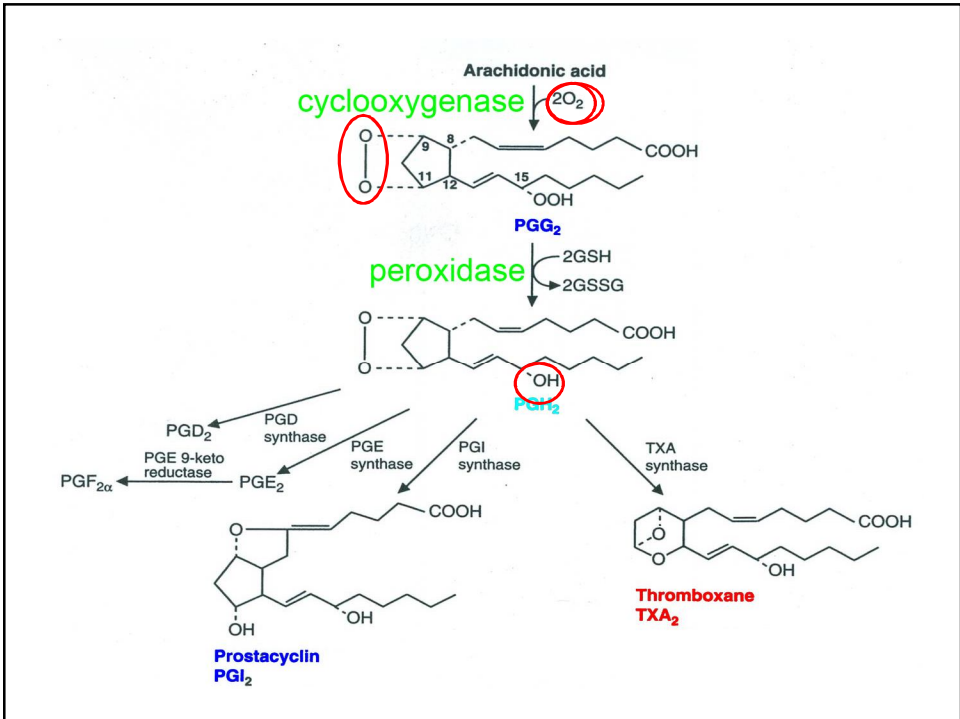
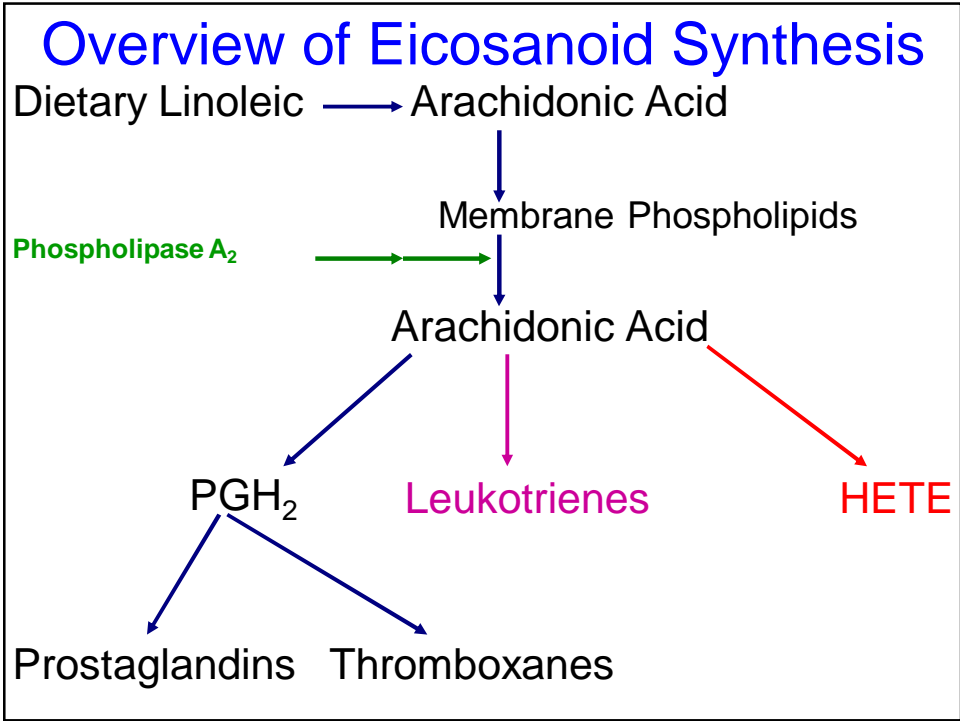
Thromboxane Increases

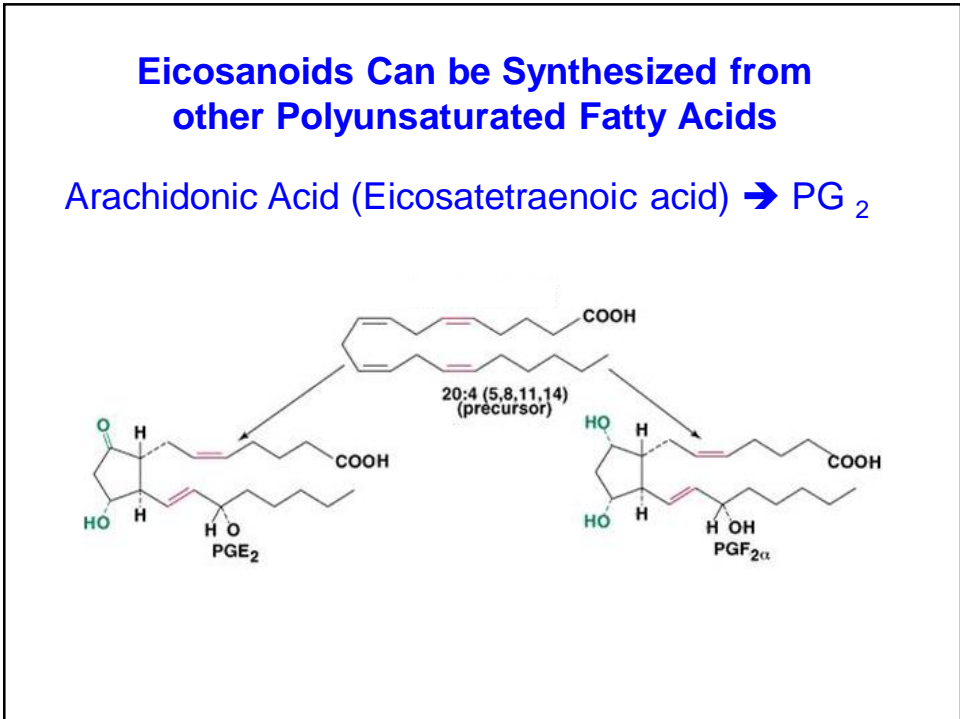
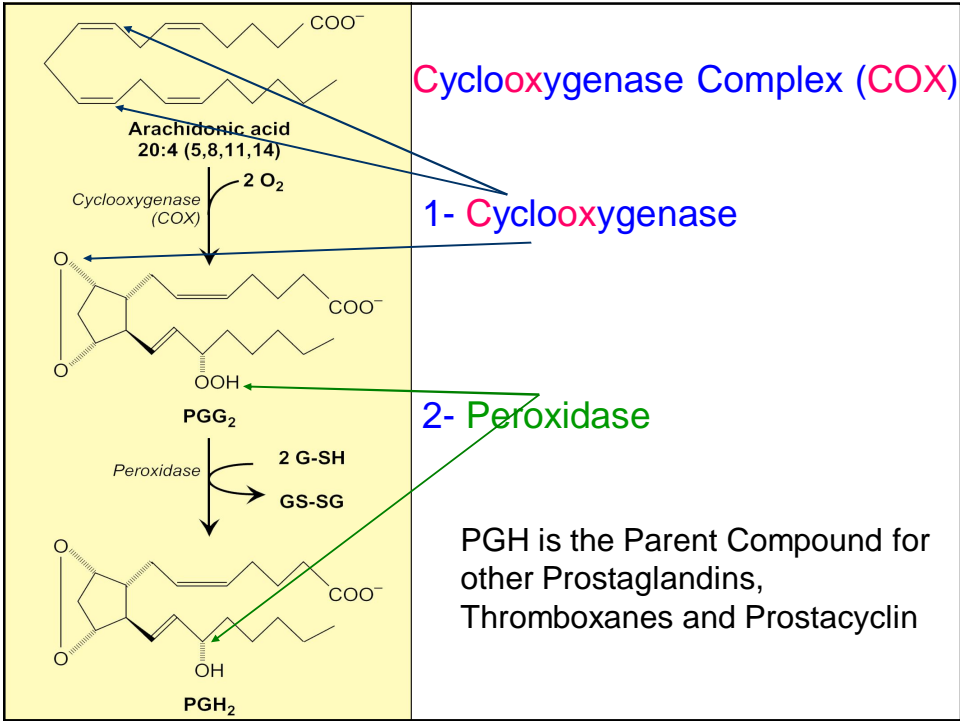
- Vasoconstriction
- Platelet Aggregation
- Lymphocyte Proliferation
- Bronchoconstriction



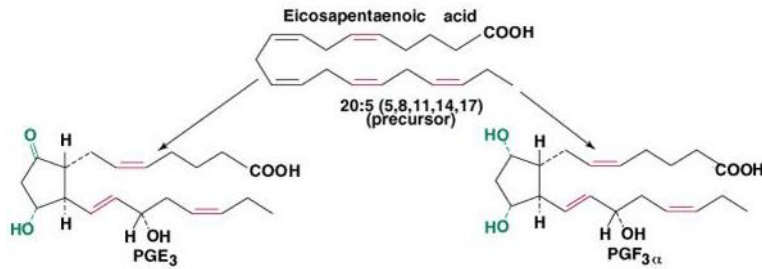
Functional Groups on the Cyclopentane Ring Determine PG Class



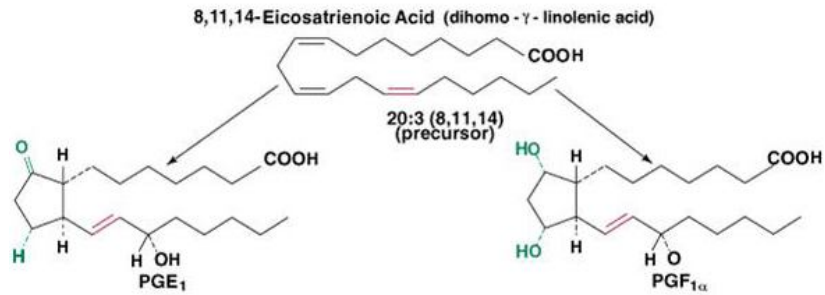




Eicosapentaenoic Acid



Eicosatrienoic Acid



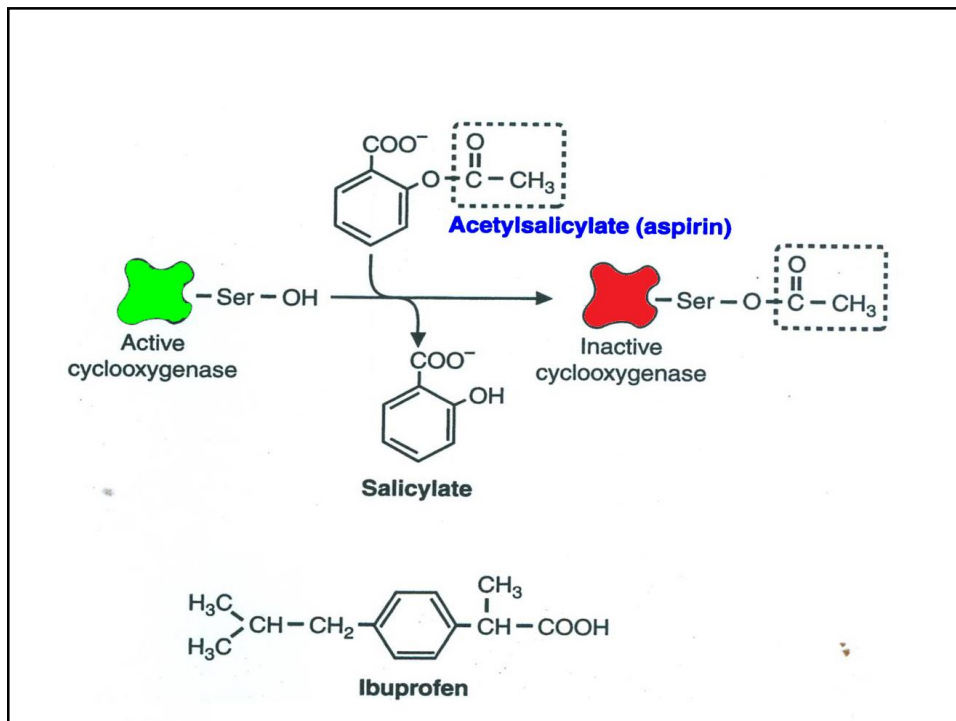
Inhibition of Prostaglandin Synthesis

- Steroidal Anti Inflammatory

Phospholipase A2

- Nonsteroidal Anti Inflammatory

Aspirin; Acetylation of Cyclooxygenase
or
Irreversible Binding to the Enzyme

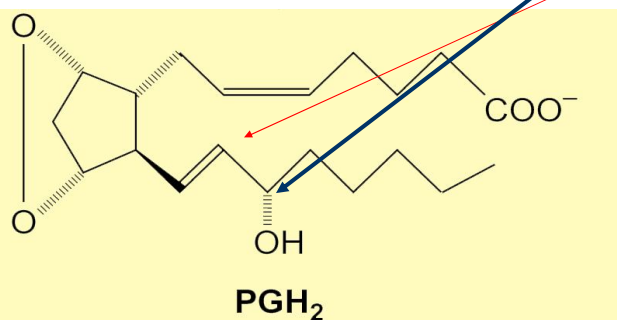


Cyclooxygenase exists in two Forms

- Cox 1
 - Constitutive
 - Gastric Mucosa, Kidney, Plateletes
- Cox 2
 - Inducible; in Response to inflammation signals
 - Monocytes, Macrophages, Smooth Muscle

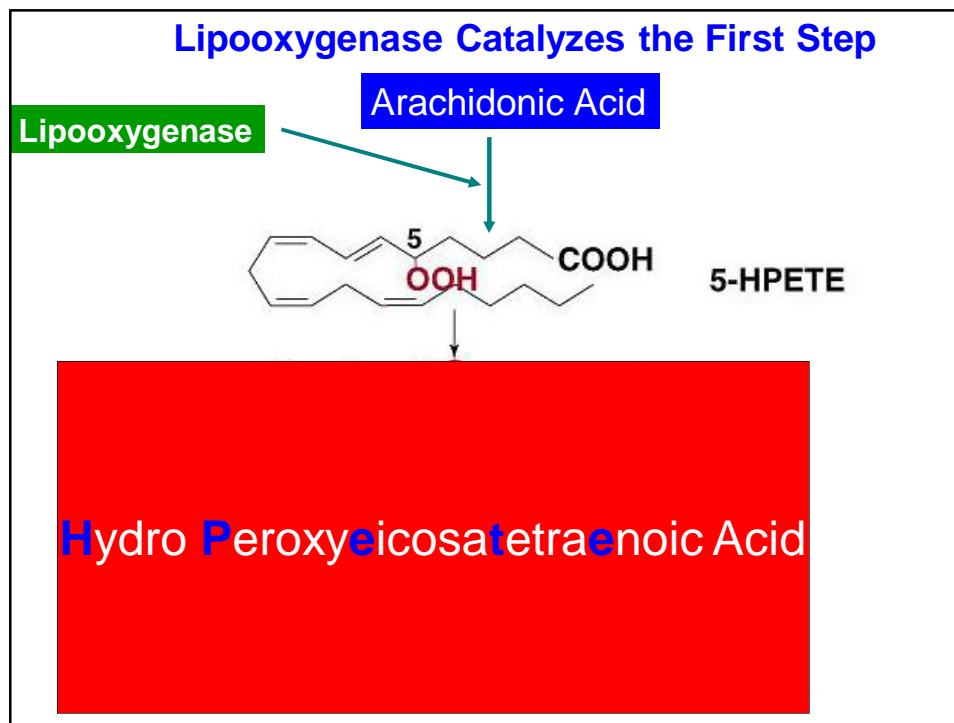
Inactivation of Prostaglandins

- Rapid
- Oxidation of Hydroxyl group at C15
- Reduction of Double bond at C13



Leukotrienes and (LT) Hydroxyeicosatetraenoic acid(HETE)

- Signal Molecules
- Produced from Arachidonic Acid
- Linear Molecules; No Ring
- LT Contain 3 Conjugated Double Bonds



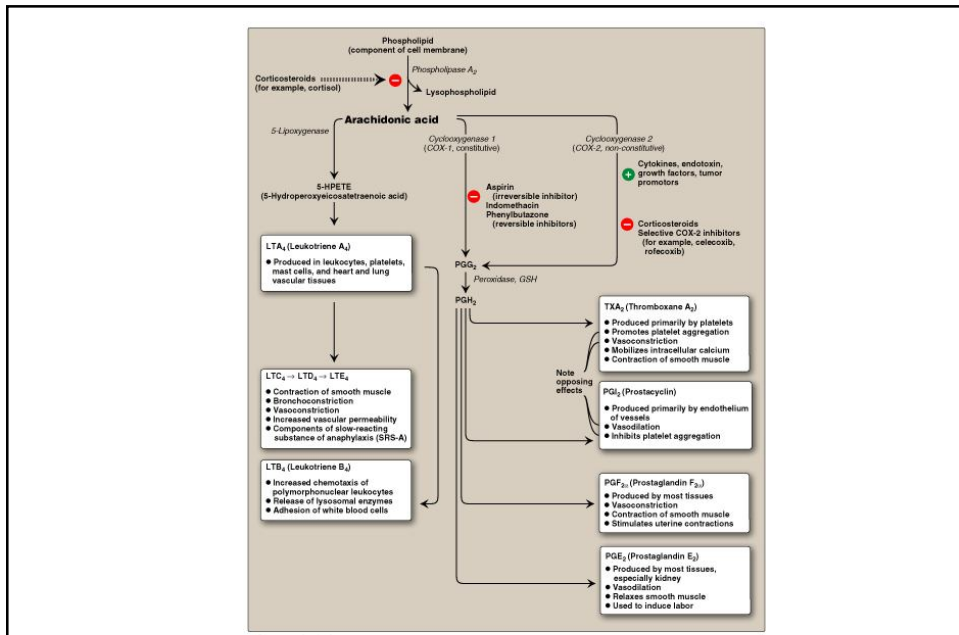
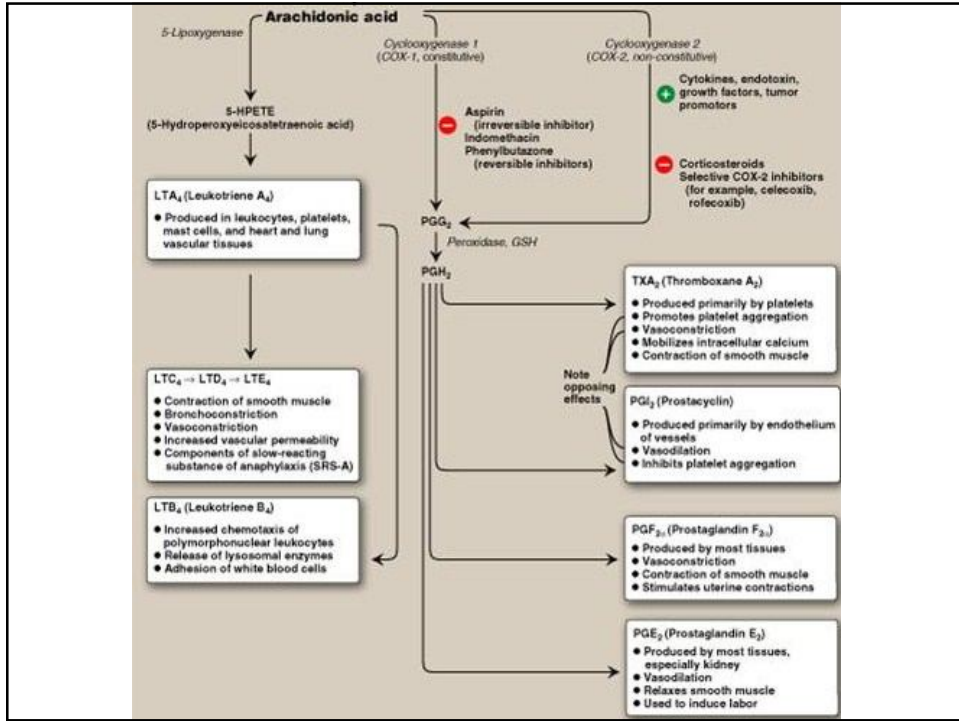


Figure 17.23 Overview of the biosynthesis and function of some important prostaglandins, leukotrienes, and a thromboxane from arachidonic acid.

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