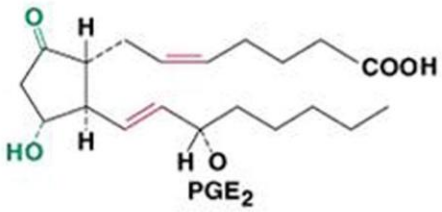
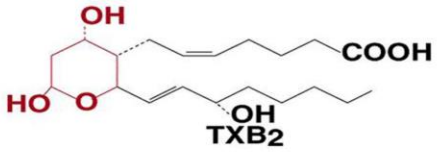
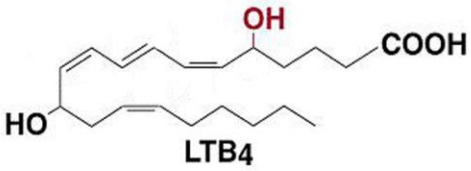
Eicosanoids

- **20 carbon signaling molecules**
- **Several Classes:**
  - **Prostaglandins**
  - **Thromboxanes**
  - **Leukotrienes**







- **Very Potent (very low conc.)**
- **Short Half Life**
- **Not Stored**

- **Produced In Almost all Tissues**
- **Wide Range of Responses**
- **Local Hormones (autocrine & paracrine)**

Some Functions of the Prostaglandins and Thromboxanes

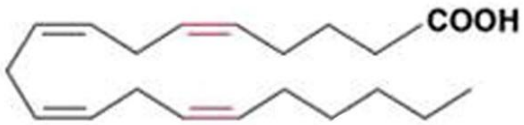
- **What 2 stands for?**

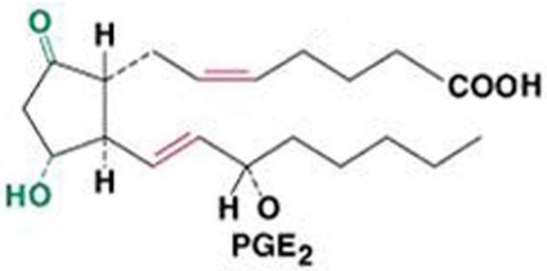
- **PGI2, PGE2, PGD2**
  - **Increase**
    - **Vasodilation, cAMP**
  - **Decrease**
    - **Platelet Agregation**
    - **Lymphocyte Migration**
    - **Leucocyte Aggregation**

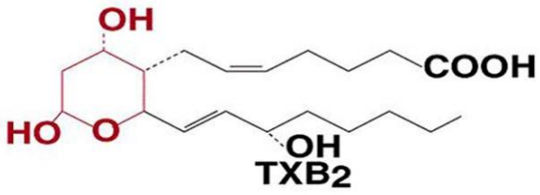
- **PGF2α Increses**
  - **Vasoconstriction**
  - **Bronchoconstriction**
  - **Smooth Muscle Contraction**

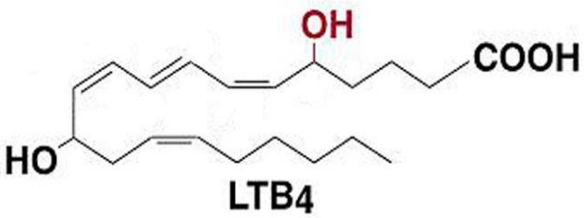
- **Thromboxane Increases**
  - **Vasoconstriction**
  - **Platelet Agregation**
  - **Lymphocyte Proliferation**
  - **Bronchoconstriction**

Eicosanoids Structure



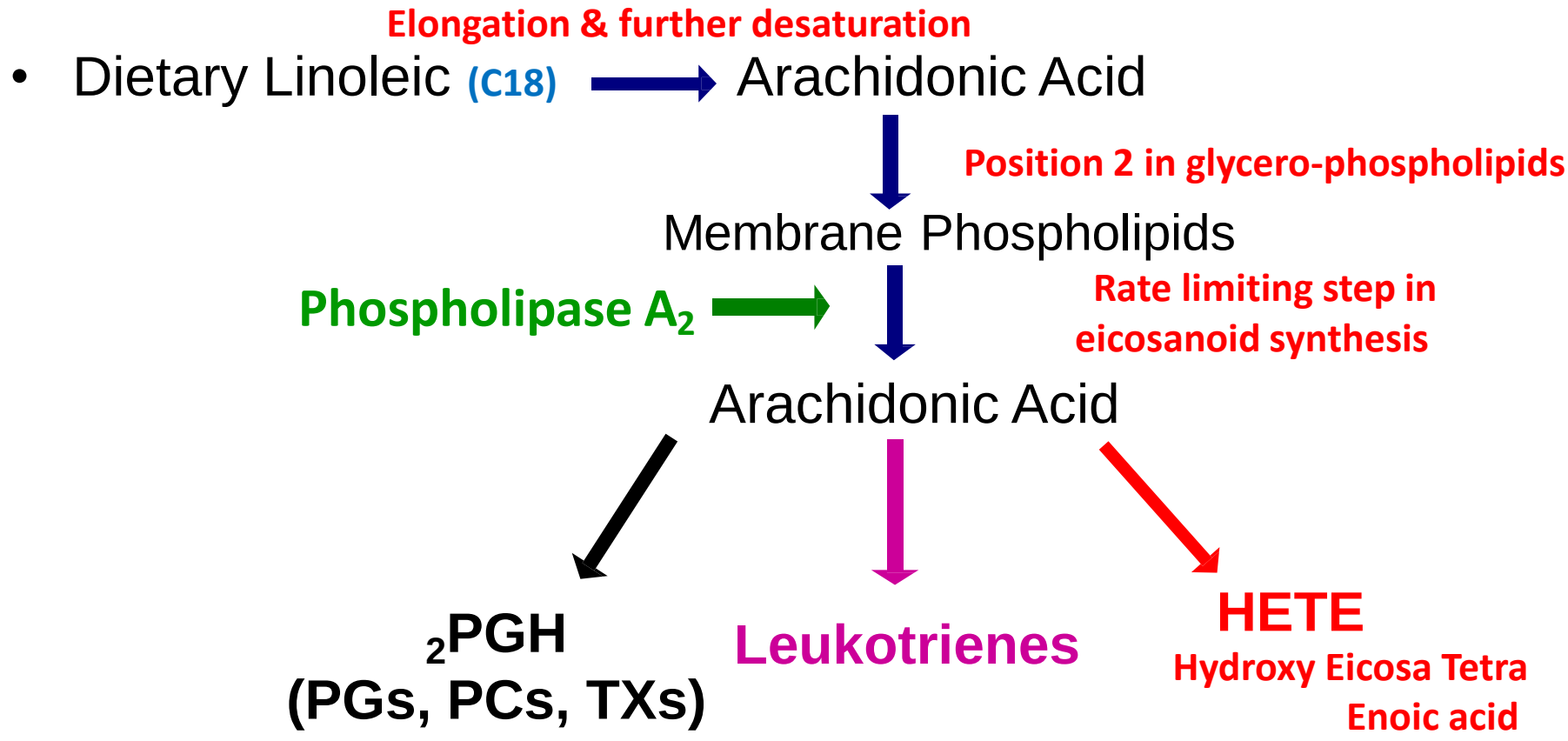






- **Arachidonic acid (20, 4, no ring)**
- **Prostaglandins (20, 2, 5-ring)**
- **Thromboxanes (20, 2, 6-ring, oxygen)**
- **leukotrienes (20, 3 conjugated, no ring)**

Eicosanoids Synthesis



Eicosanoids Can be Synthesized from other Polyunsaturated Fatty Acids

- **Fatty acids of 20 carbons with:**
  - **3 double bonds like Eicosatrienoic acid (omega-6)**
    - 1 double bonds, **PGE1 (3 → 1)**
  - **4 double bonds as Eicosatetraenoic acid (arachidonic acid)**
    - 2 double bonds, **PGE2, PGF2, TXB2 (4 → 2)**
  - **5 double bonds Eicosapentaneoic acid : (omega-3)**
    - 3 double bonds, **PGE3, TXB3 (5 → 3)**
- **Which is more healthy? Less MI**
  - **Omega-3: TxB3 → inhibits platelet aggregation**
  - **Omega-6: PGE1 → stimulates platelet aggregation**