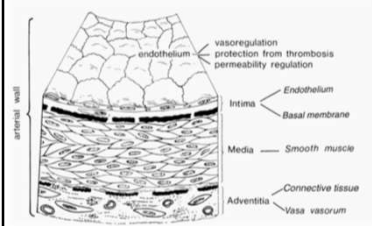


Endothelium, smooth muscle, vessels

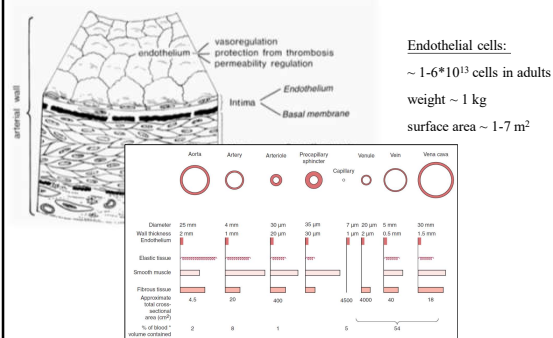
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UD Faculty of Medicine
Division of Clinical Physiology

Vessels



Vessels - endothelium as an organ



Functions of vascular endothelium

Release of vasodilator agents

Nitric oxide (EDRF)
 Prostacyclin (PGI₂)
 Bradikynin
 EDHF (endothelium derived hyperpolarizing factor)

Release of vasoconstrictor agents

Endothelins

Protection of vascular smooth muscle

vasoconstrictory → to vasodilatory stimuli
 (acetylcholine and serotonin)

Antiaggregatory effect

Acts via NO (nitric oxide) and PGI₂ (thrombocyte activation ↓)

Functions of vascular endothelium

Prevention of coagulation

Thromboresistant surface (heparan sulfate – antithrombin cofactor)

Immune and barrier function

Supply of antigens to immunocompetent cells
 Secretion of interleukin I, E-selectin (rolling)

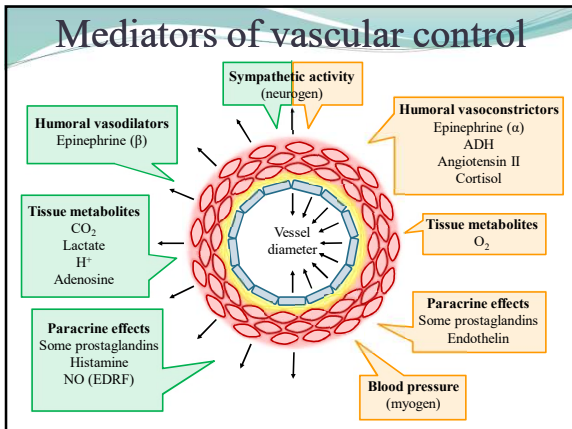
Enzymatic activity

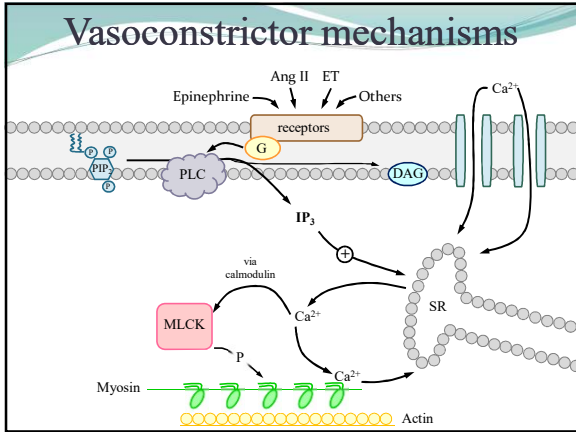
Angiotensin-converting enzyme
 Carbonic anhydrase (large amounts in lung endothelium)

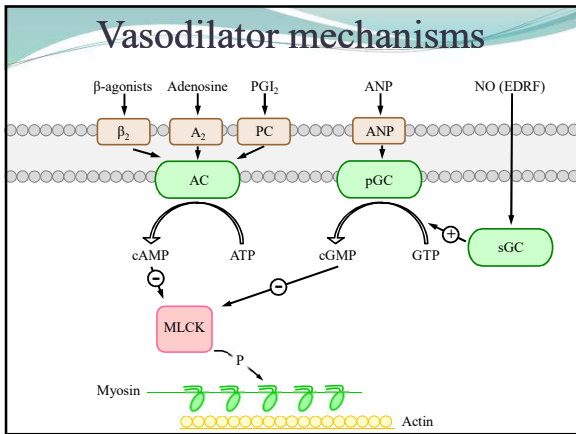
Growth signal to vascular smooth muscle

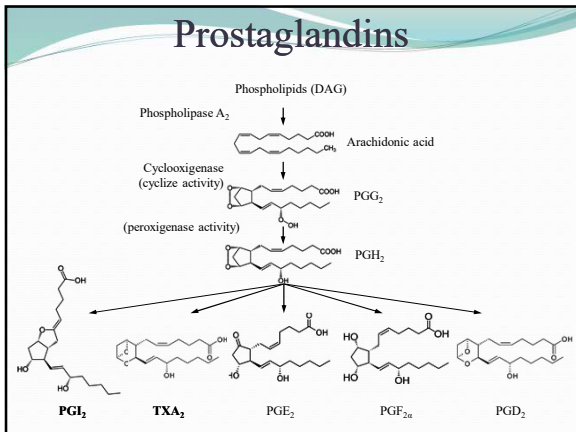
VEGF (vascular endothelial growth factor), angiotensin
 Heparin-like inhibitors of growth

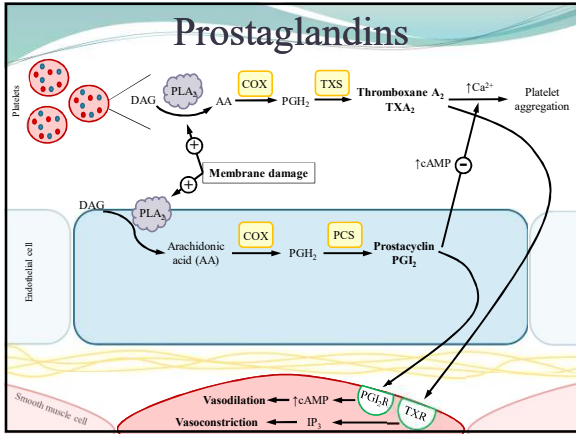
Mediators of vascular control

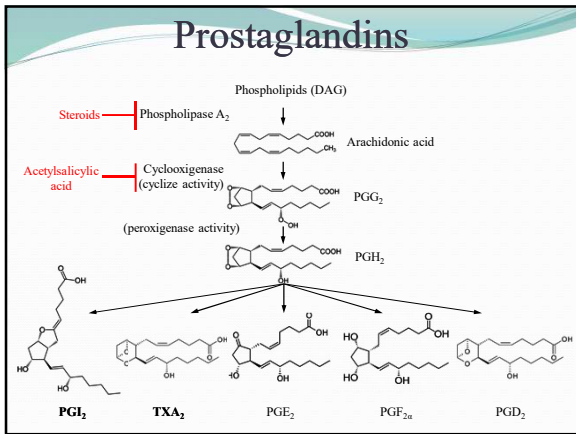


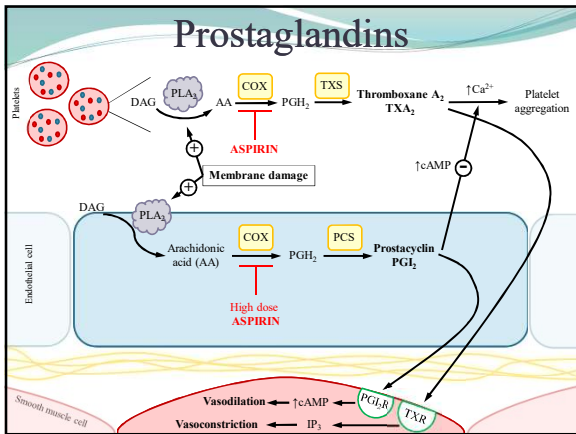


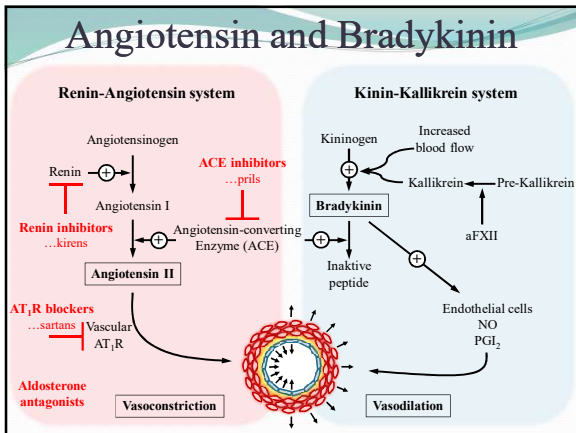












Nitric oxide (NO)

Chemical characteristics: short lived (half-life: seconds), lipophilic, freely diffusible, soluble gas

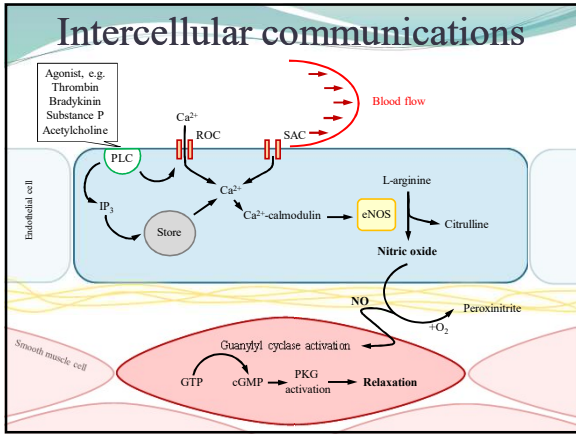
Synthesis of NO: (NOS = Nitric Oxide Synthase)

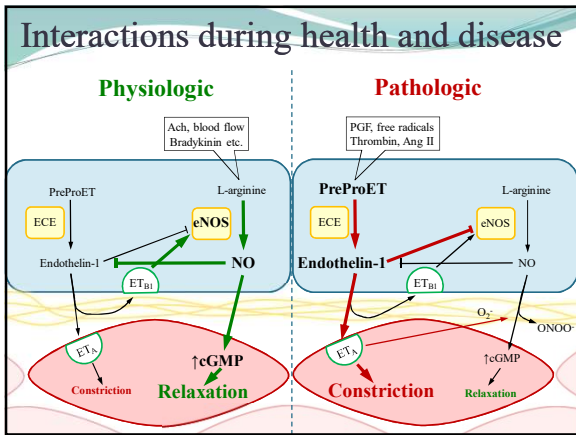
nNOS = NOS I (in nervous system)
 iNOS = NOS II (inducible [macrophages, endothelium])
 eNOS = NOS III (endothelial or constitutive form), upregulated by oestrogens, insulin and chronic increases in wall shear stress

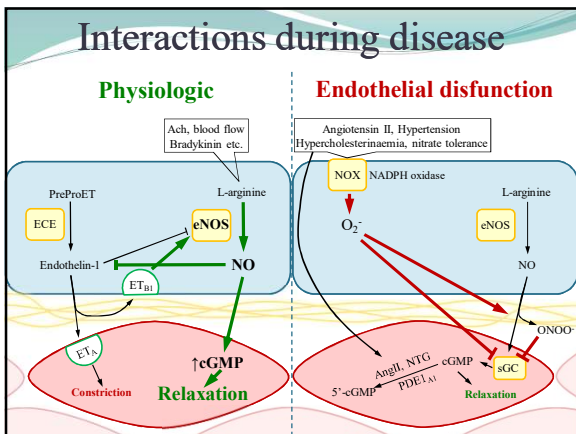
Chemical reaction:

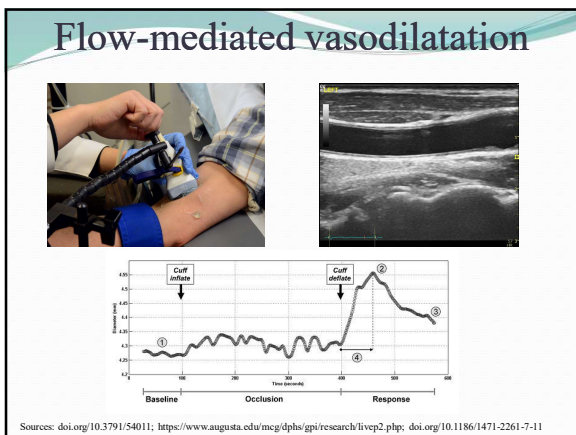
$$\text{L-arginine} + \text{NADPH} + \text{H}^+ + \text{O}_2 \rightarrow \text{Citrulline} + \text{NO} + \text{NADP}^+$$

Cofactors: NADPH, tetrahydrobiopterine

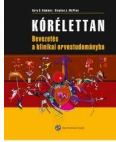






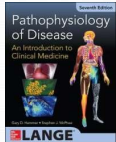


Literature



Kórélettan – Bevezetés a klinikai orvostudományba
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Oldalszám: 299 - 314 o.



**Pathophysiology of Disease:
An Introduction to Clinical Medicine 7th Edition**

Pages: 295 - 310
