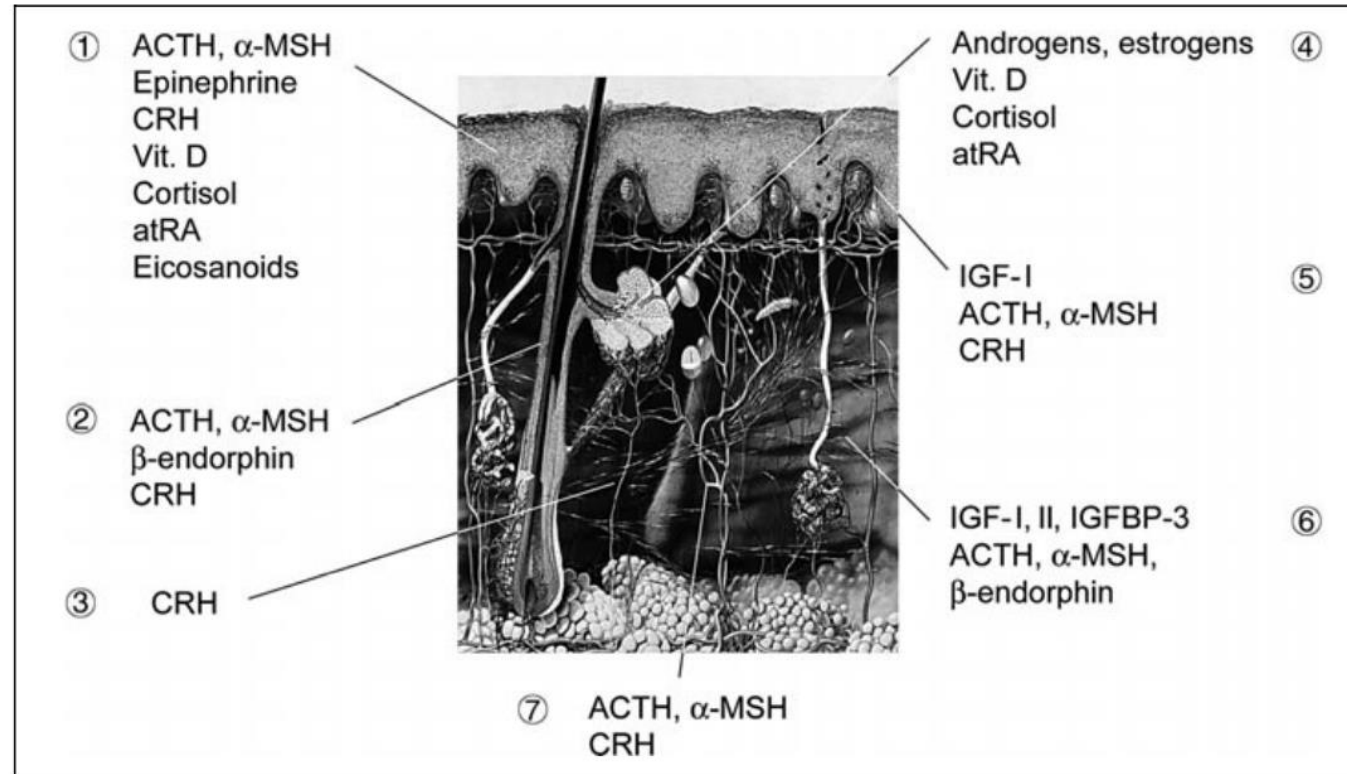


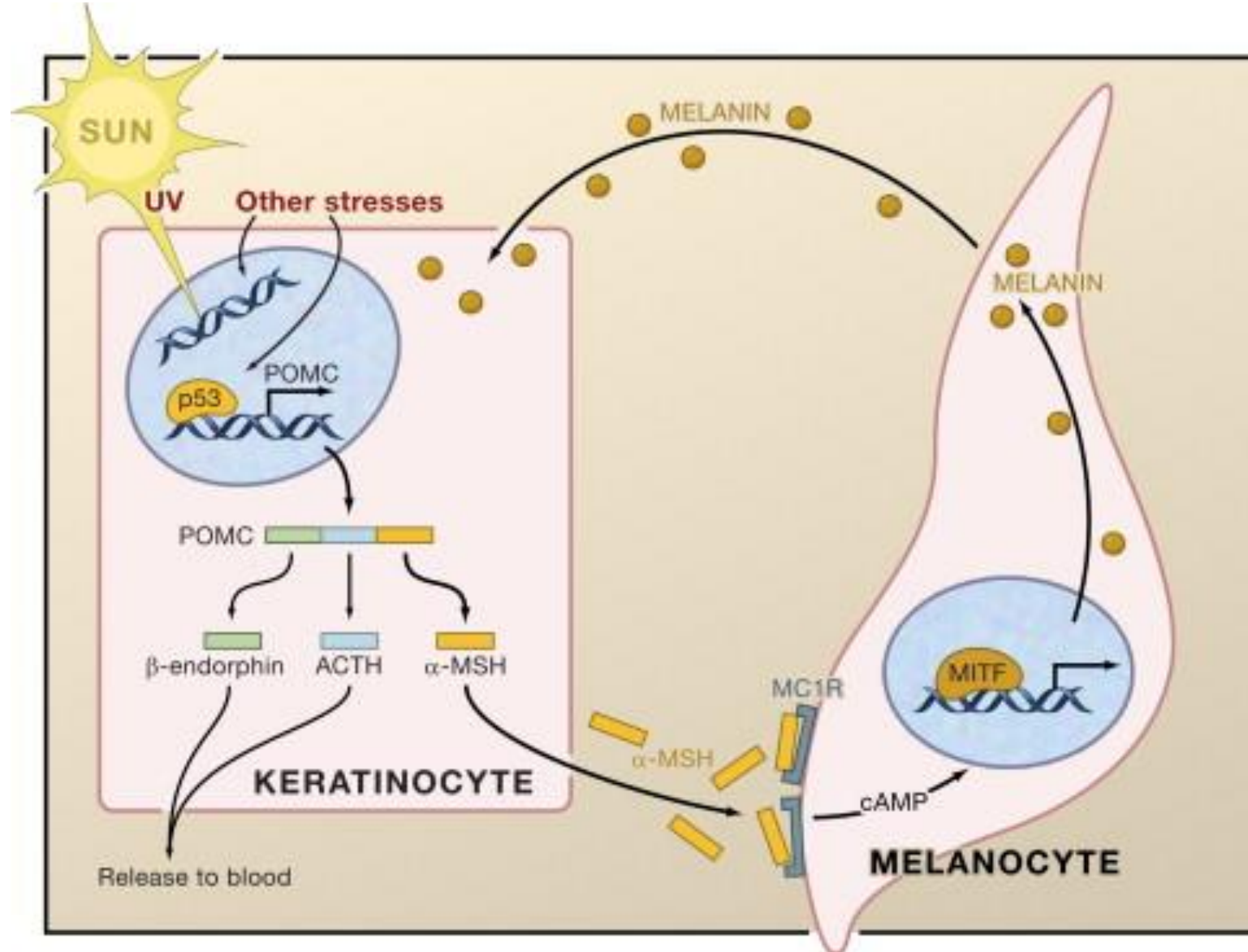
# Skin as an endocrine organ

**Fig. 2.** Synthesis of hormones in human skin. ① Keratinocytes; ② hair follicles; ③ cutaneous nerves; ④ sebaceous glands; ⑤ melanocytes; ⑥ fibroblasts; ⑦ endothelial cells. ACTH = Adrenocorticotrop hormone;  $\alpha$ -MSH =  $\alpha$ -melanocyte stimulating hormone; CRH = corticotropin releasing hormone; Vit. D = vitamin D; atRA = all-*trans* retinoic acid; IGF-I = insulin-like growth factor I; IGFBP-3 = insulin-like growth factor binding protein-3.



CRH – stimulation of sebaceous lipogenesis, inhibition of proliferation of keratinocytes; ACTH, alfa-MSH – activity of melanocytes, pigmentation, stimulation of proliferation of keratinocytes, synthesis of collagenase and MMP enzymes; GH, IGF-1 – homeostatic regulation of cell proliferation and differentiation; androgens – stimulation of proliferation of sebocytes and dermal papilla cells; estrogens – regulation of cell proliferation, effect on scalp hair growth period; glucocorticoids – hair growth, sebocyte proliferation, skin atrophy; vitamin D – conversions of estrogens, growth-promoting activity on keratinocytes.

# Skin and CRH-ACTH axis



# Cardiovascular endocrinology

- Myocardium
- Endothelium

Vasoconstricting	Vasodilating
Sodium-retention effect	Natriuretic
Growth stimulation	Growth inhibition
Proatherogenic	Antiatherogenic

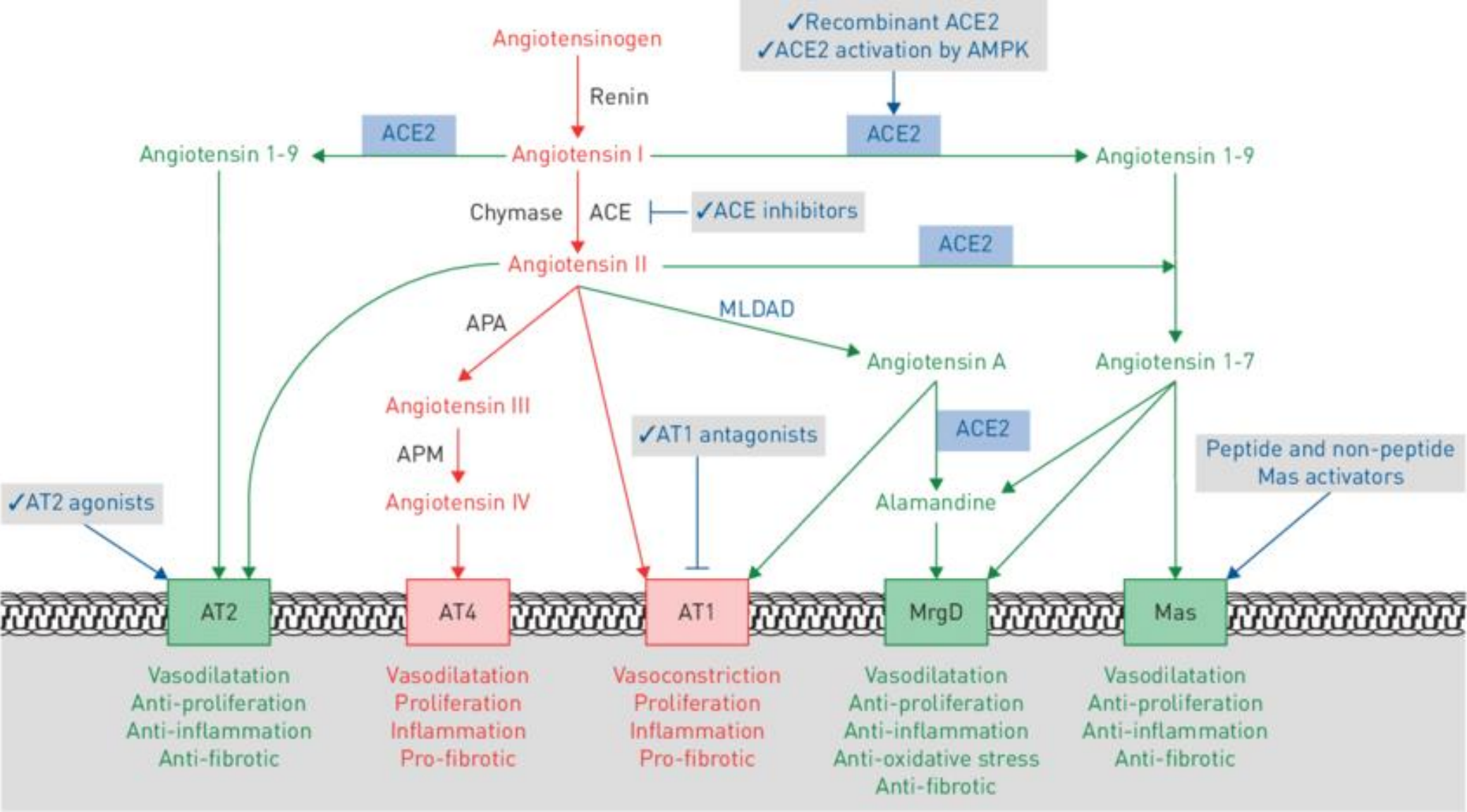
Endothelial dysfunction is determined by an imbalance between vasoconstrictor and vasodilator factors.

# RAAS system

- Blood pressure, volume of circulating fluids
- Circulating versus local components of RAAS
- Intermediary RAAS (angiotensinogen, ACE, AT1, AT2, ATR1, ATR2)

AT1R	AT2R
All tissues	Prenatally in all tissues
Vasoconstriction, positive inotropic ef.	Embryonal differentiation
Secretion of aldosterone, catecholamines, ADH	Physiological development of the cardiovascular system
Inhibition of renin (negative feedback)	Change in receptor density and distribution is dependent on age, sex and pregnancy
Reabsorption of sodium	In repairing tissues after damage
Regulation of the feeling of thirst	
Proliferation, hypertrophy, remodeling	
Stimulation of fibroblasts - fibrosis	
Amplification of prooxidative and proinflammatory processes	

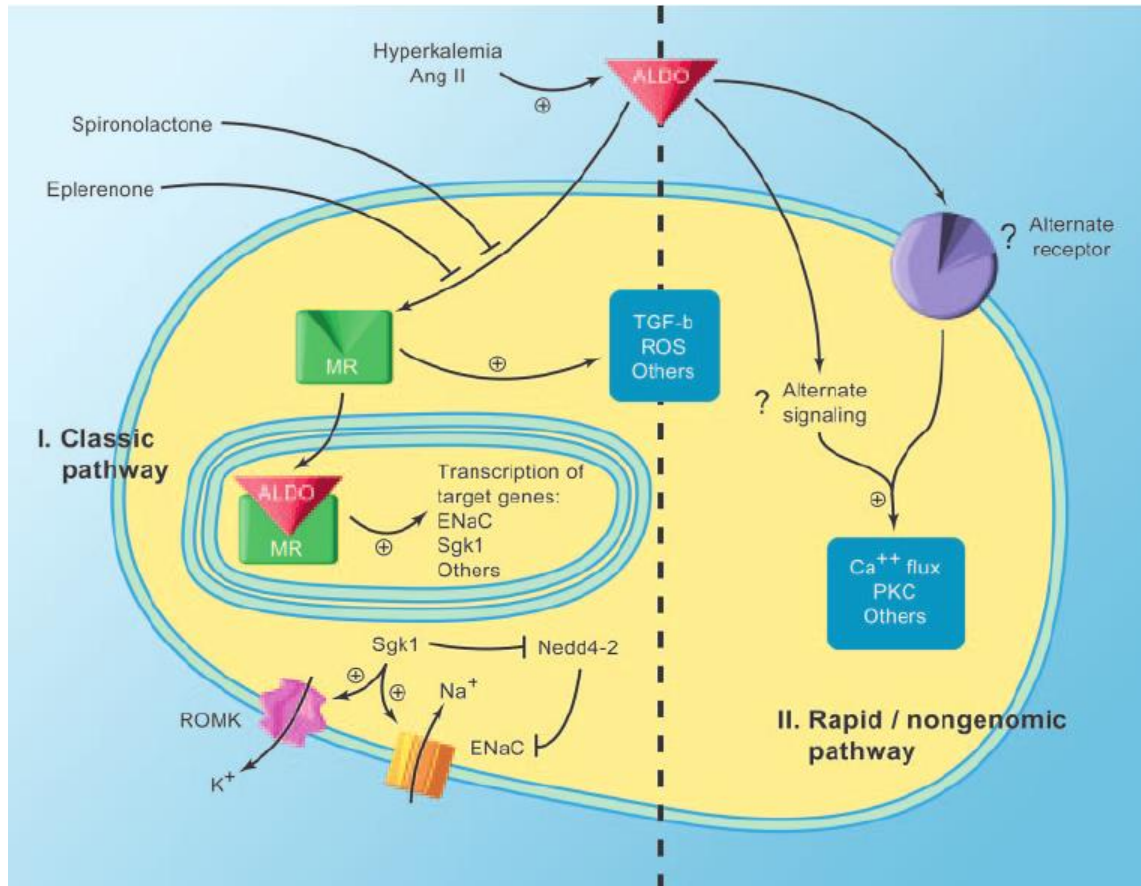
# RAAS system



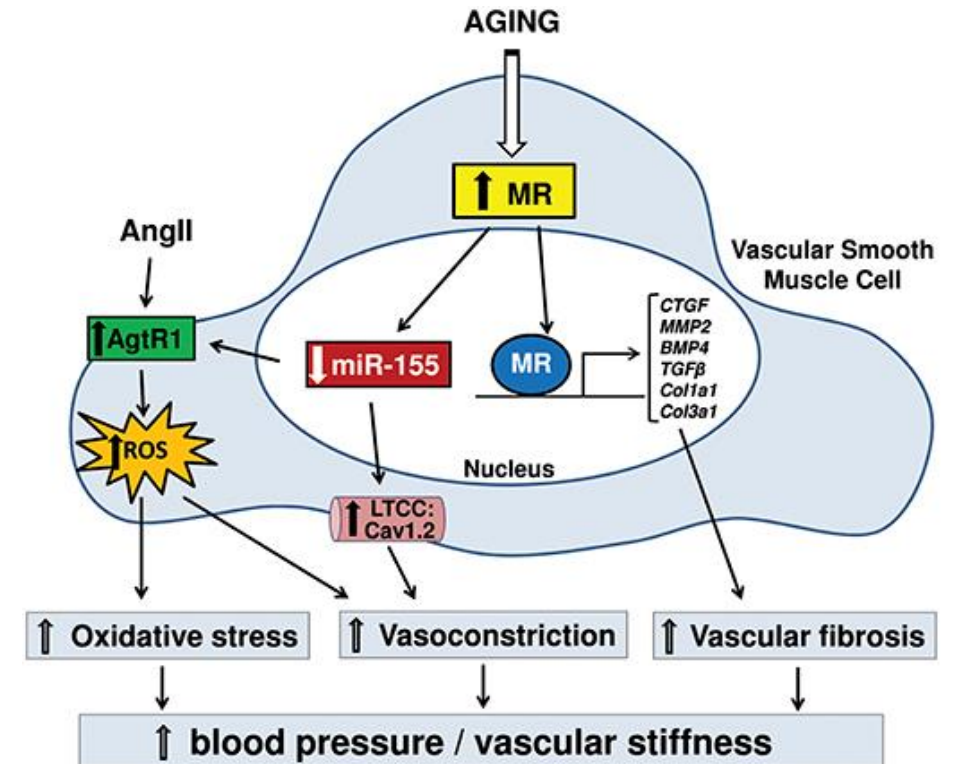


# Aldosterone

## Renal effects

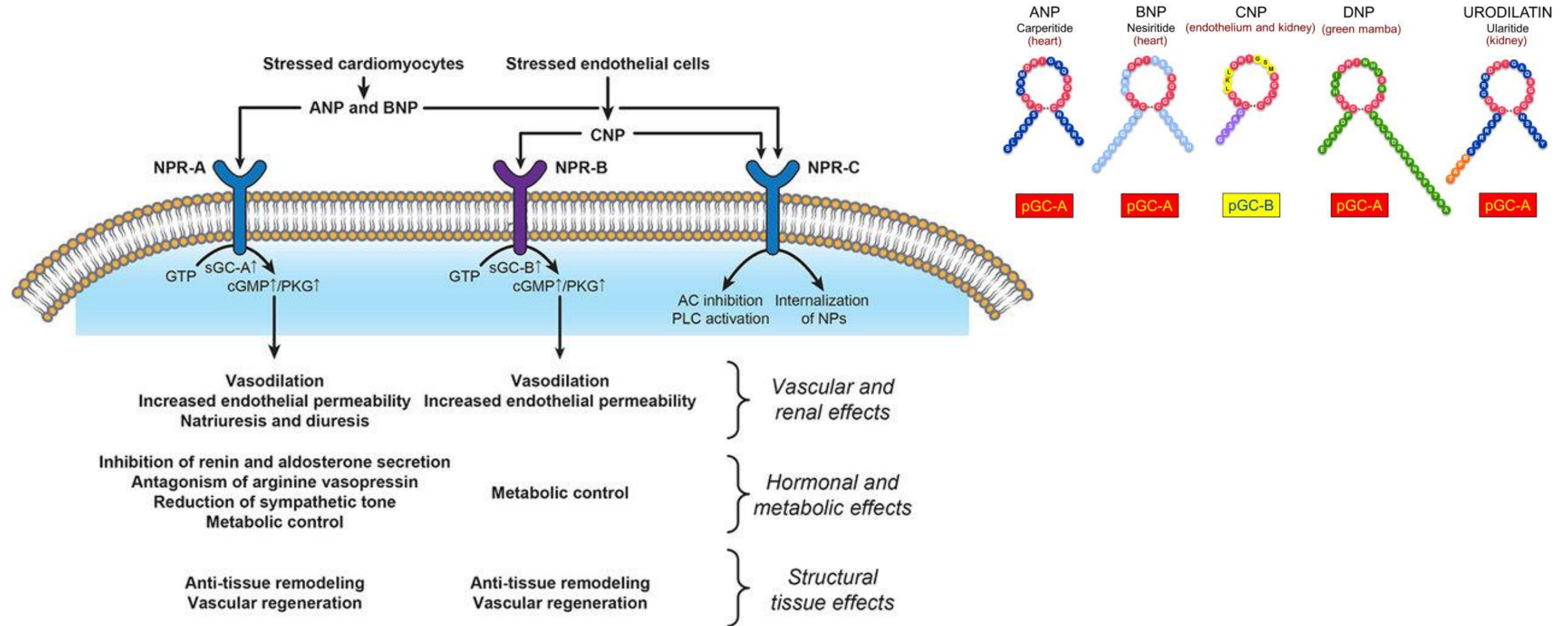


## Extrarenal effects

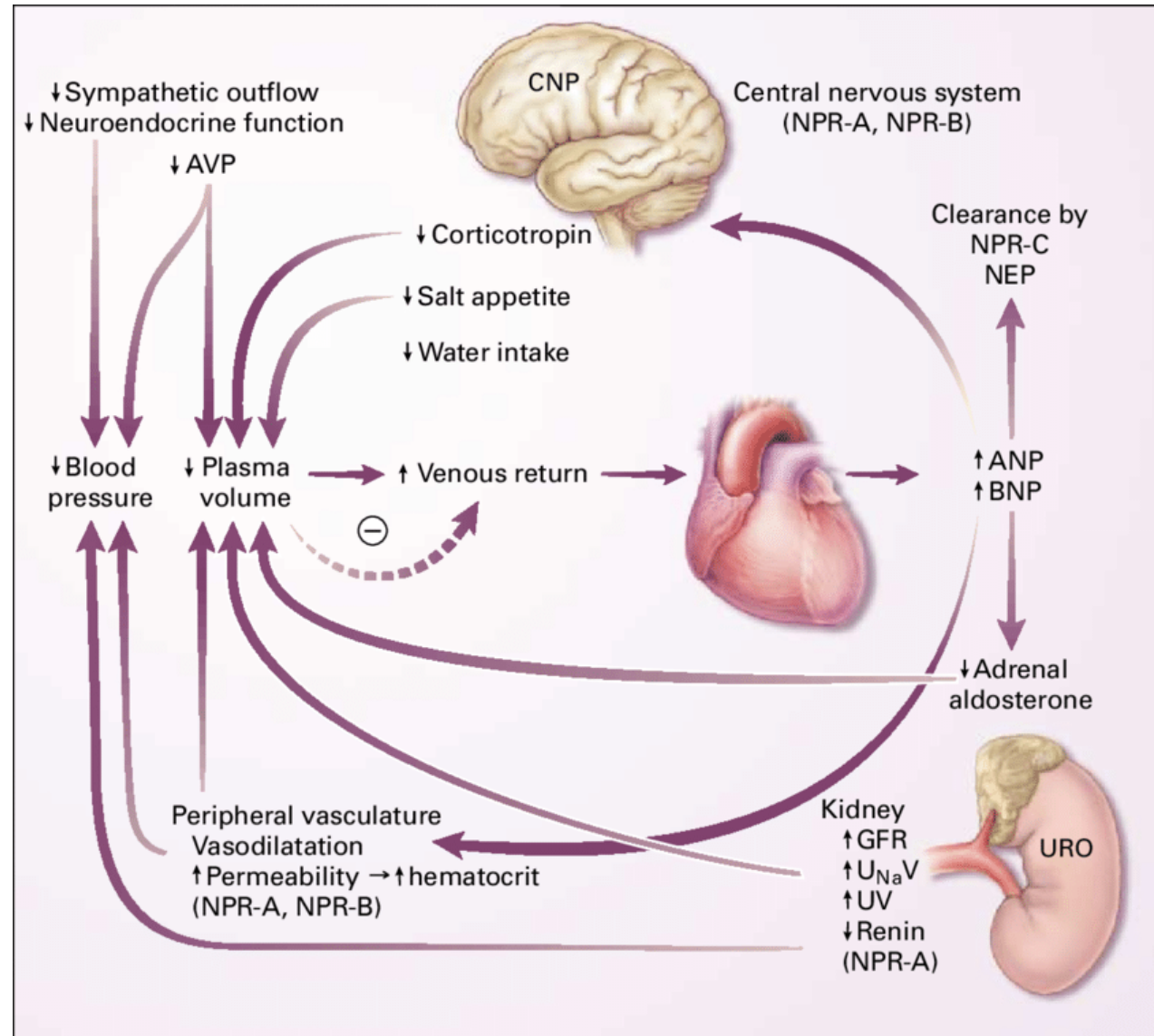


Increase of collagen synthesis, changes in rigidity of vessels, fibrotic changes, direct pro-arrhythmogenic effect (ion dysbalance, endothelial dysfunction, decrease of coronary perfusion, increase of sympathetic activity etc.)

# Natriuretic peptides – ANP, BNP, CNP

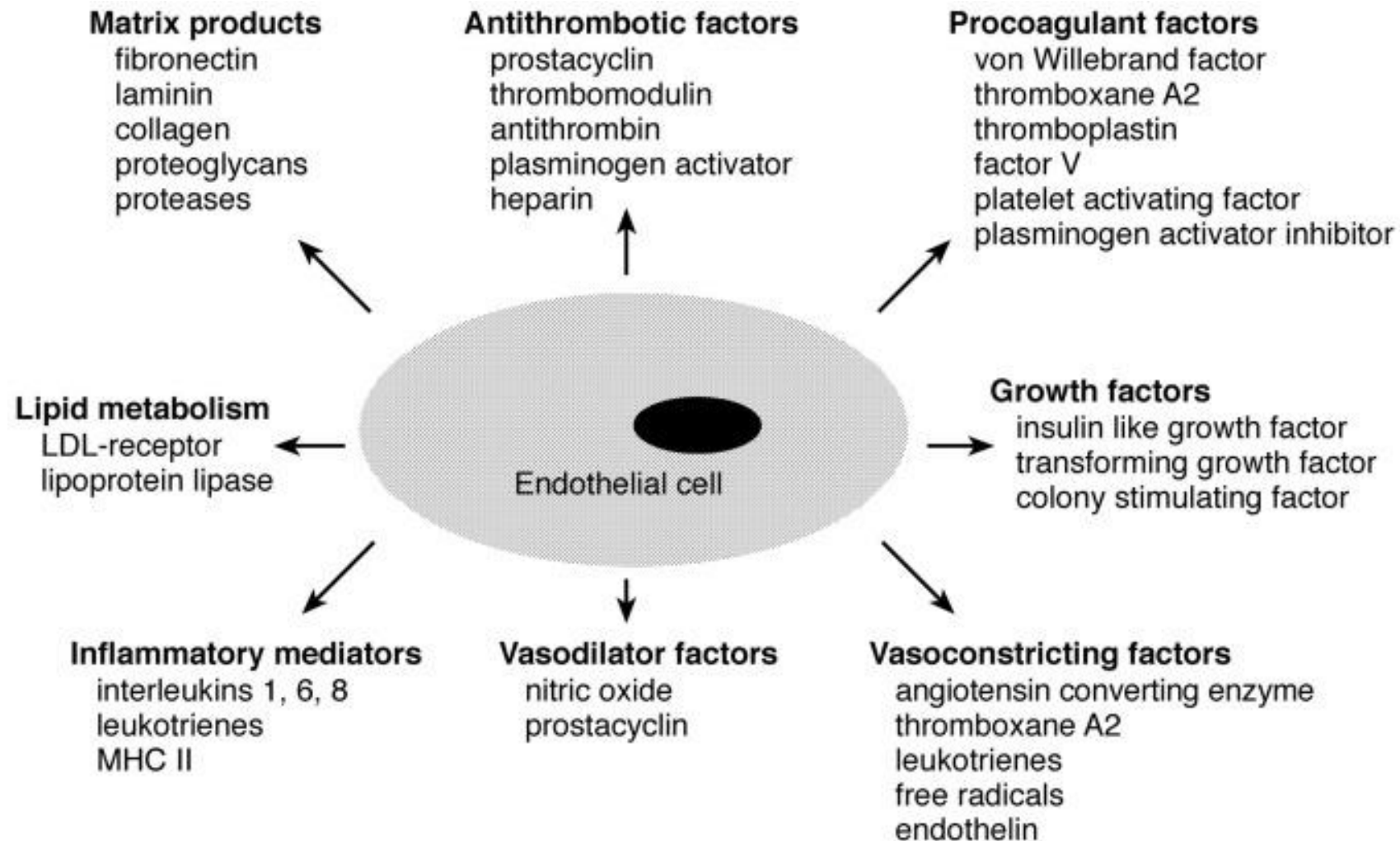


# Natriuretic peptides – ANP, BNP, CNP

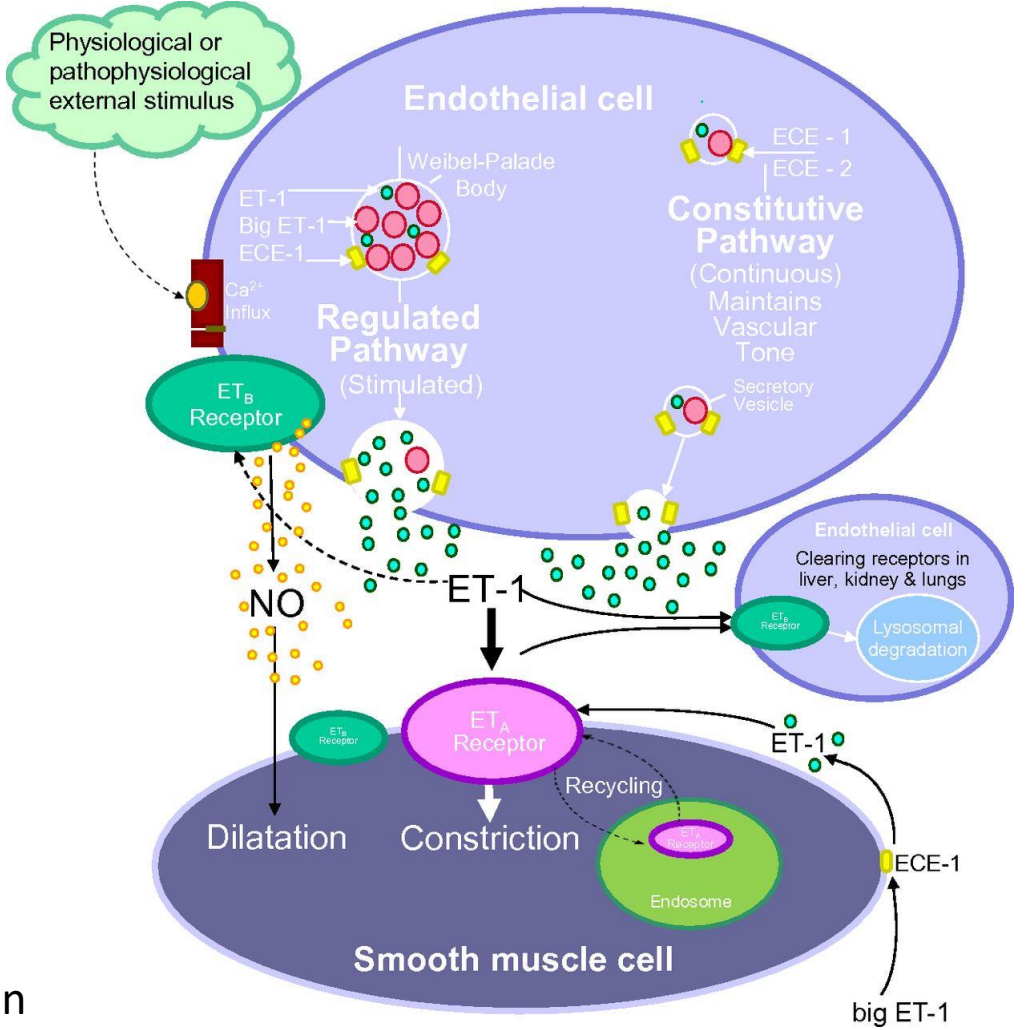
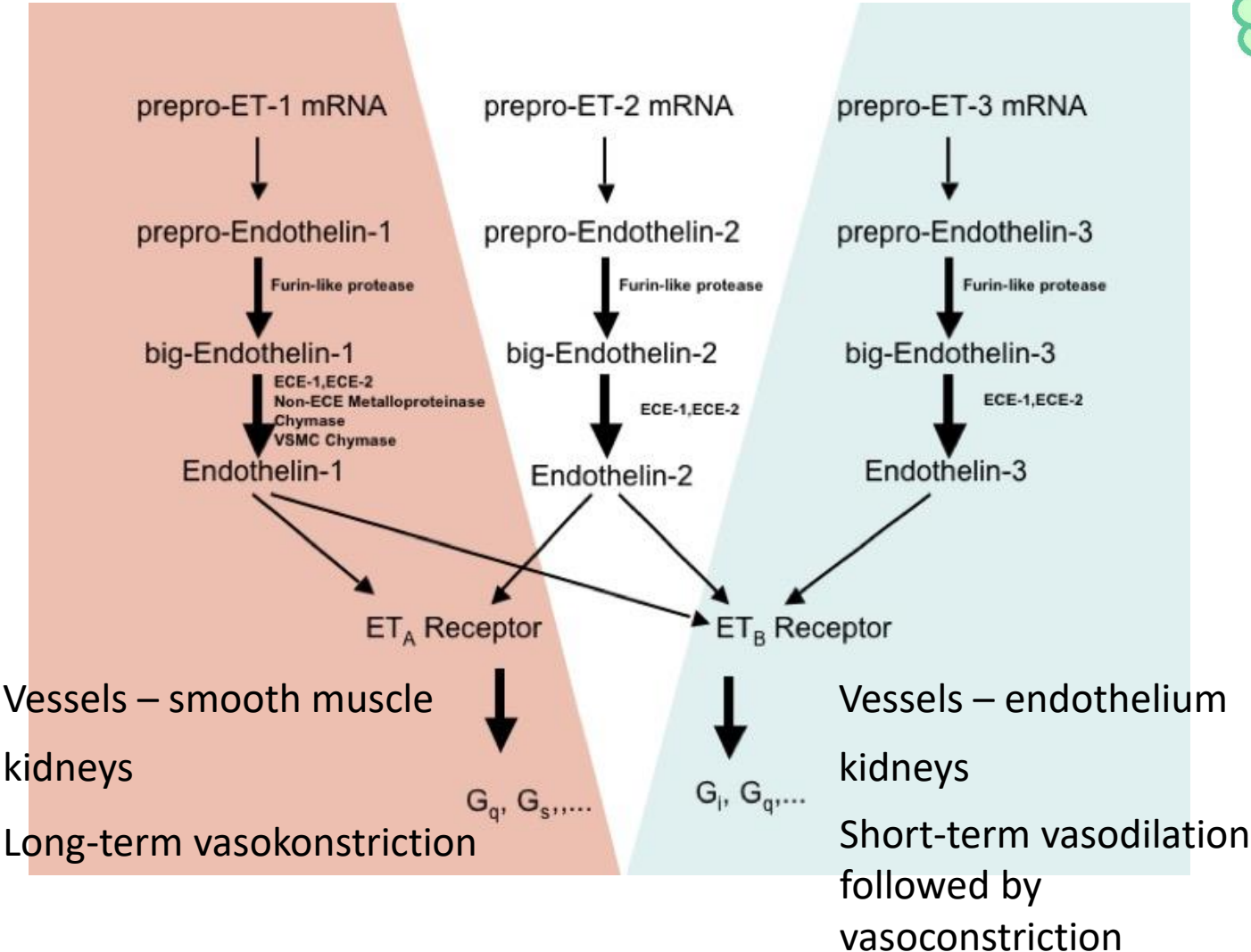




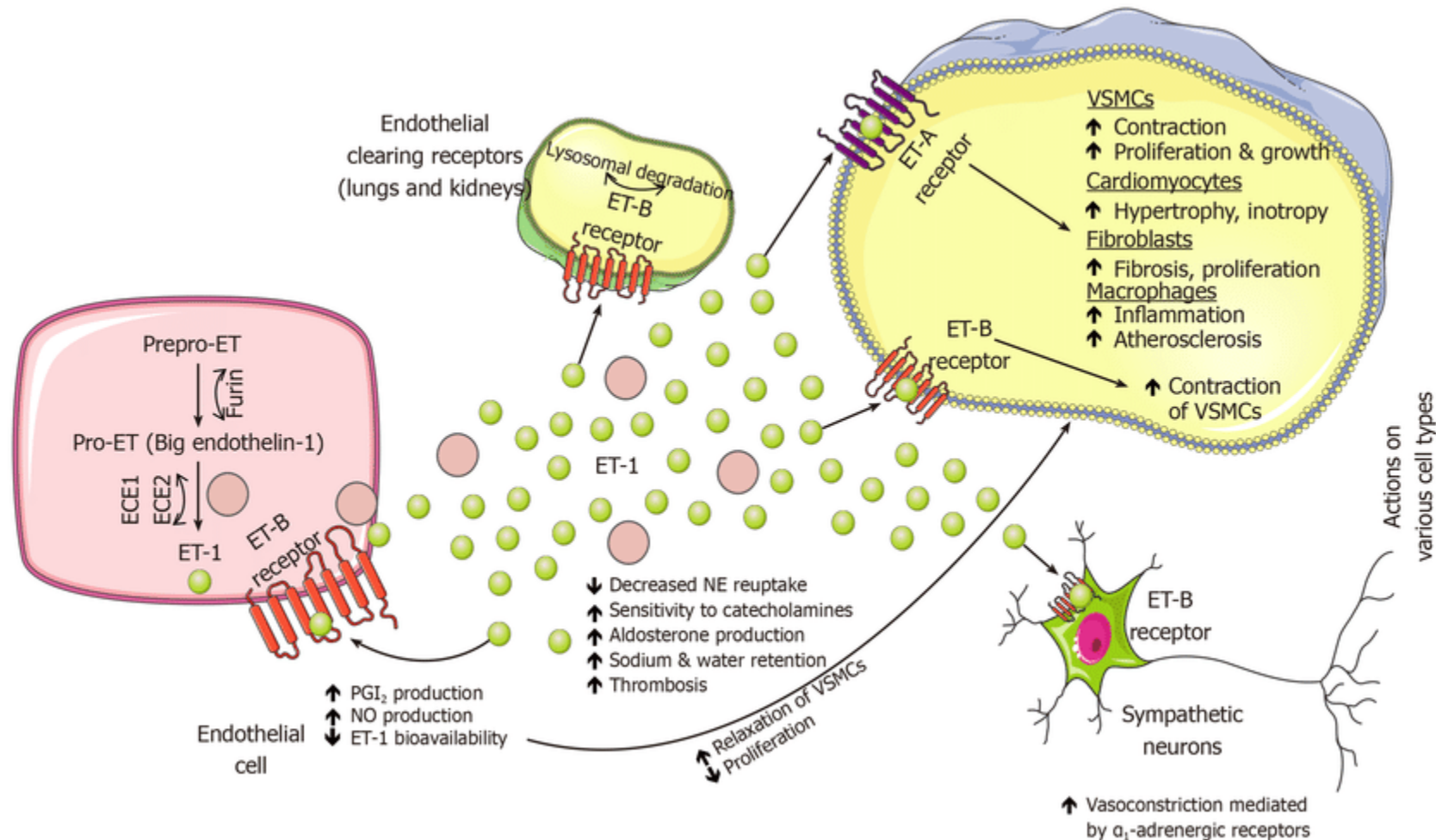
# Endothelium physiology



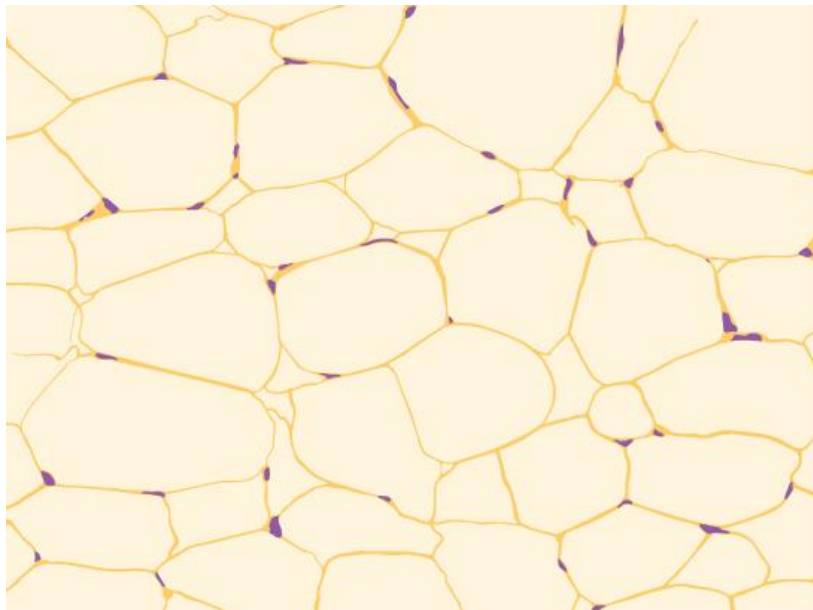
# Endothelins and their receptors



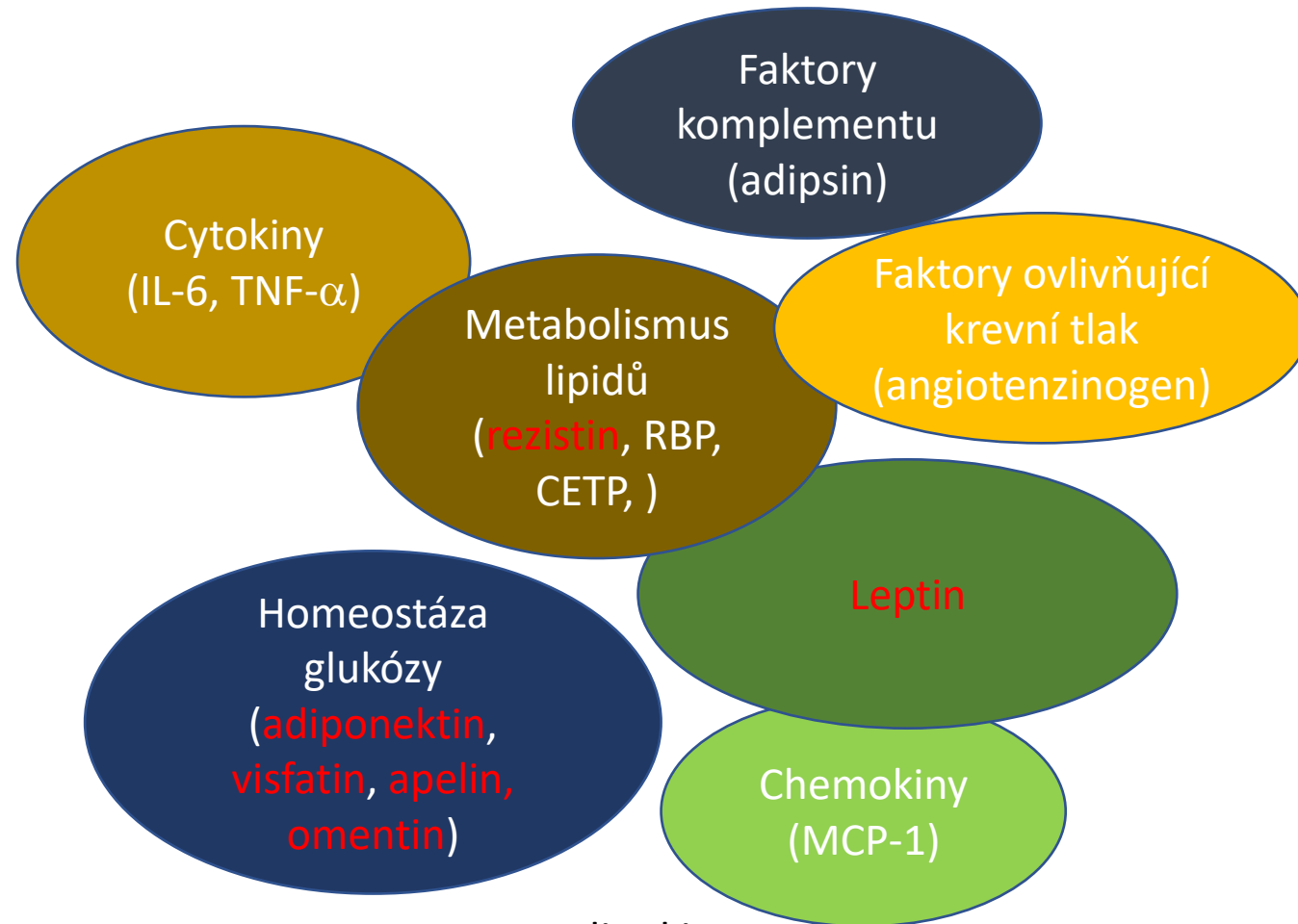
# Endothelins and implication in physiology and patophysiology



# Endocrine function of adipose tissue



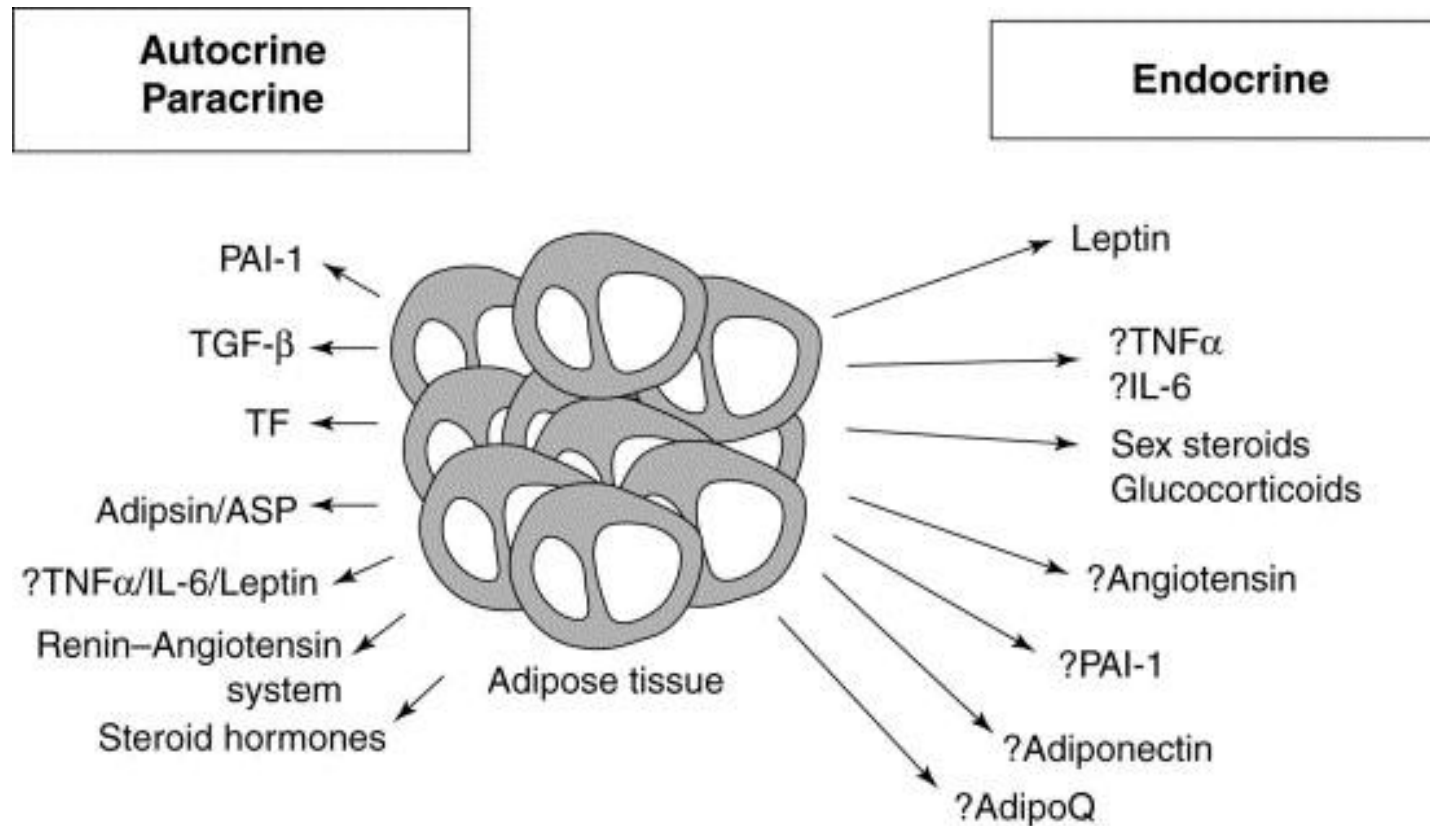
Tuková tkáň



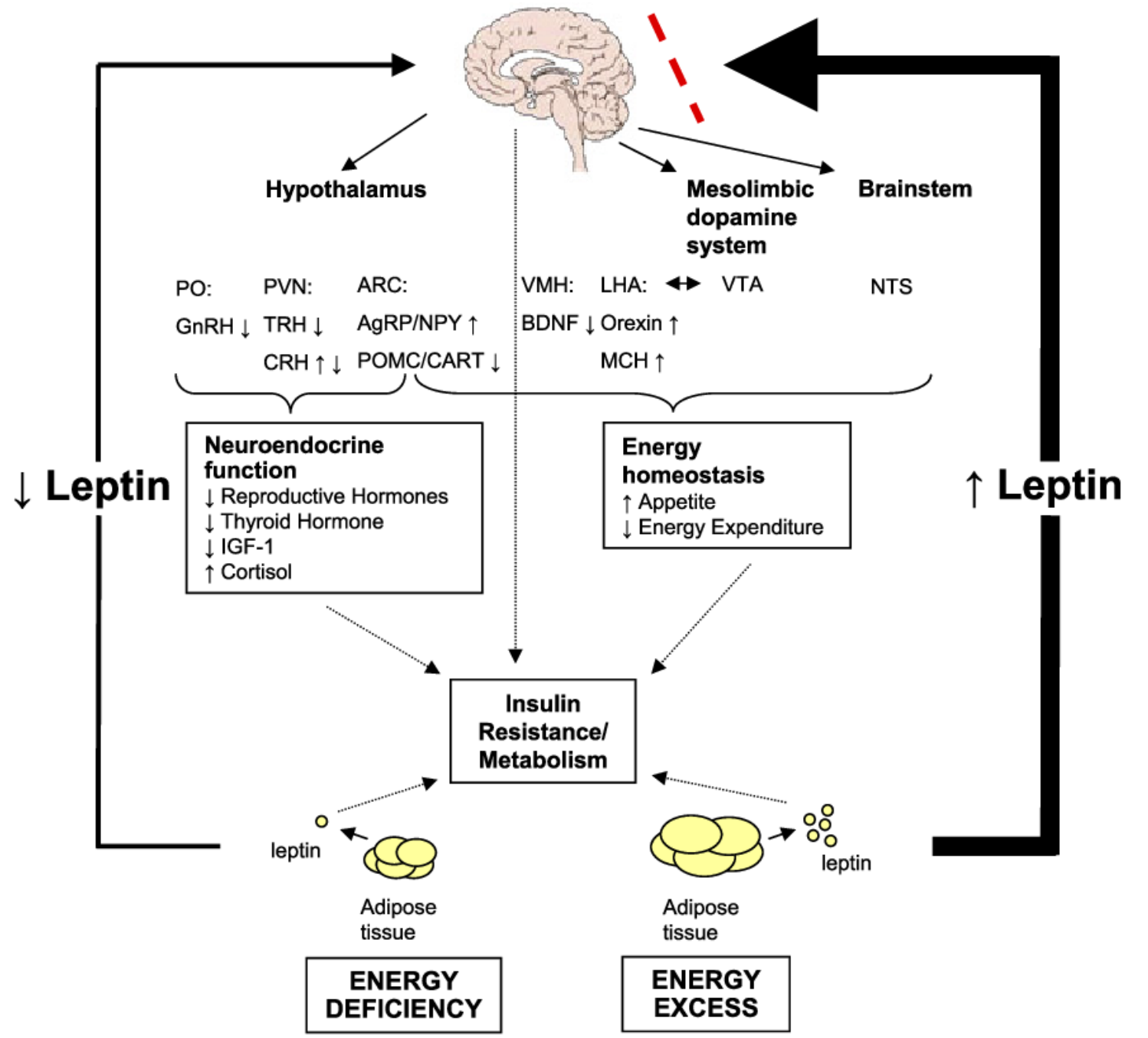
Adipokiny



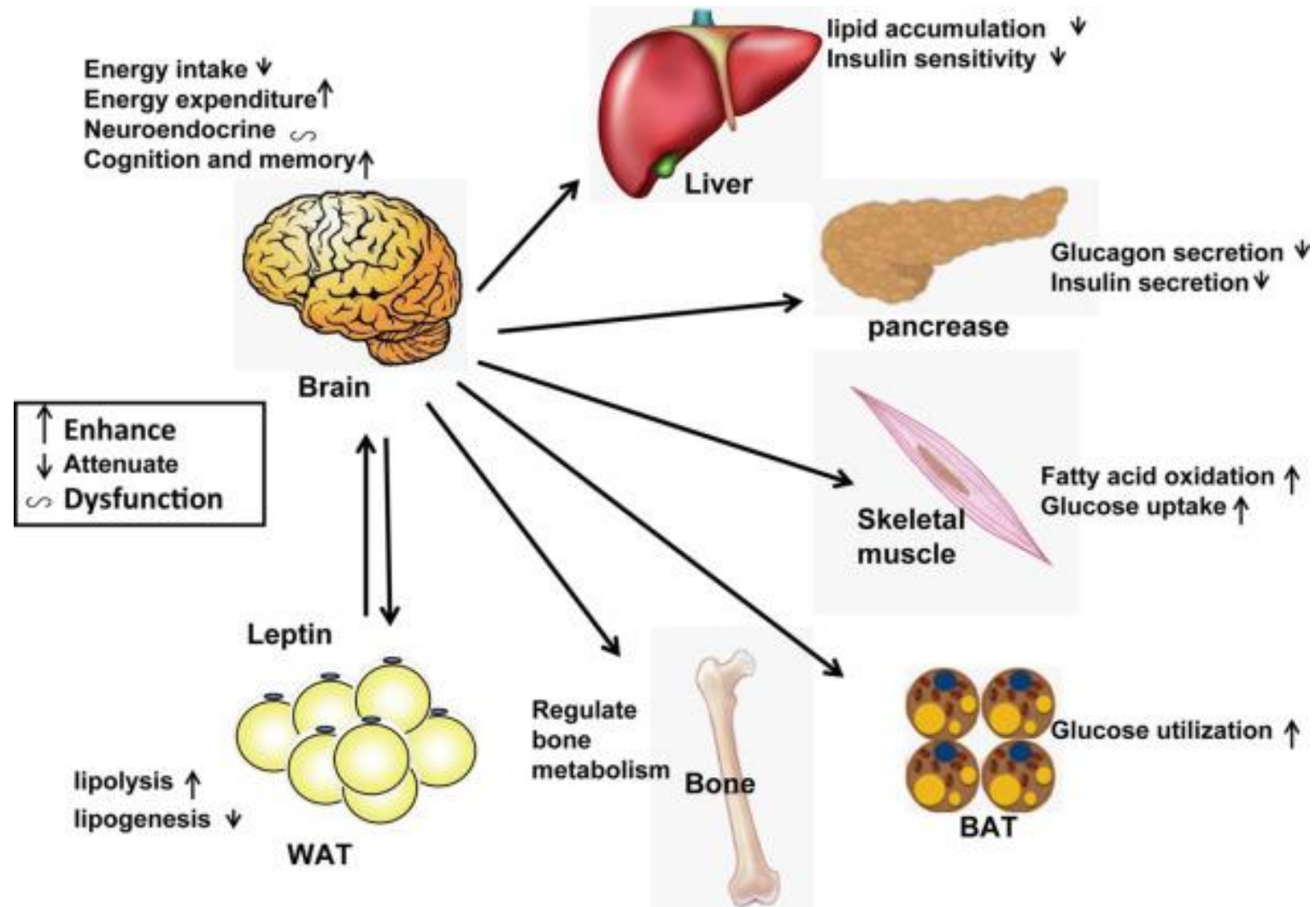
# Endocrine function of adipose tissue



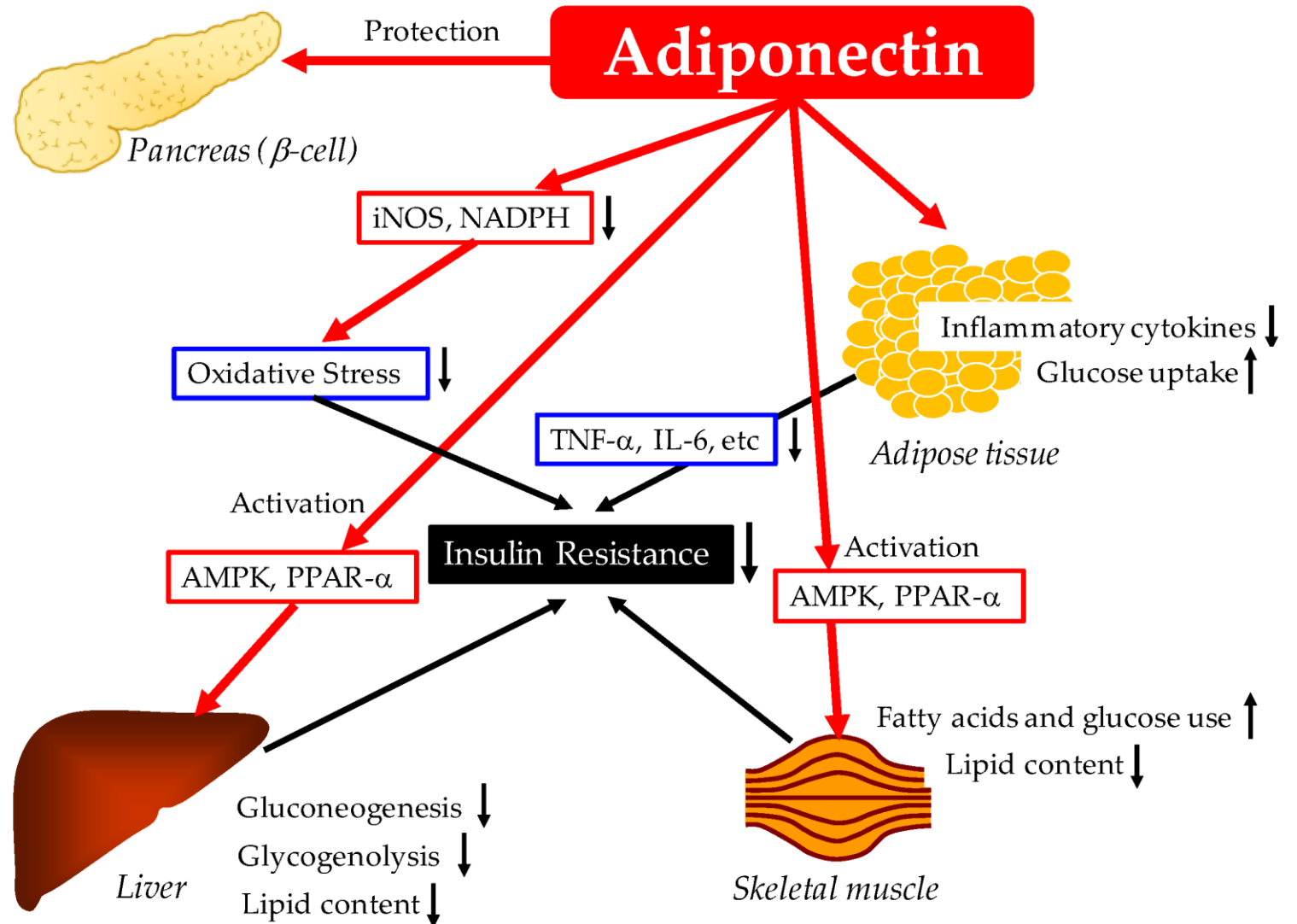
# Leptin and energy metabolism



# Leptin - functions



# Adiponectin





# Resistin

