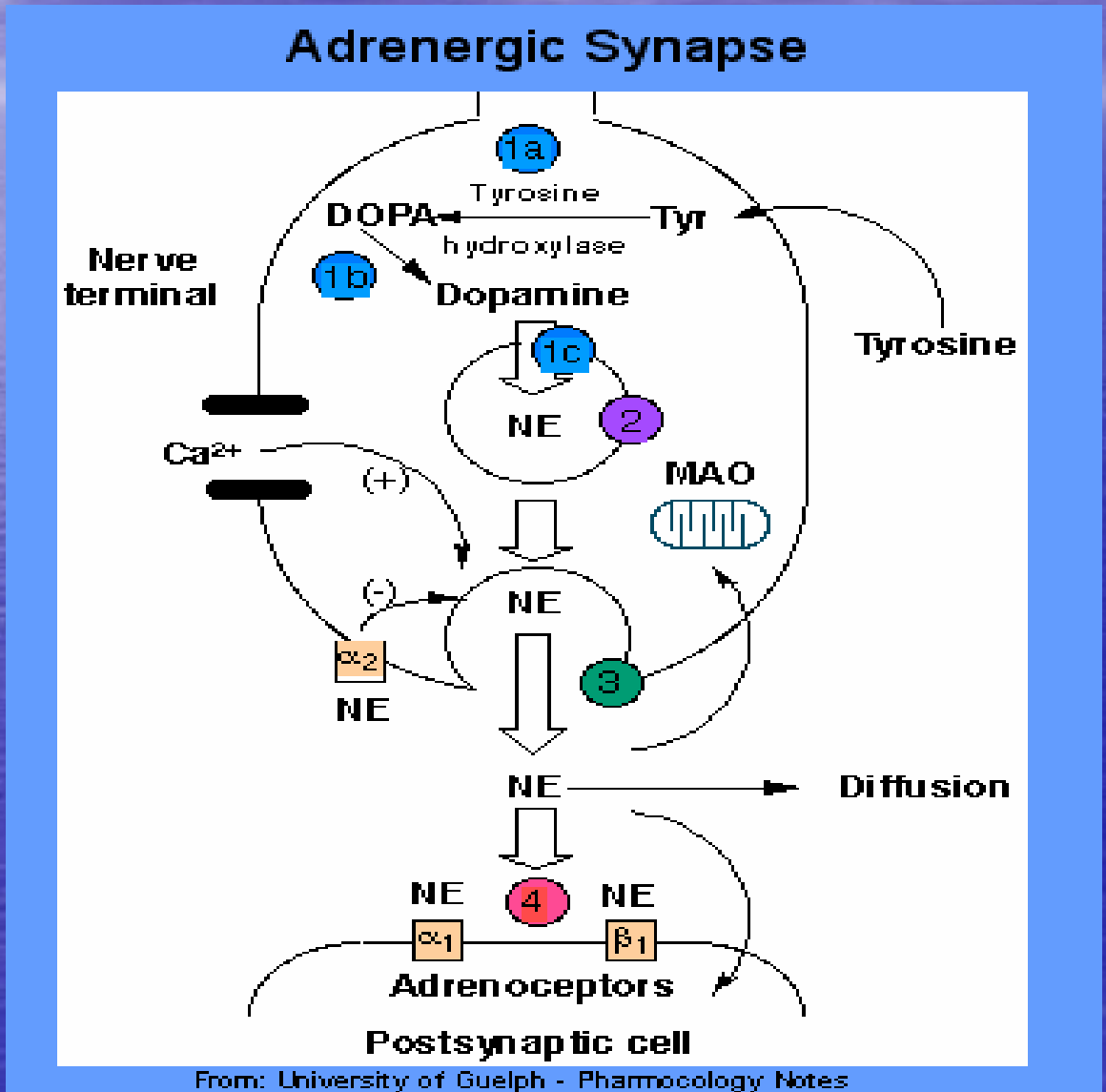
Noradrenalin & Receptors

- A brief information about the NT
- Receptor types
- Action mechanisms

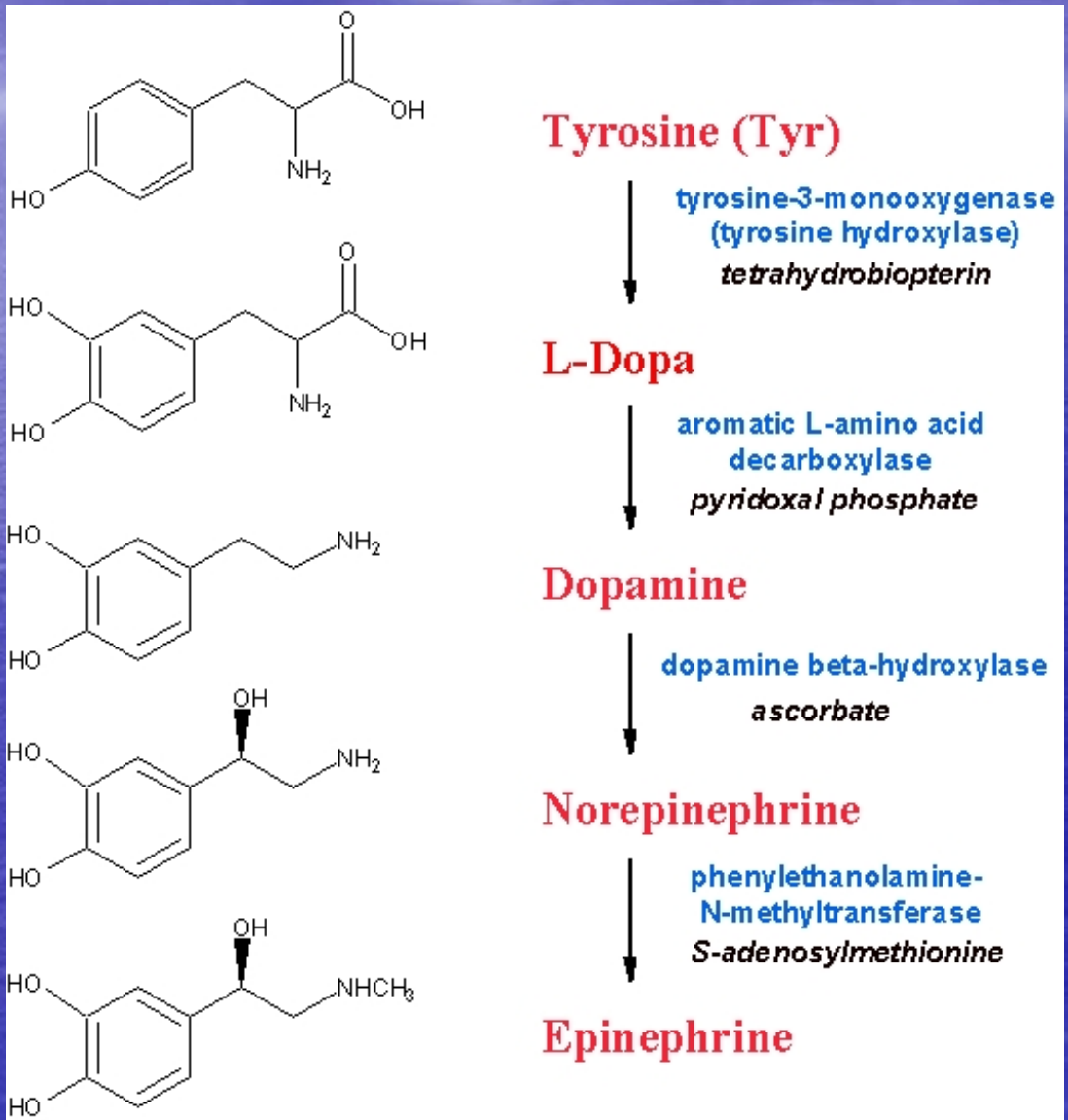
- Noradrenalin works both as a neurotransmitter in the CNS and as a hormone when it is released by the adrenal gland with adrenalin.
- Noradrenalin is released from the adrenal glands during stress.
- In the brain it plays a crucial role in arousing the body, for example from sleep.
- High level of noradrenalin leads to hypersensitivity
- Low level is related to poor concentration and depression
- Acts on adrenergic receptors

Release of noradrenalin

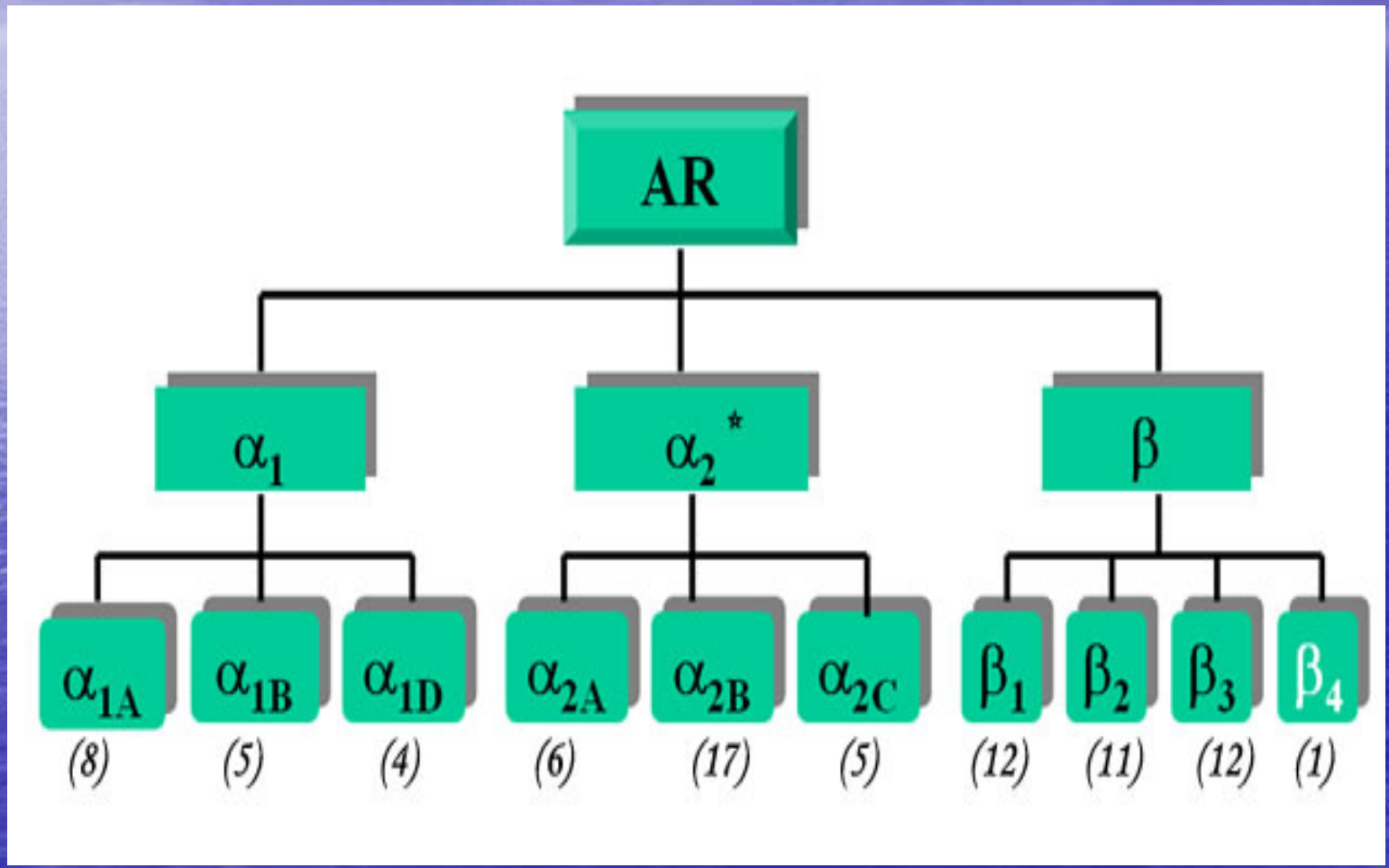


From: University of Guelph - Pharmocology Notes

Synthesis pathway of Noradrenalin



Adrenergic Receptor types & Family



Alpha Receptors

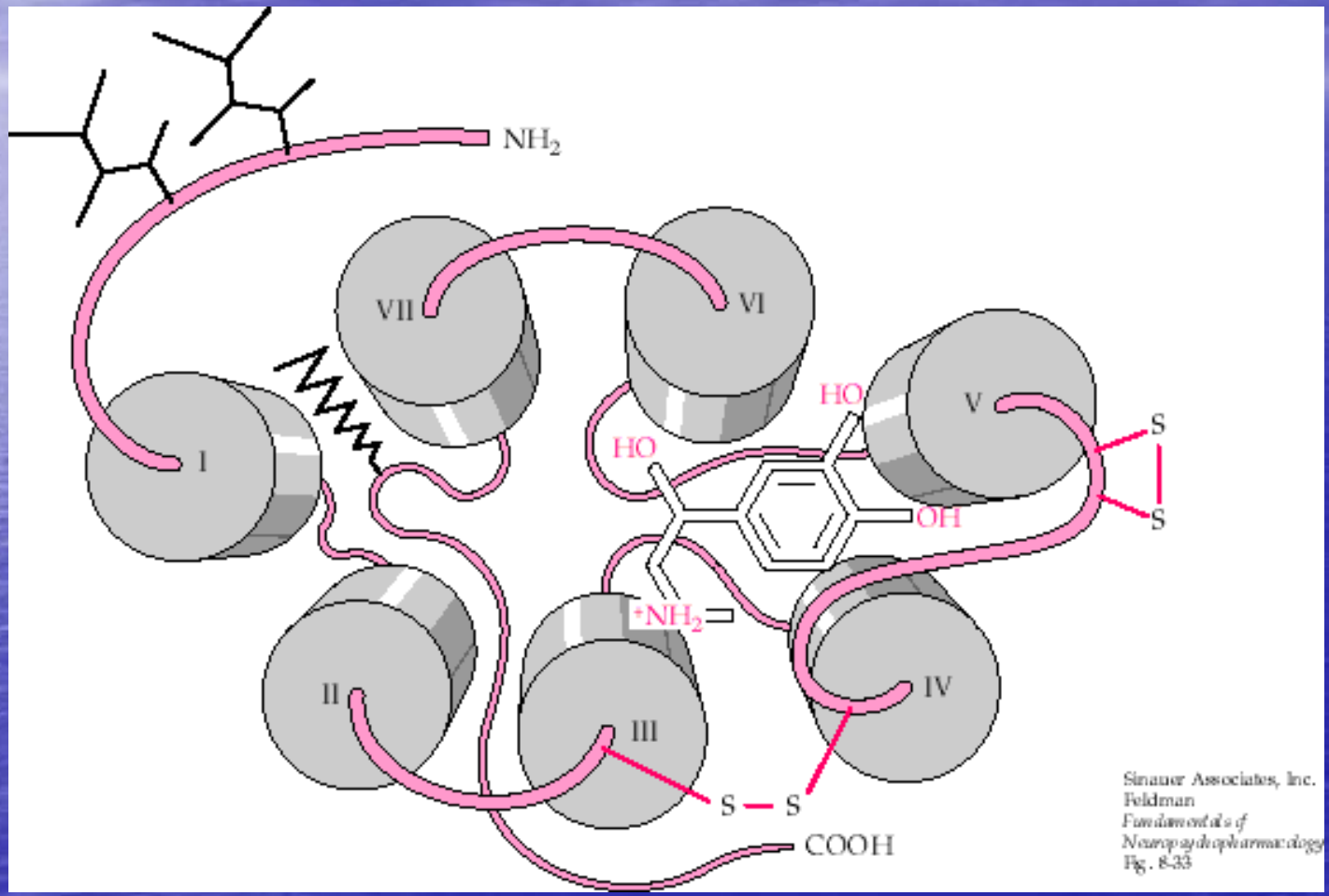
Alpha 1

- Predominant form of alpha receptor in the body.
- Found primarily in the smooth muscles of arterioles, eye, gut, skin, veins, etc., as well as in some other cell types (like salivary glands).
- Usually causes contraction of smooth muscle cells.

Alpha 2

- Found at pre-synaptic terminals of adrenergic nerves.
- Functions as an autoreceptor. If stimulated, it decreases the subsequent release of transmitter.
- When an agonist binds to an α2-receptor, cyclic AMP levels within the cell decrease.

Beta Receptors



Beta 1

- Found in heart muscle, and in the kidney.
- Causes increased heart rate and contractility.
- Promotes release of renin from the kidney

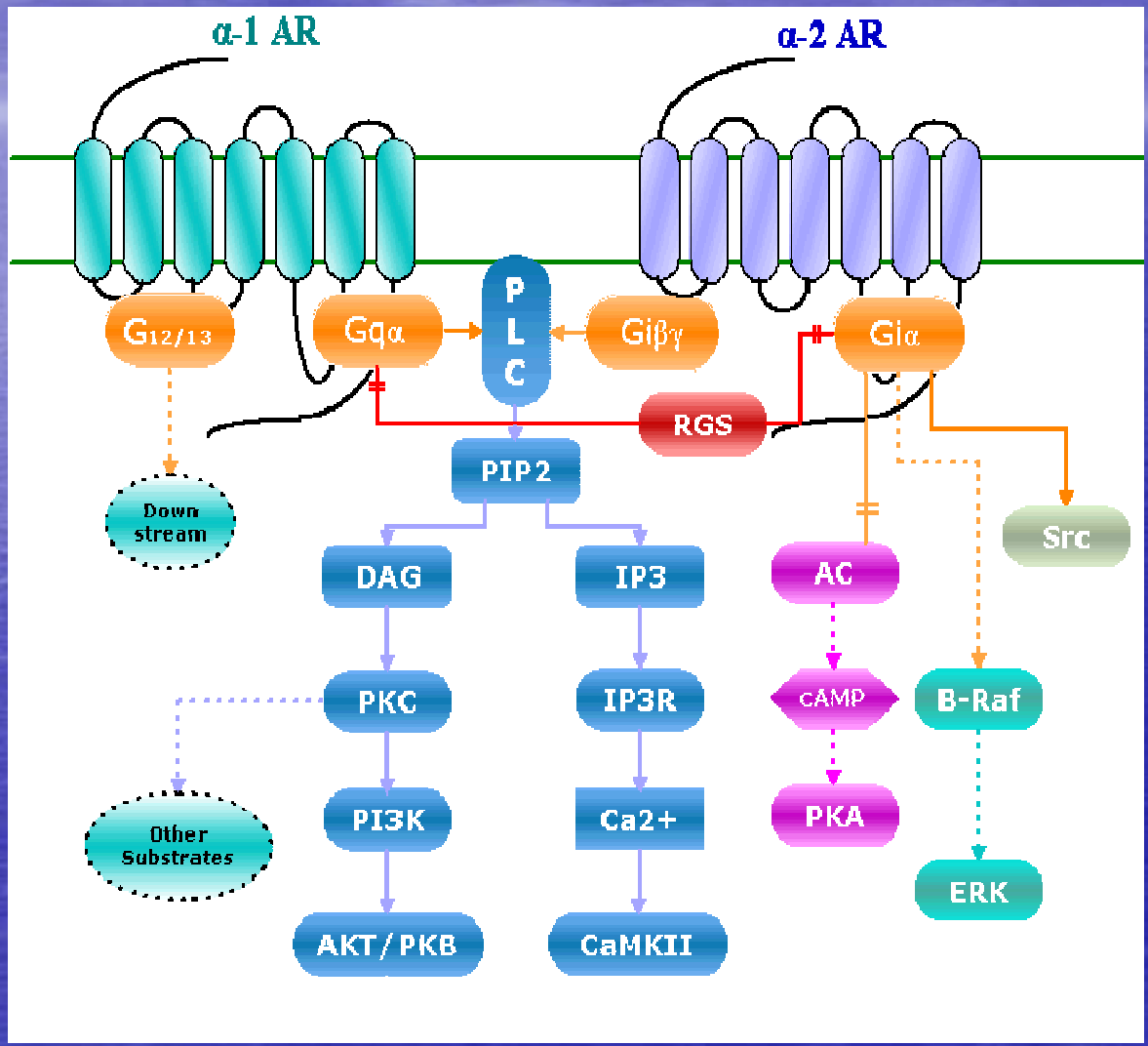
Beta 2

- Found in smooth muscle that relaxes upon stimulation, and in metabolic tissues
- Decrease in gastrointestinal motility.
- Vasodilation in skeletal and cardiac muscle.

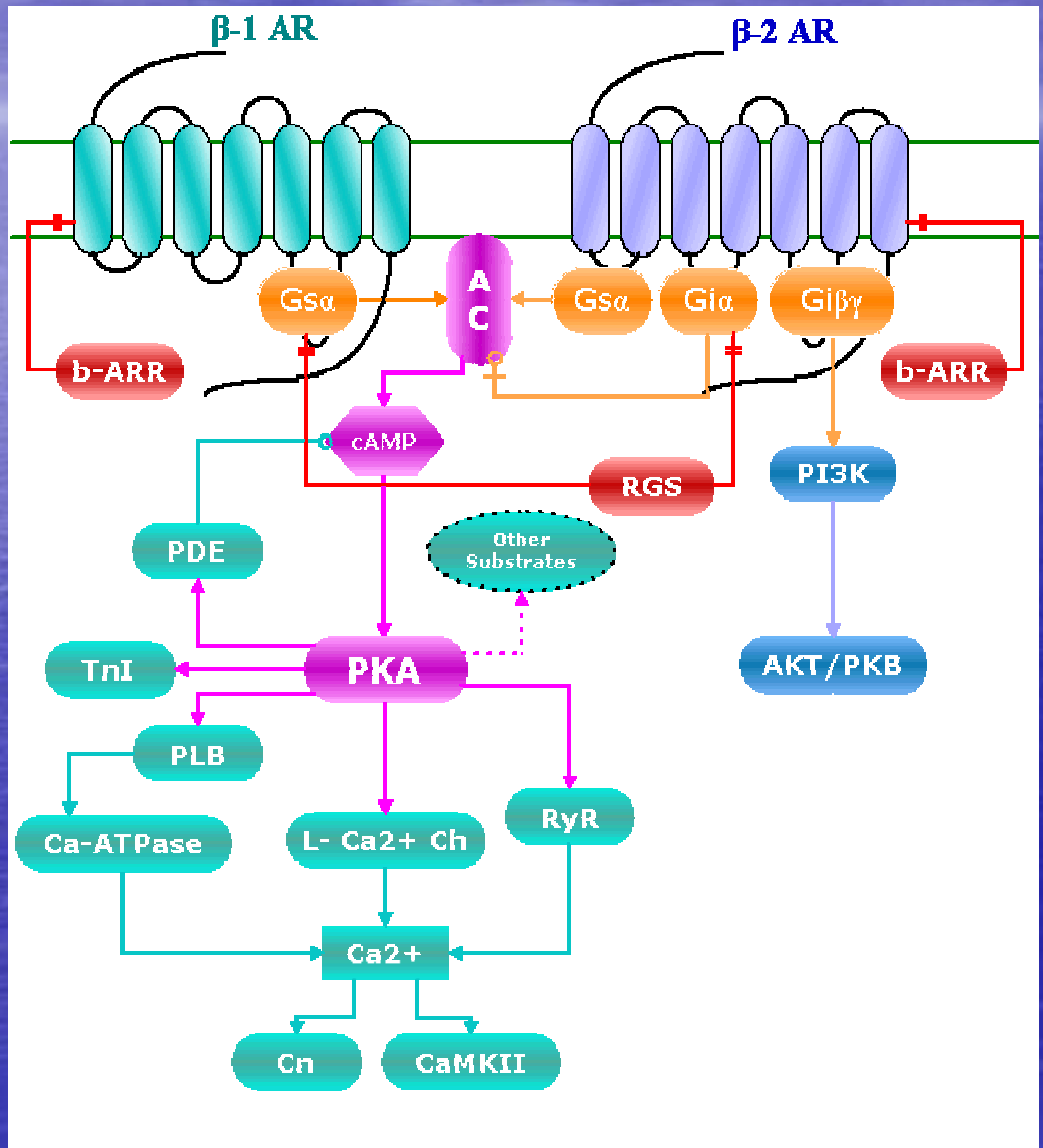
Beta 3

- β3 receptors are only found on brown adipose tissue.
- Stimulates lipolysis, increasing fatty acids in the blood.
- Adults don't have much brown adipose tissue, but babies have lots. The role of brown adipose tissue is thermogenesis - as blood passes through the brown adipose tissue it gets warmed up.

Signal transduction mechanism; Alpha Receptors



Signal Transduction Mechanism; Beta Receptors



2 Drug Examples:

- Monoamine oxidase inhibitors & amphetamine; Increase the free noradrenalin and elevate mood.
- Desipramine; Elevates the mood by decreasing the reuptake of liberated noradrenalin.

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