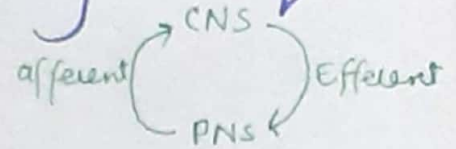


THE AUTONOMIC NERVOUS SYSTEM

Pharmaco-study YouTube

Nervous System



Central-NS (CNS)
Brain
Spinal cord

Peripheral-NS (PNS)
Neurons located outside CNS

(Motor) Efferent Division

Afferent (Sensory) Division

(carry signal from CNS → peripheral tissues)

carry signals from peripheral tissues to CNS

Auto = Self
Nomous = governing

Autonomic nervous sys.

(abdomen/intestine)
(visceral, vegetative or involuntary system)

Somatic → NO ganglia involved
voluntary control (contraction of skeletal muscles)

provide sensory input that mediates reflex action

- composed of efferent neurons for innervation.
- regulate funct. w/out conscious participation of mind.
- Innervate smooth muscles of

- viscera
- cardiac
- vasculature
- exocrine (gland that makes tears, saliva, milk & digestive juices)
- digestion
- CO
- Blood flow
- glandular secretion

Enteric sys. (neurons)
Sympathetic sys. (neurons)
Parasympathetic sys. (neurons)

- constitute "brain of gut"
- innervate GIT, pancreas, Gall bladder
- Control motility, exo & endocrine secretions, microcirculation of GIT.
- Modulated by both sym & parsym. system
- Junction indep. of CNS.

Somatic sensory

visceral sensory

General

Specific

General

Specific

- Touch
- pain
- pressure
- vibra.
- Temp
- proprioceptors in - skin - body wall - limbs
- Hearing
- vision
- Equilib.

- stretch
- pain
- Temp
- chemical changes
- Irritation in viscera
- Nausea
- Hunger

- Taste
- Smell

SYMPATHETIC V/S PARASYMPATHETIC

NO. of vertebrae = 26 — adult — sacral & coccygeal fuse from 5 & 4 to 1, 1
33 — child.

* Neurons of Symp.

Thoracolumbar / Dorsolumbar

- * pre-gang. neuron of symp sys. comes from thoracic & lumbar regions (T1) $\xrightarrow{11-12}$ L2 of spinal cord.

- * pre-gang. neuron $\rightarrow$ short
- * post-gang. neuron $\rightarrow$ long

Pharmacology YouTube

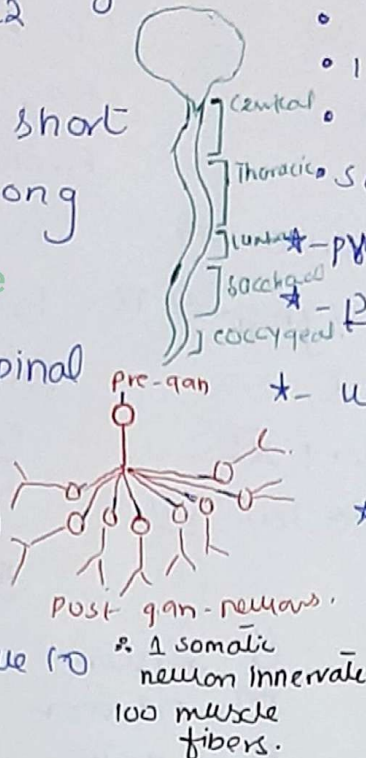
- * Located close to spinal cord

- * Extensive branching
- * In mesenteric plexus

1 pre-gang. $\xrightarrow{\text{interact}}$ 8000 or more fibers

- * Diffuse response due to branching

- * wide distribution



Neurons of Parasymp.

CRANIOSACRAL

- * pre-gang. neuron fiber arise from from brain
- * cranial nerve (III) (oculomotor)
- * " " (VII) (facial)
- * IX (glossopharyngeal)
- * X (vagus) 90% of all parasymp. neu.
- * sacral region (S2-S4) of spinal cord.

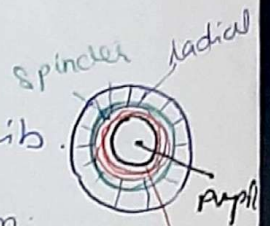
- * pre-gang. fibers $\rightarrow$ long
- * post-gang. fiber $\rightarrow$ short (PS)

- * within or near the effector organs

- * Minimal branching

- * Discrete (separate/distinct)

- * limited distrib.



FUNCTIONS

- * Sympathetic (fight/flight) (3F) (Fright, Fear, Fight)

- * Parasymp (rest-digest) (cool-calm, Always: constriction = Active, Relax = Passive)

- * Eyes — contrac of iris radial muscle — pupil dilates
- contrac of iris sphin (pupil contract), ciliary mus (near vision)

- * Lacrimal Gland: $\rightarrow$ Stimulation of Tears

- * Salivary gland $\rightarrow$ Thick viscous secre. copious, watery secret

- * Trachea & bronch: — Dilation
- constriction, $\uparrow$ secre.

- * Adrenal gland: Secre. of epi & norepinephr.

- * Kidney: Renin secre (B₁ — $\uparrow$ ses, $\downarrow$ ses)

- * Heart: — $\uparrow$ HR + contractility
- $\downarrow$ HR + contrac.

- * GIT — $\downarrow$ motility & tone
- $\uparrow$ motility & tone

- * Uterus & bladder — Relax of detrusor
- contrac of detrusor

- * Genitalia (male): — Stimulate ejaculation
- Stimulate erection

- * Female — Relaxation of uterus

- * Sweat gland, hair follicles, spleen & most of B-V. | ciliary muscle, Pancreatic & gastric glands

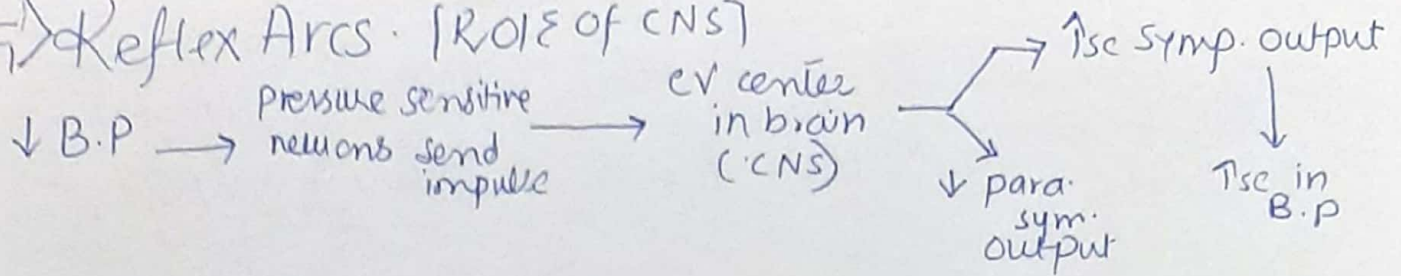
Blood vess. Dilation (skeletal mus)

Blood vs constriction (Skin, mucous mem & Splanchnic area)

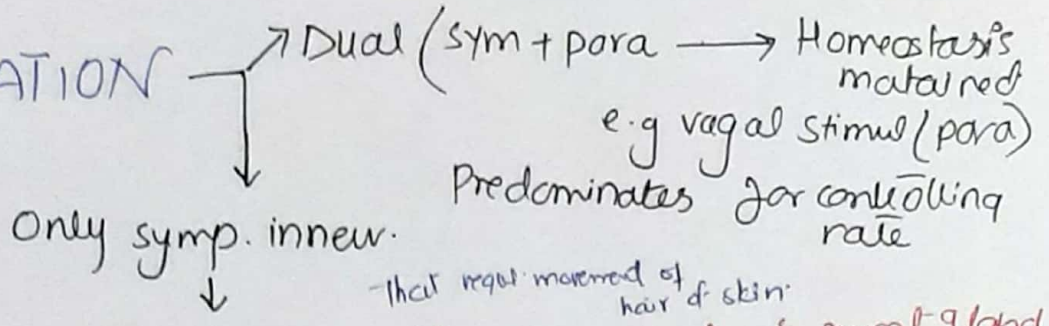
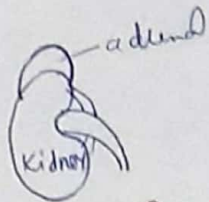
- * Sym. sys = function as a unit & discharge as comp. sys. e.g. during exercise or in resp. to fear.

- * parasymp = never discharge as a comp. unit.

⇒ Reflex Arcs · [ROLE of CNS]

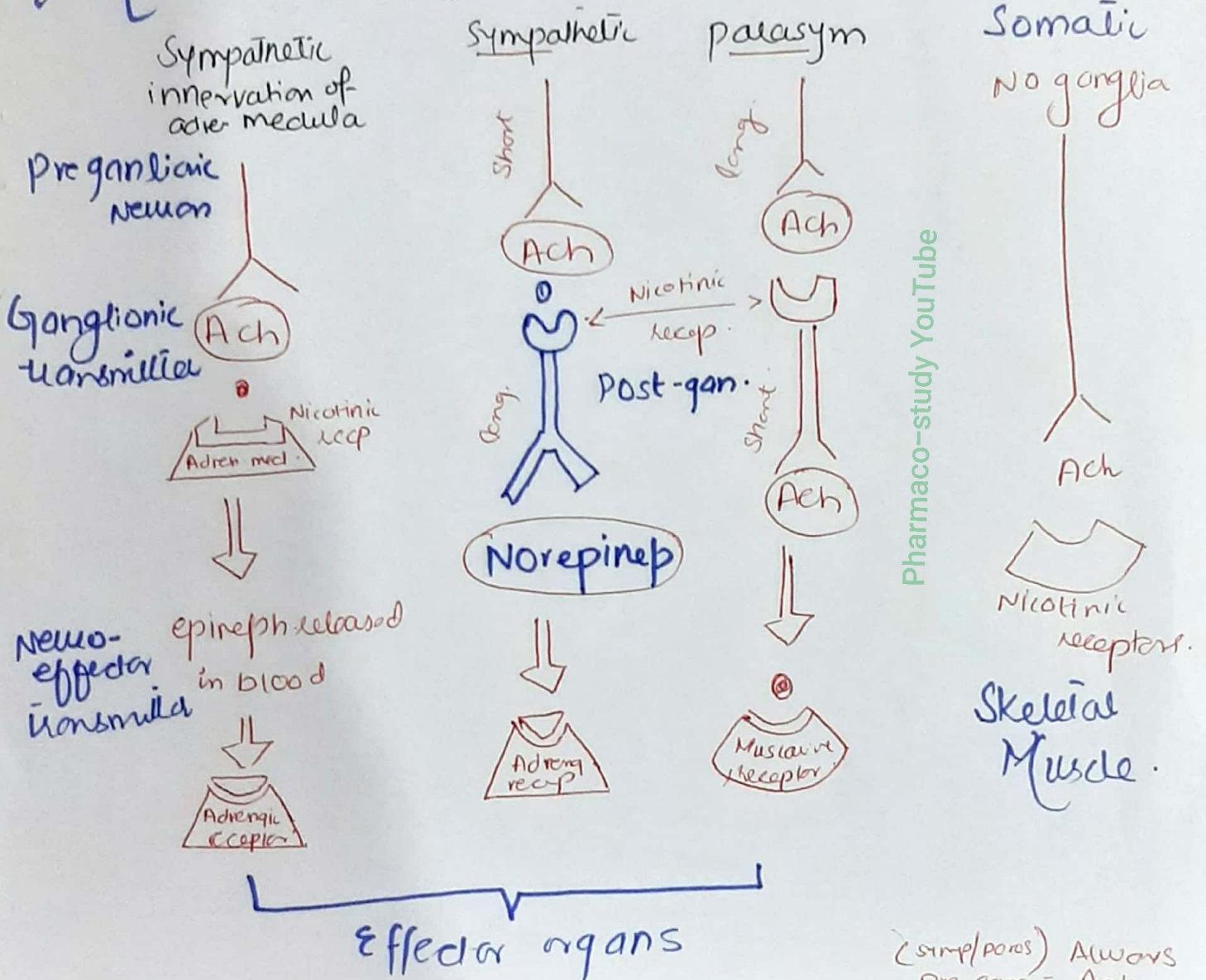


⇒ INNERVATION



Adrenal medulla, kidney, pilomotor muscles & sweat glands

⇒ AUTONOMIC & SOMATIC CHEMICAL SIGNALING



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Main NT in ANS are ACh & nor-epineph.

Major of para = ACh (Post)

Major NT always release in Post-symp

(symp/para) Always Pre-gang = ACh

Symp = N.E / N. Adrenaline (Post) (major) (ACh minor)