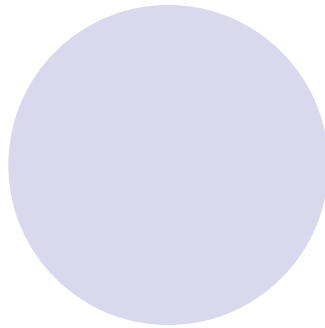
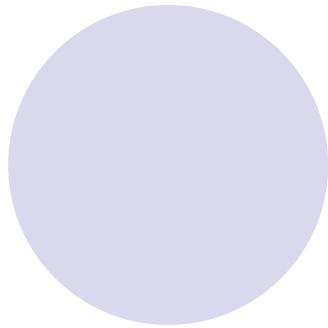
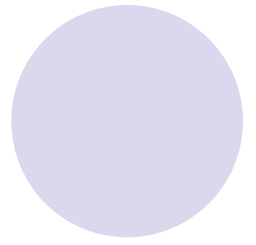
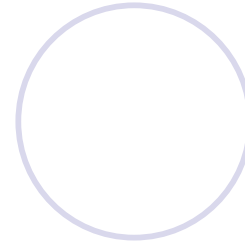
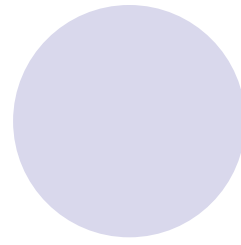
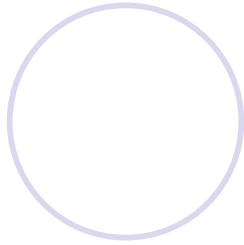
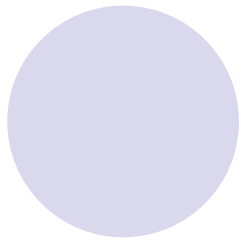


Lecture 7. Structural and functional organization of the autonomic nervous system





ANS – is a complex of central & peripheral cell structures, which regulate the functional level of all the body organs & systems, required for the adequate response to external or internal stimuli

ANS FUNCTIONS

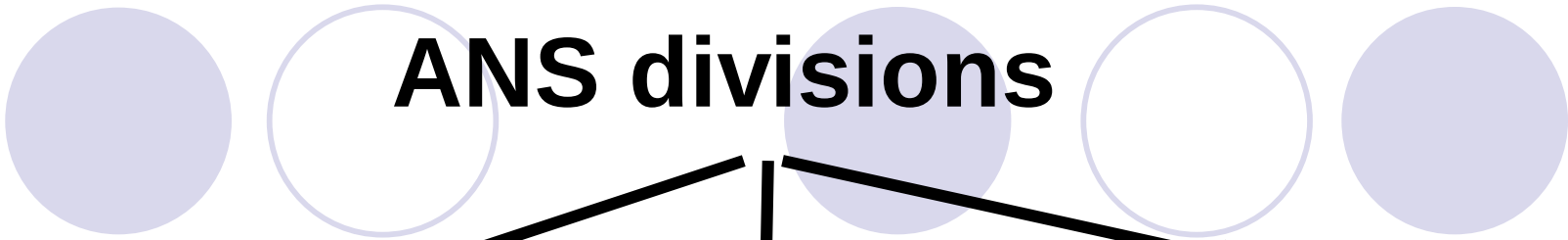


- Maintenance of homeostasis
- Adjustment of internal environment to the changings of external environment (food intake, mechanical work, lack of water, heat, cold)
- Regulation of the work of organs and systems which don't partake in homeostasis maintenance (sex organs, intraocular muscles)

Autonomic Nervous System

- **ANS acts on smooth muscles & glands**
 - Controls & regulation of the heart, respiratory. system, GI tract, bladder, eyes & glands
 - Involuntary - person has little or no control
- **Somatic - voluntary - person has control (skeletal muscle)**

ANS divisions

The diagram features five circles at the top, alternating in color between light purple and white. A central black line descends from the title and splits into three arrows pointing to the left, down, and right.

parasympathetic

**Cranio-bulbar
(III, VII, IX, X cr.n.)**

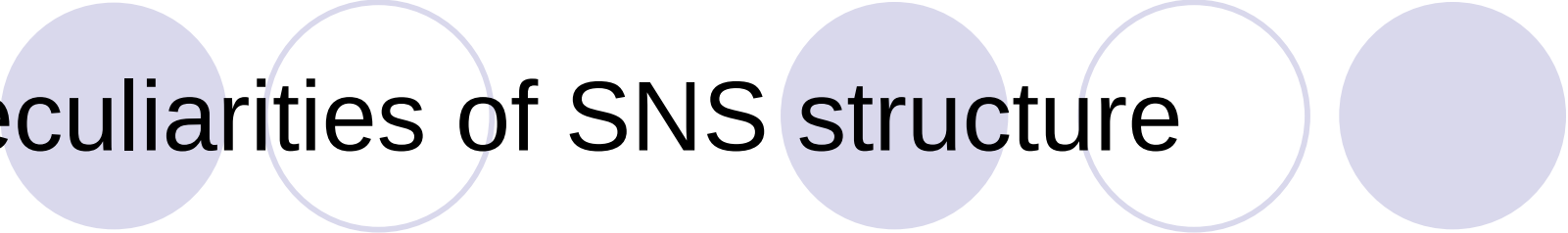
**Sacral
(pelvic nerve)**

sympathetic

Thoraco-lumbar

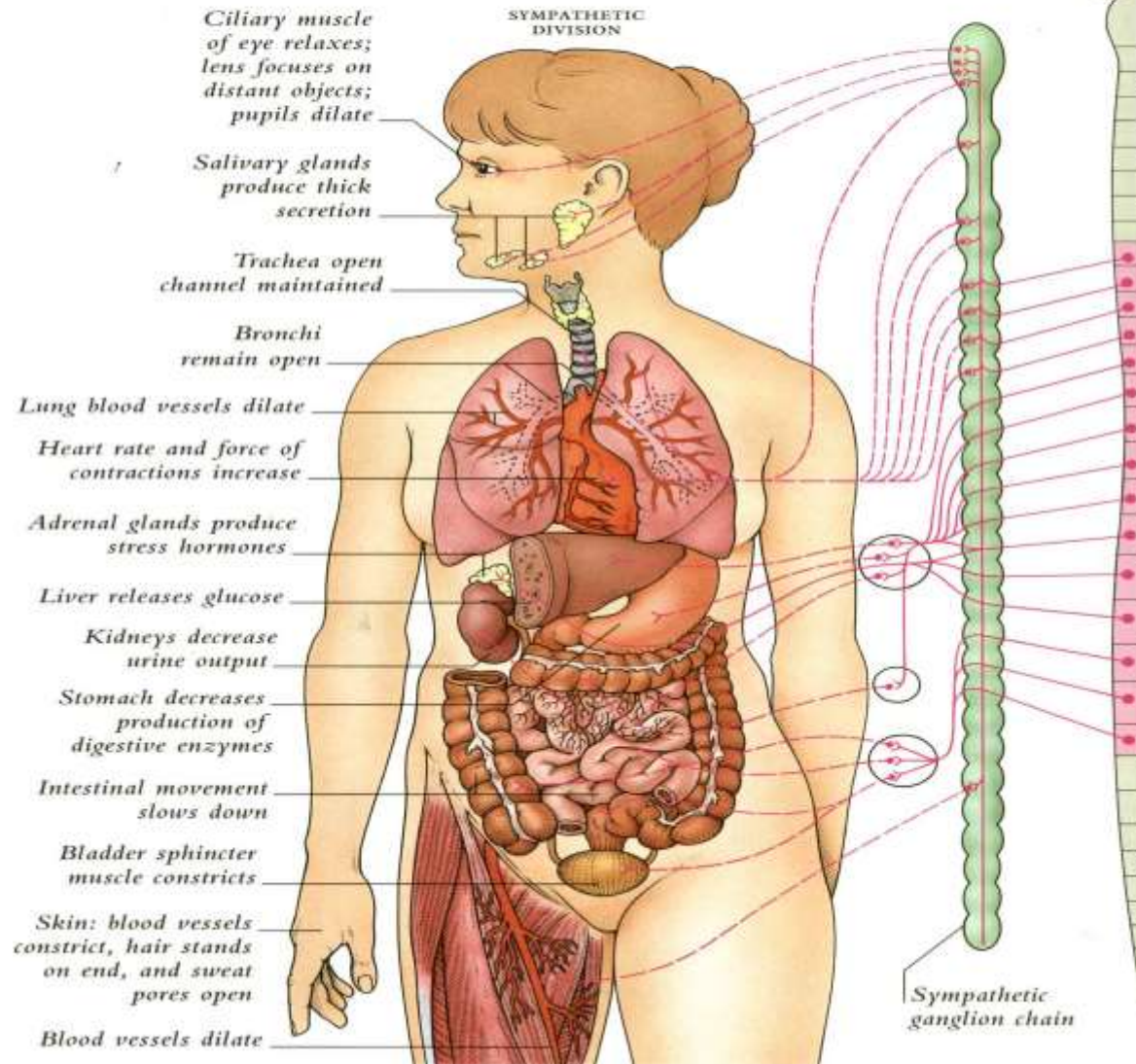
metasympathetic

*(intraorgan plexuses & fibers in the heart,
GIT, urinary bladder.
bronchi)*



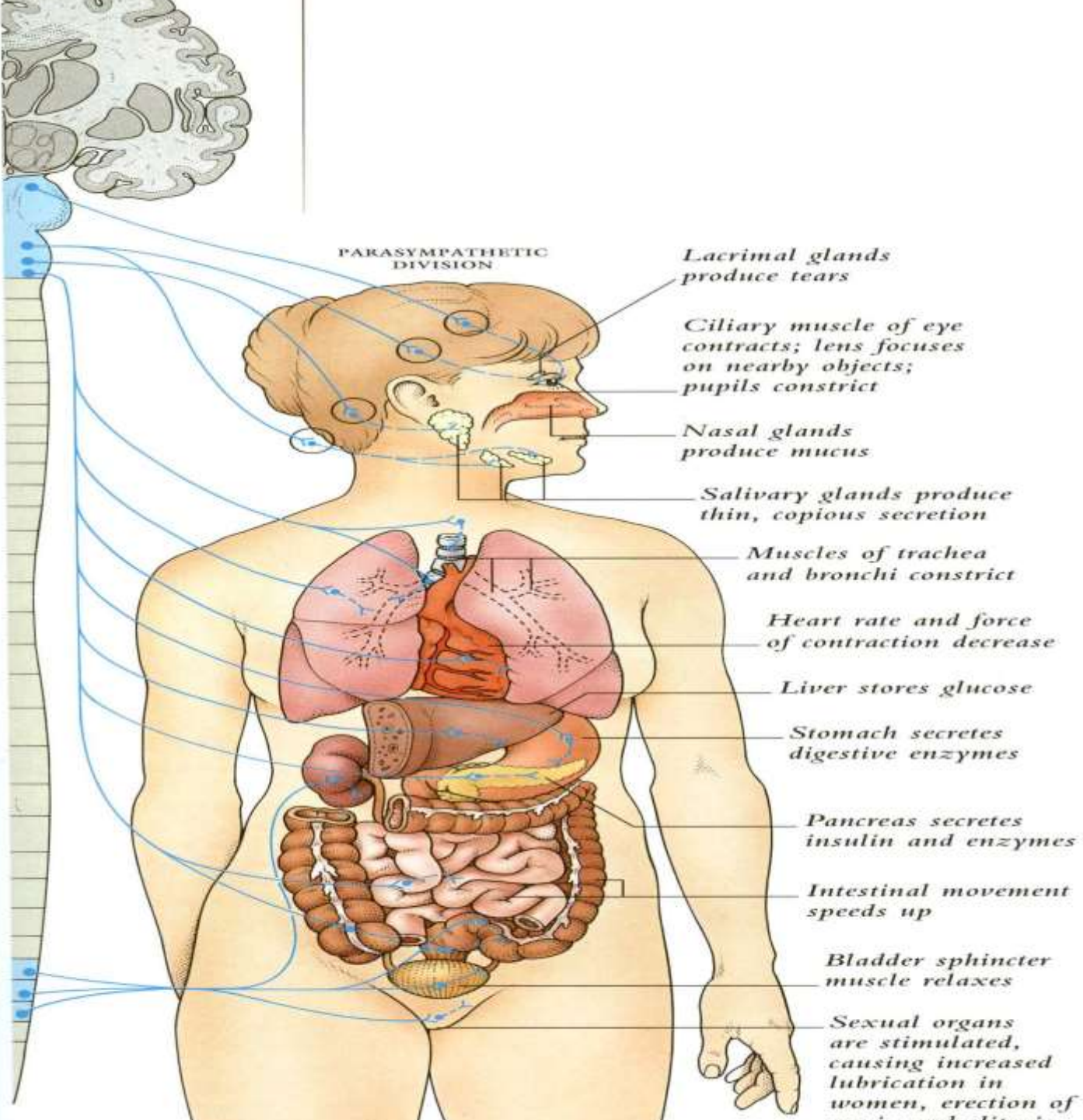
Peculiarities of SNS structure

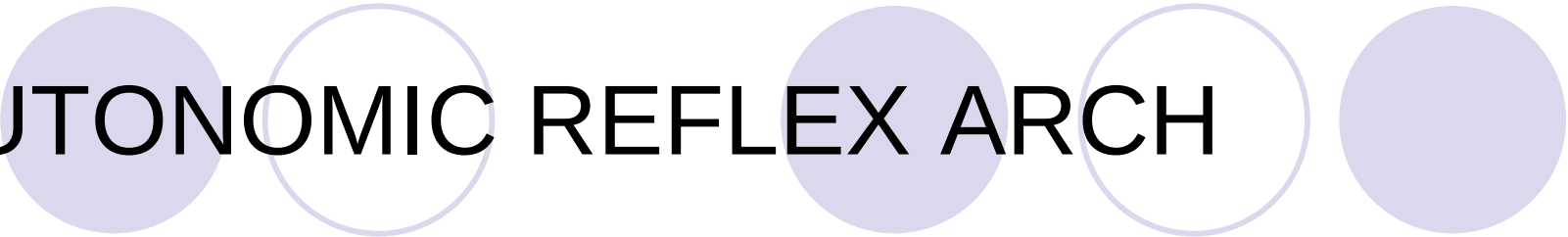
- Lateral horns in thoraco-lumbar segments (Th 2- L3)
- Axons form rami communicantes alba
- End up on paired paravertebral ganglia or non-paired prevertebral ganglia (celiac, superior mesenteric and inferior mesenteric)
- rami communicantes grisea or nerves (to the organs of head, pelvis and abdomen)



Peculiarities of PSNS structure

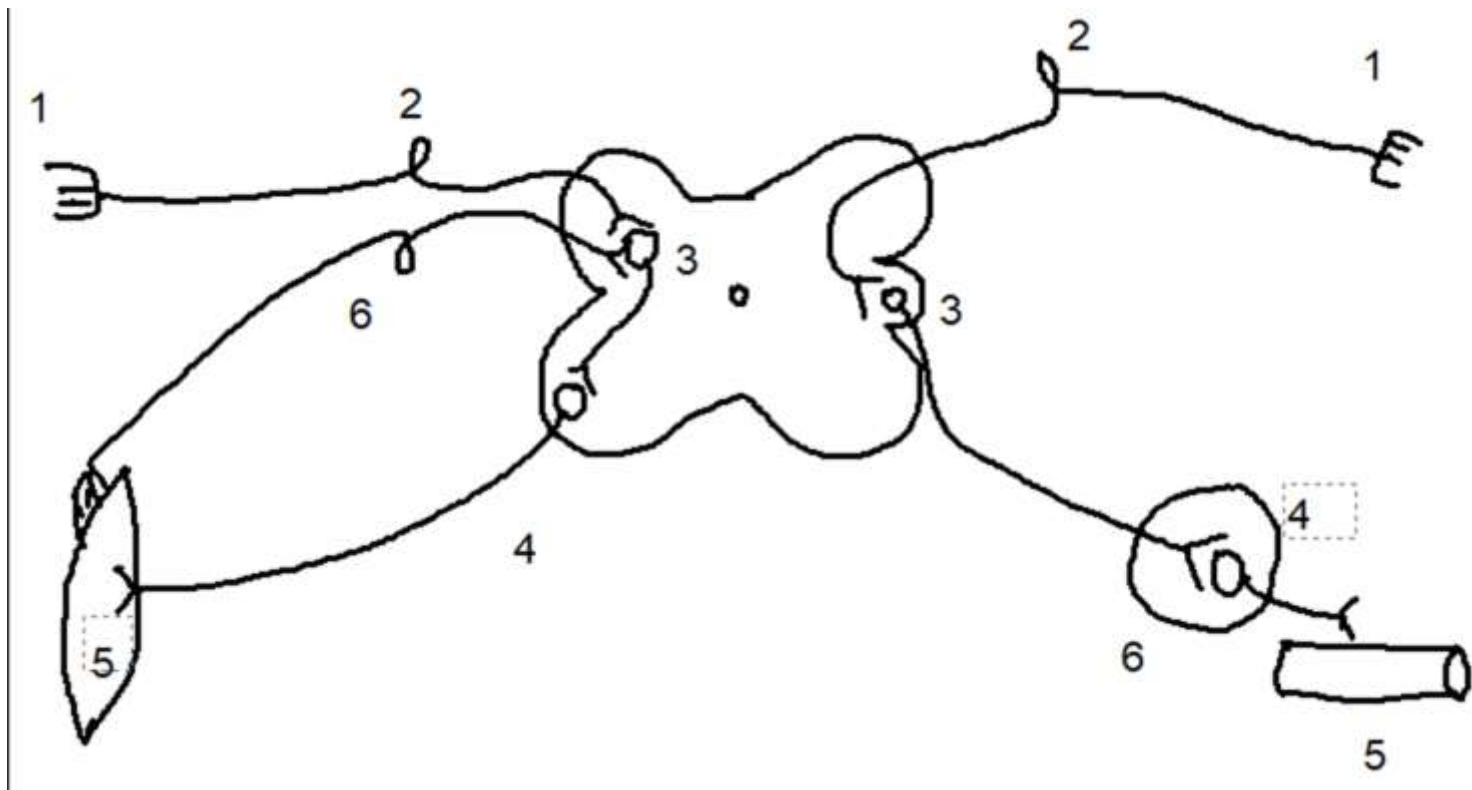
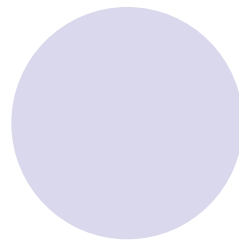
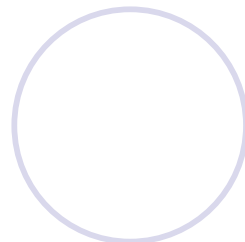
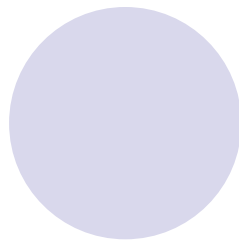
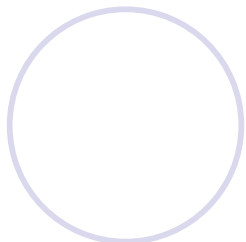
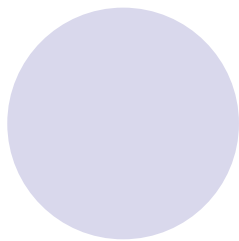
- Midbrain- III pair nucleus
- Medulla – VII (chorda tympany to submandibulum & sublingual glands), IX (n. auriculo-temporalis to parotid gland), X (vagus)
- Sacral segments



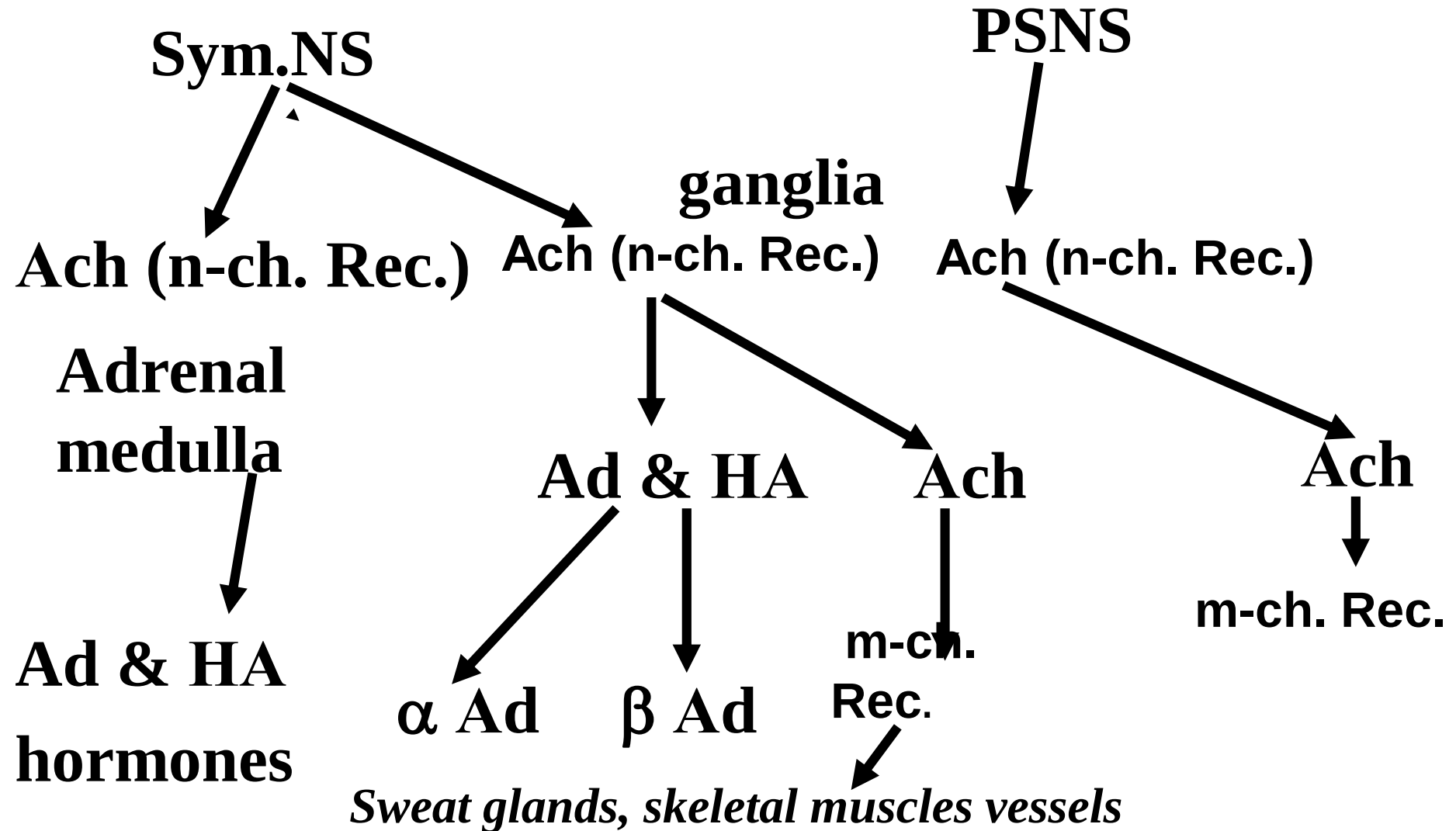


AUTONOMIC REFLEX ARCH

- Two efferent neurons
- Long postganglionic fibers in SNS
- Different mediators released by pre-and postganglionic fibers



Mediators & receptors in ANS



Effects of sympathetic stimulation

Organs	Receptors	Effects
Bronchi	β	dilation
Heart	β	>HR,>SV
Veins	β	constriction
Arteries	α (skin,kidney,intestines)	constriction
	β (coronary arteries)	dilation
	Ach (sweat glands, piloerectors, vasodilators of skeletal muscles)	
Liver	β	glucogenolysis
Adipose tissue	β	lipolysis

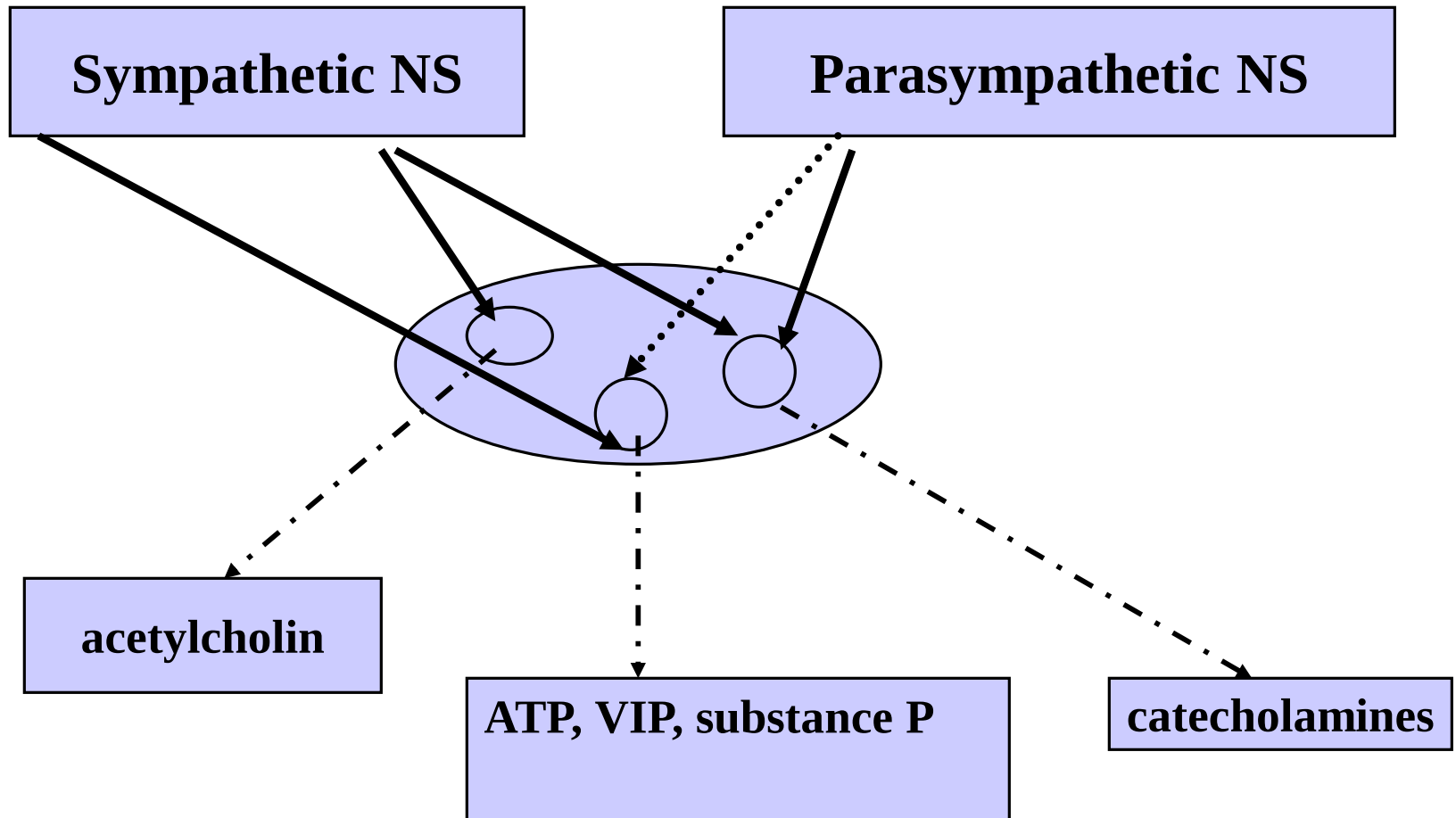
ANS influence on different organs

Organs	Parasympat.	Sympat.
heart	inhibition	Excitation
Vessels:		
of Skin, abdominal organs.	-	Constriction
of Muscles	-	Constriction & dilatation
of heart , brain	-	dilatation
Salivatory glands, sex organs	dilatation	constriction
Bronchi	constriction	dilatation

ANS influence on different organs

Organs	Parasympat.	Sympathet.
Glands:		
Sweat	-	secretion
Salivatory	extrusion	synthesis
pancreas	extrusion	synthesis

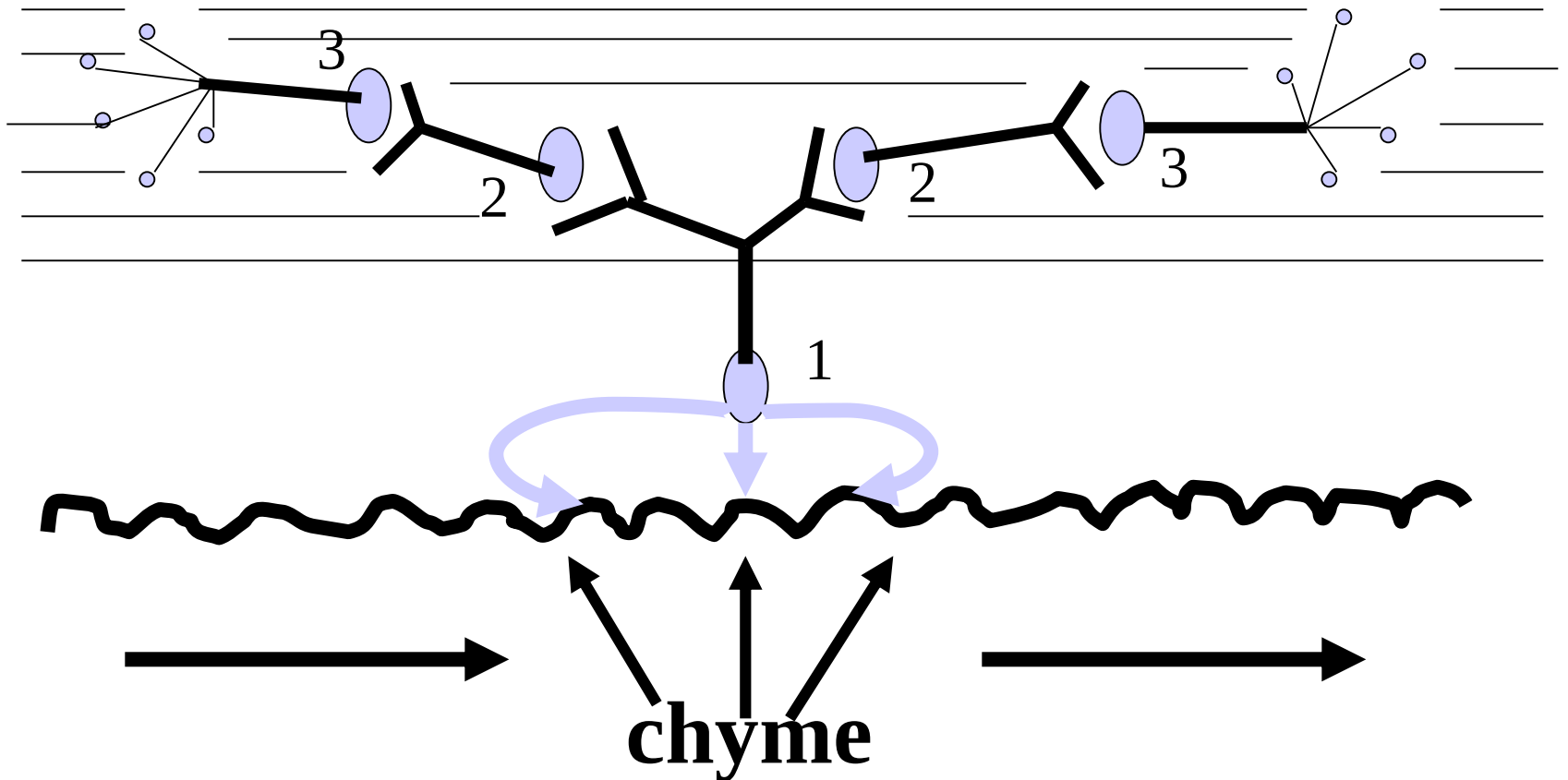
Interaction of Sympathetic & parasympathetic departments

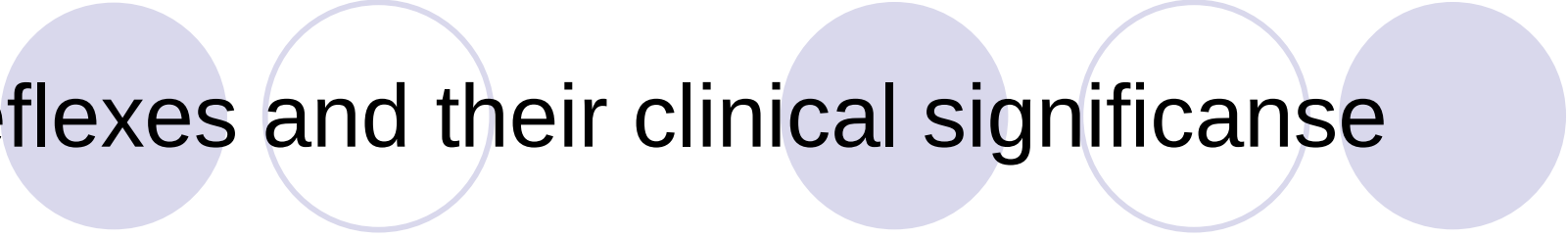


INTRAMURAL PERISTALSIS REFLEX

CONTRACTION-
cholinergic

RELAXATION-
pyrinergic





Reflexes and their clinical significance

Somato-visceral

viscera-somatic

Viscera-visceral