

Autonomic Nervous System

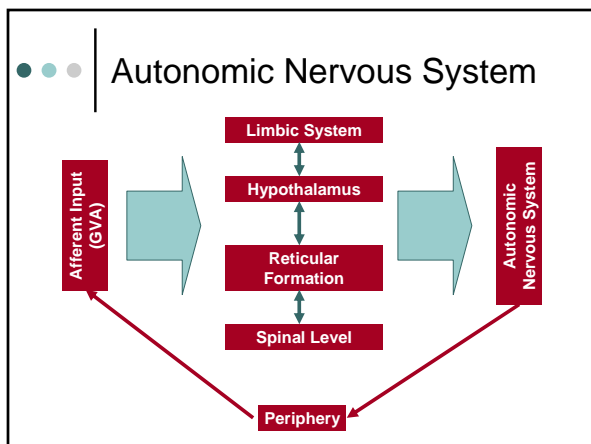
Medical Neuroscience
Dr. Wiegand

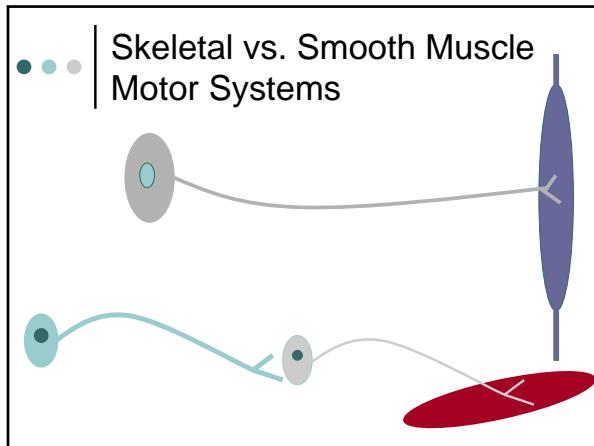
Autonomic Nervous System

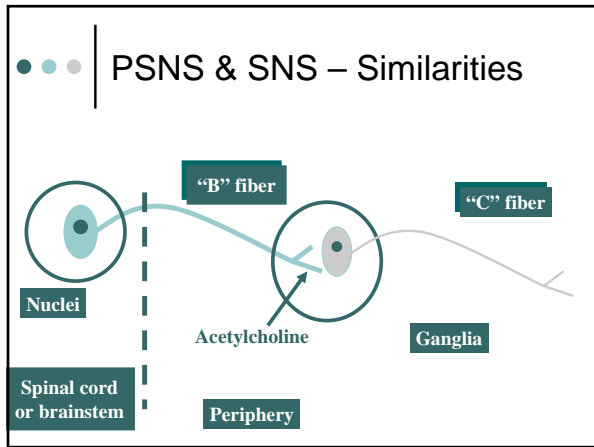
- o Enteric System
- o Sympathetic Nervous System
- o Parasympathetic Nervous System

All systems have GVE and GVA components

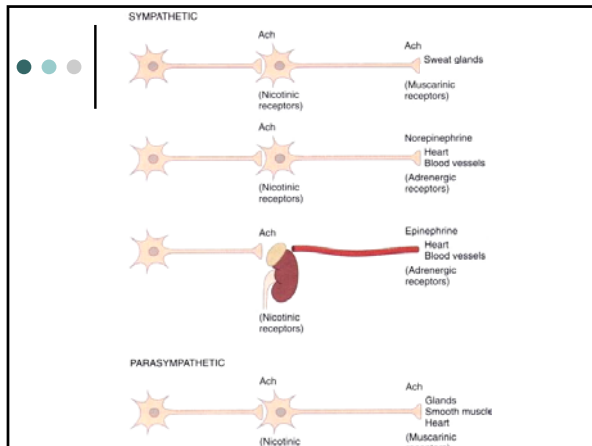
Primarily considered a two neuron chain motor system





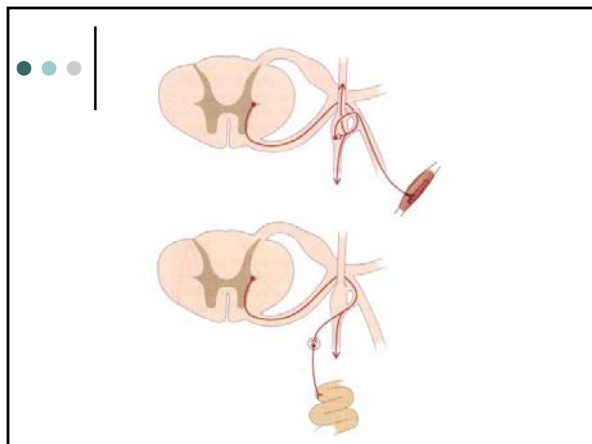


- ### PSNS & SNS – Differences
- | | |
|---|---|
| <ul style="list-style-type: none"> ○ SNS <ul style="list-style-type: none"> • activate body • thoracolumbar (T1-L2) • short preganglionic/long postganglionic fibers • global responses • postganglionic transmitter: norepinephrine (except sweat glands – ACH) | <ul style="list-style-type: none"> ○ PSNS <ul style="list-style-type: none"> • prepare body for rest • craniosacral (CN III, VII, IX, X & S2-4) • long preganglionics/short postganglionic fibers • discrete/local responses • postganglionic transmitter: acetylcholine |
|---|---|



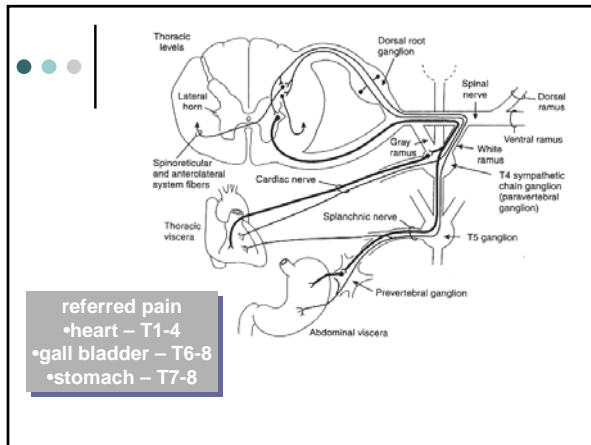
Sympathetic Nervous System

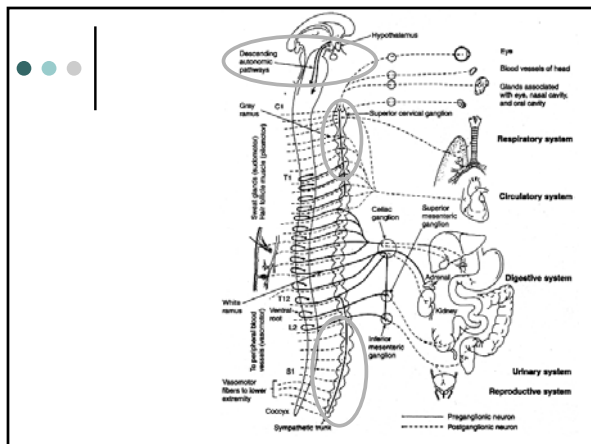
- "Fight or Flight" system
- Activation
 - increases heart rate
 - increases sweating
 - dilates pupil
 - inhibits GI movement
 - closes sphincters
 - diverts blood from skin and GI tract to skeletal muscles

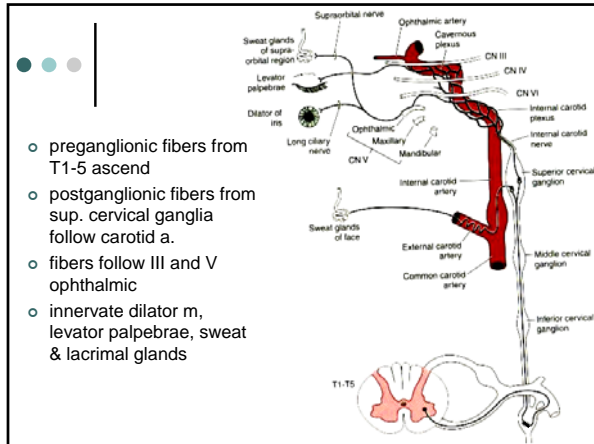


Sympathetic Nervous System- Preganglionic Neuron May:

1. terminate on postganglionic neuron in the sympathetic chain ganglia
2. ascend or descend to higher or lower ganglia and terminate on postganglionic neuron in the sympathetic chain ganglia
3. pass through the sympathetic chain to prevertebral ganglia (celiac, inferior or superior mesenteric)
4. pass through the sympathetic chain ganglia to adrenal medulla



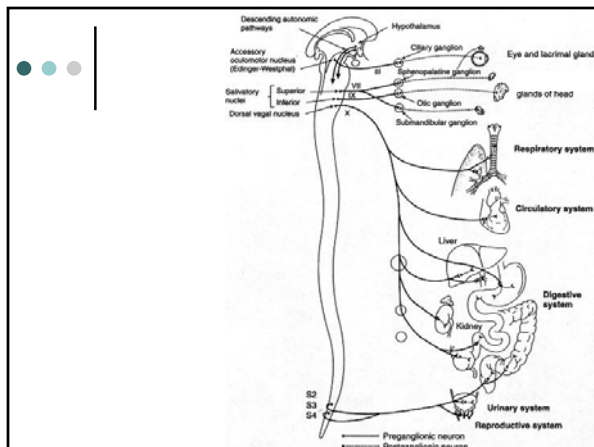




- preganglionic fibers from T1-5 ascend
- postganglionic fibers from sup. cervical ganglia follow carotid a.
- fibers follow III and V ophthalmic
- innervate dilator m, levator palpebrae, sweat & lacrimal glands

Parasympathetic Nervous System

- prepares body for rest
 - promotes digestion, GI peristalsis
 - slows heart rate
 - constricts pupil
 - empties bladder
 - relaxes sphincters
 - mediates genital erection



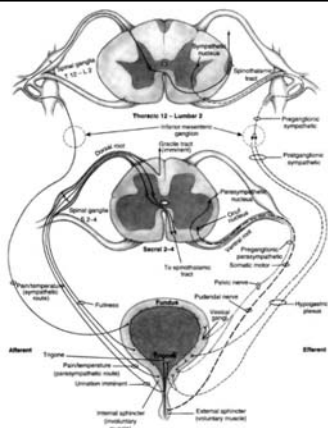
Horner's Syndrome

- damage to the descending fibers from the hypothalamus or the superior cervical ganglia
- miosis – pupillary constriction
- anhidrosis – lack of sweating
- ptosis – drooping of the eye lid
- enophthalmos – eye appears to sink in to the orbit



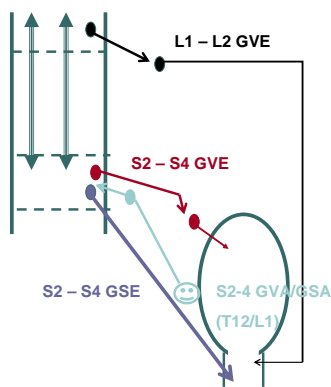
Bladder

- SNS – retention
- PSNS – voiding (micturition)



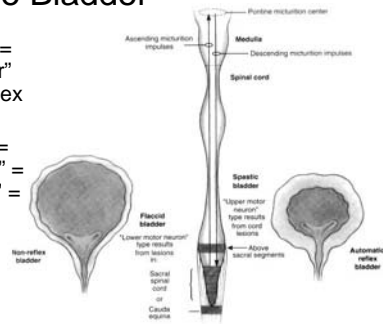
Bladder Innervation

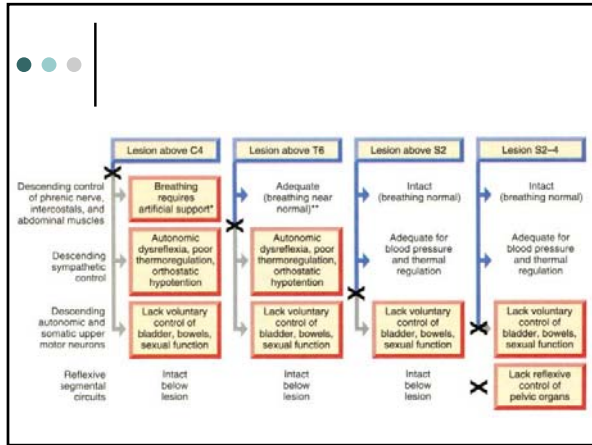
- SNS input from L1-2 (int. urinary sphincter)
- PSNS input from S2-4 (detrusor mm)
- GSE (Onuf) to ext. urinary sphincter
- GSA (pain, temp & pressure to T12/L1 & S2-4)
- GVA to S2-4
- paracentral lobule & brainstem



Autonomic Nervous System and the Bladder

- o "UMN bladder" = "spastic bladder" = automatic reflex bladder
- o "LMN bladder" = "flaccid bladder" = "atonic bladder" = autonomous reflex bladder







"The best thing you can do is to get very good at being you."
