

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

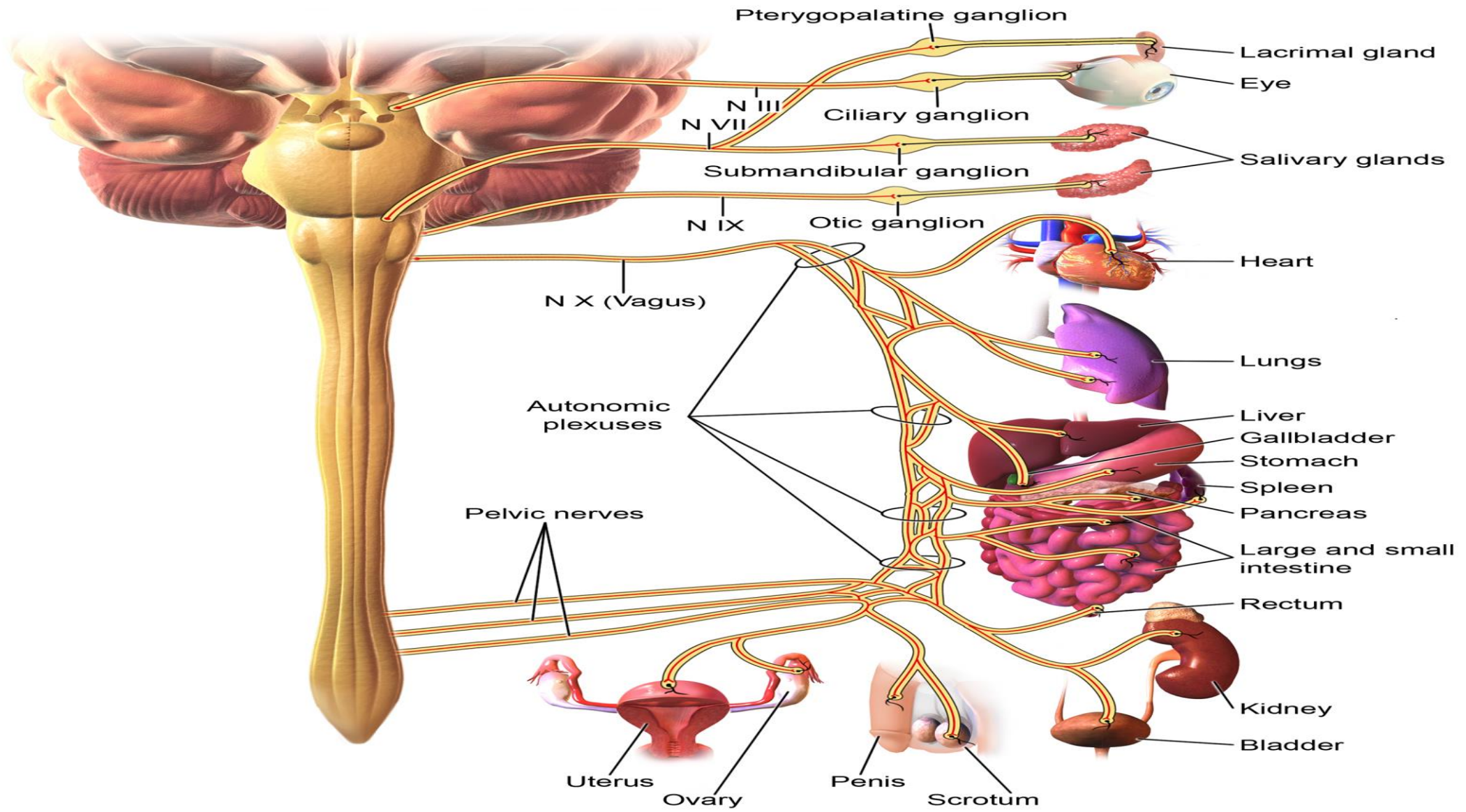
ENTERIC NERVOUS SYSTEM

By

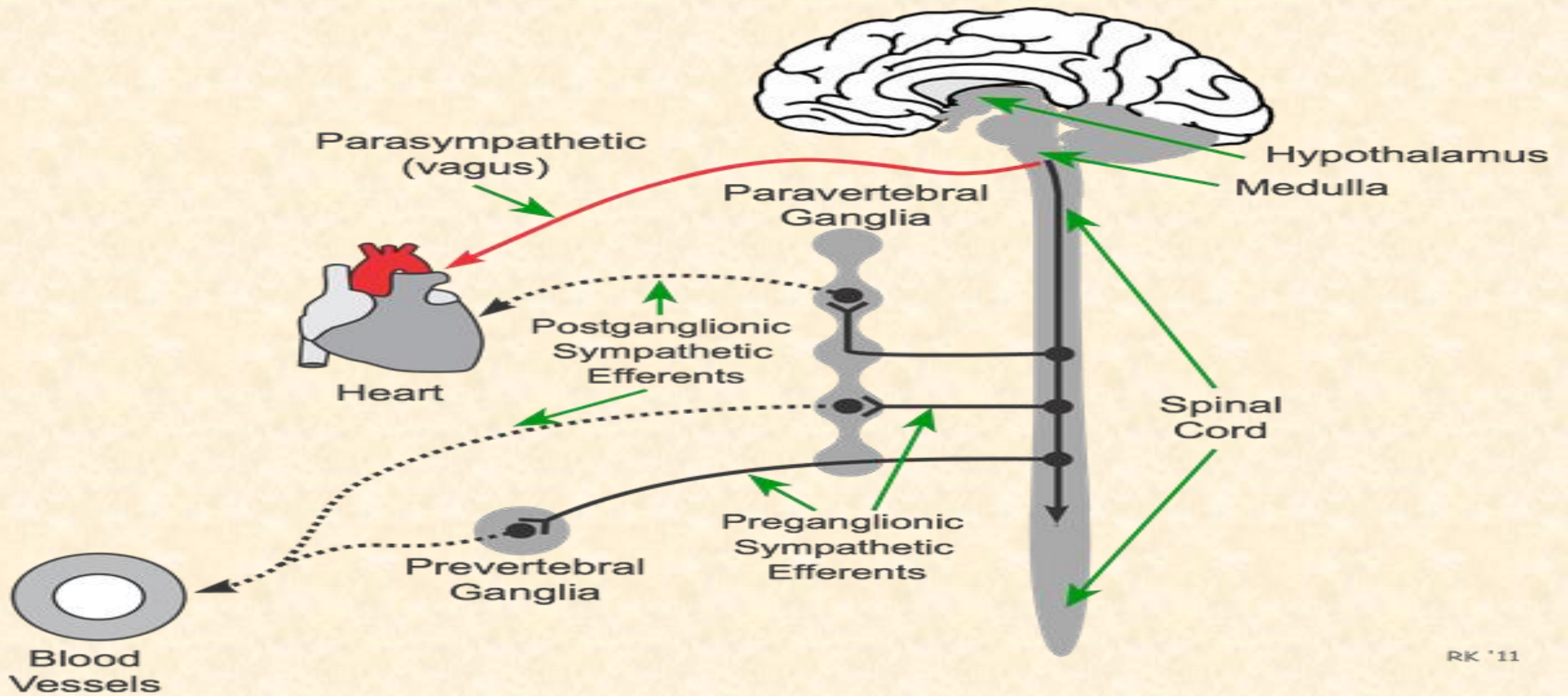
DR. MAHVISH JAVED

Assistant Professor, Anatomy

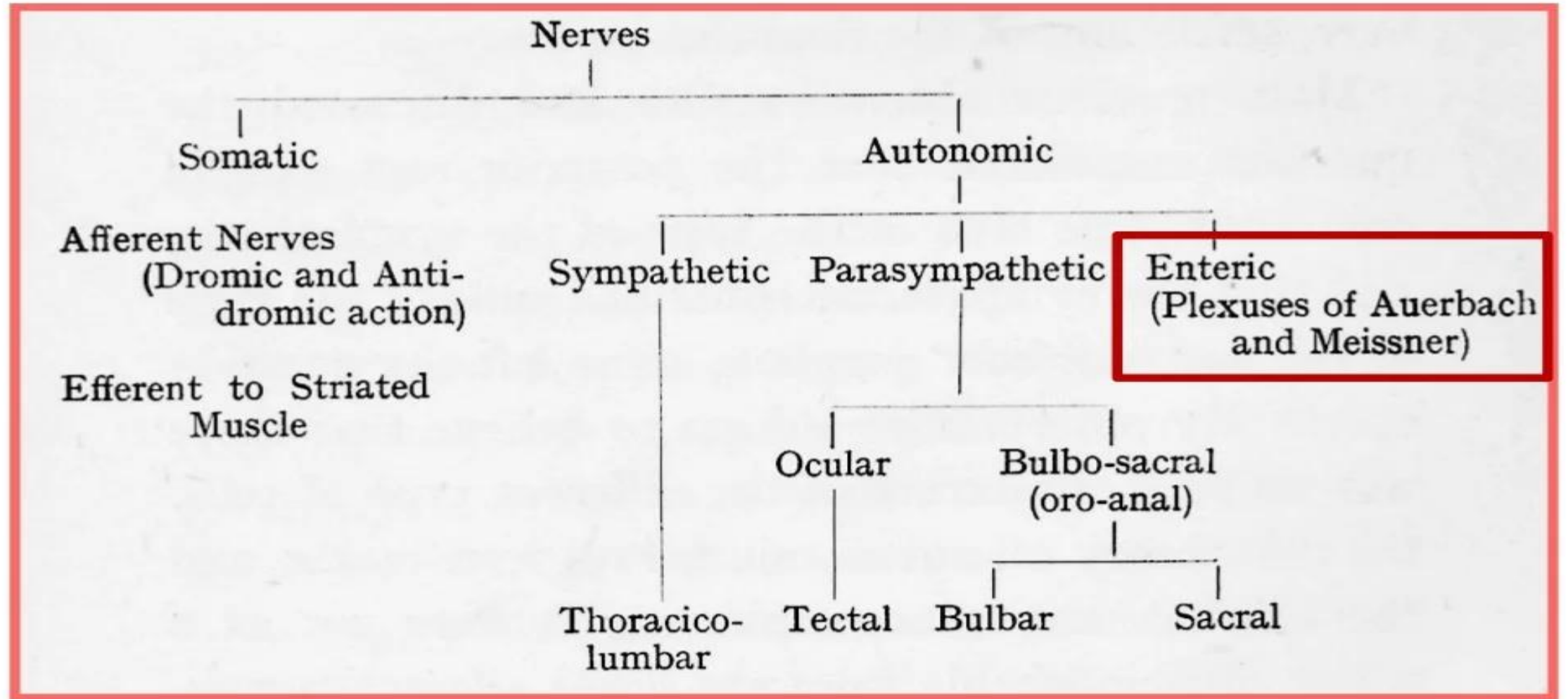
KGMC Peshawar



Parasympathetic Innervation



Peripheral nervous system by J.N Langley



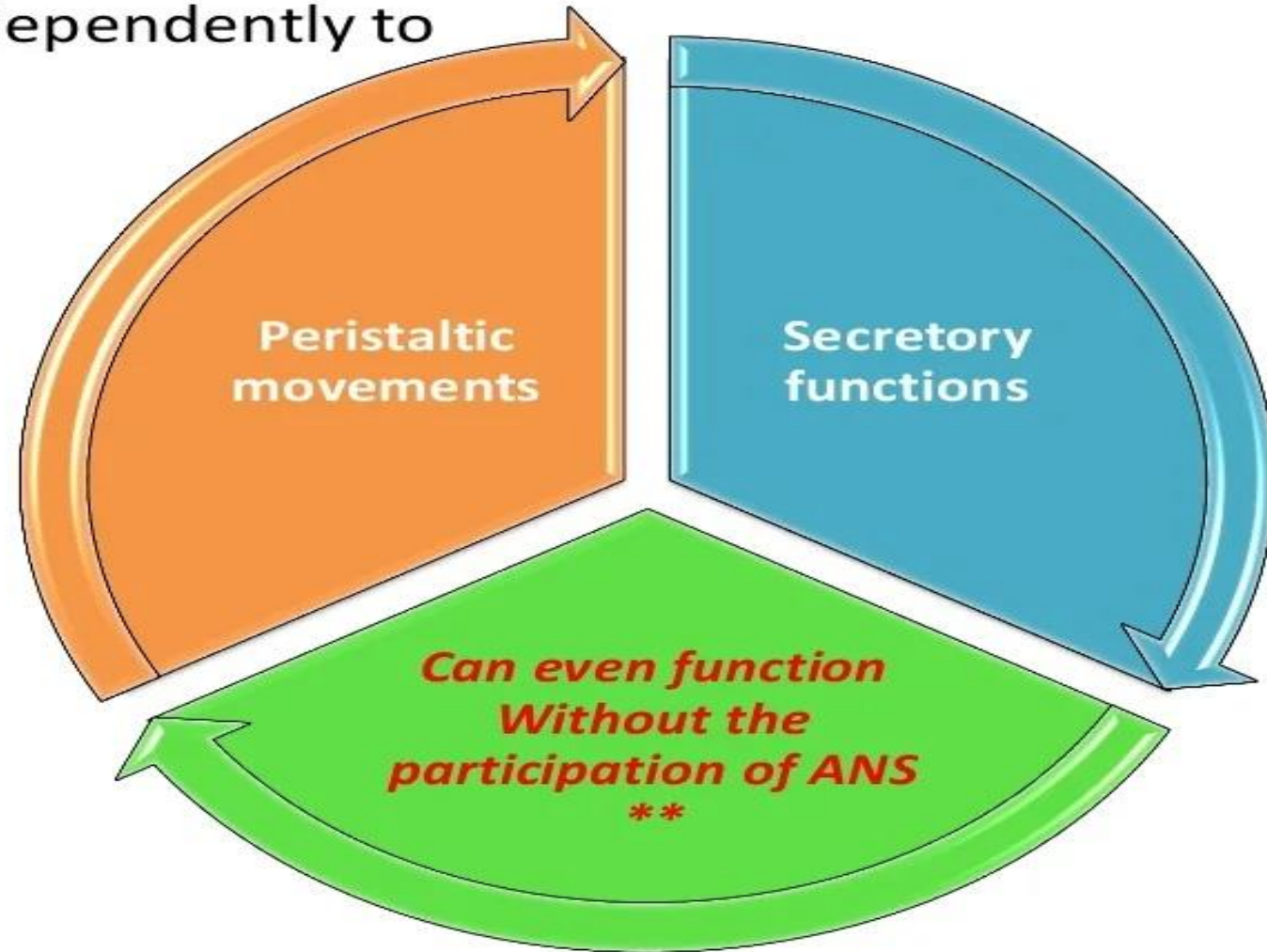
MYENTERIC PLEXUS

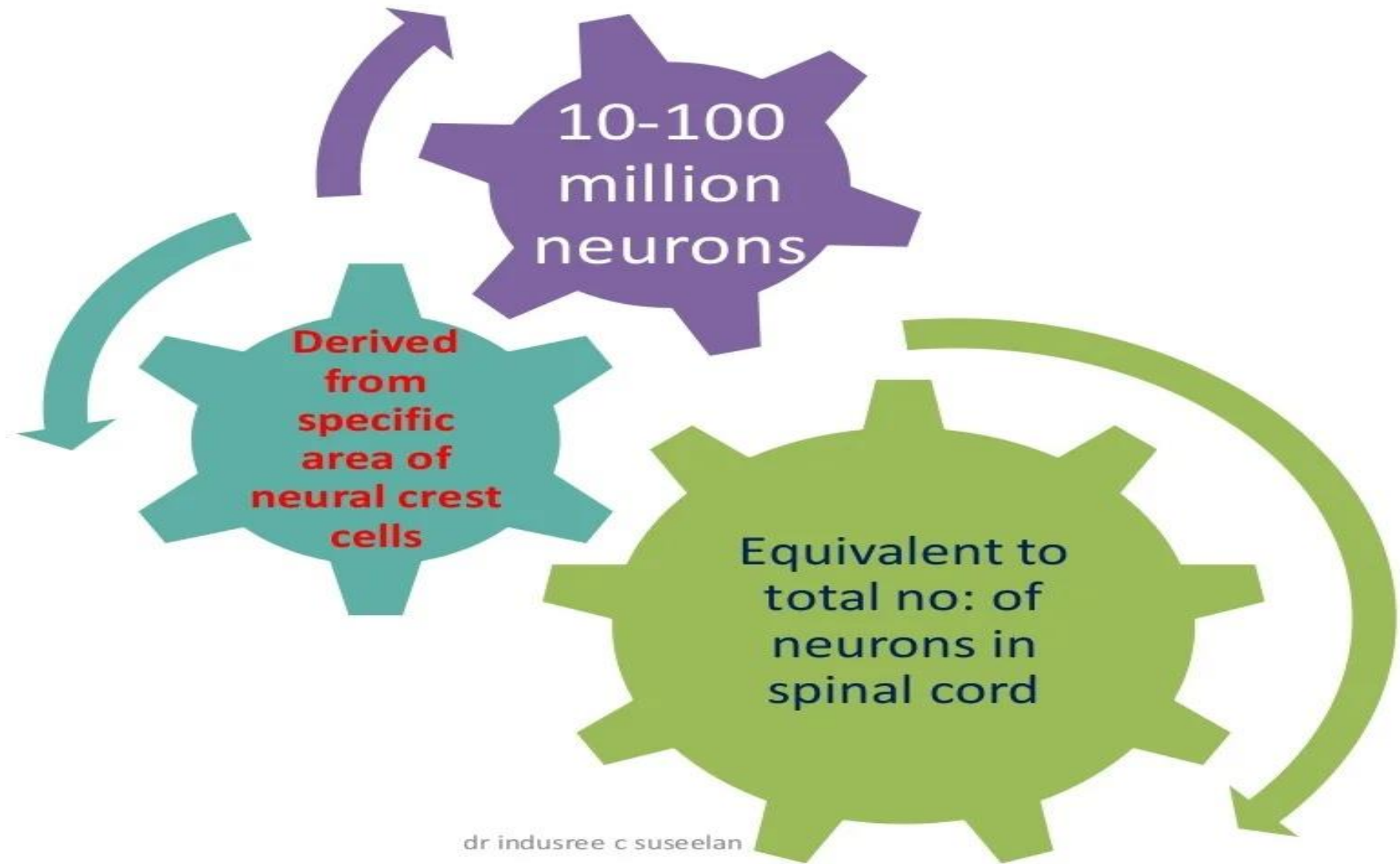
- AUERBACH's plexus
- Located b/w the outer longitudinal and the inner circular layers of smooth muscles → extend from the upper esophagus to the anus.
- Multipolar
- Motor function
- Controls mainly the gastrointestinal movements

SUBMUCOSAL PLEXUS

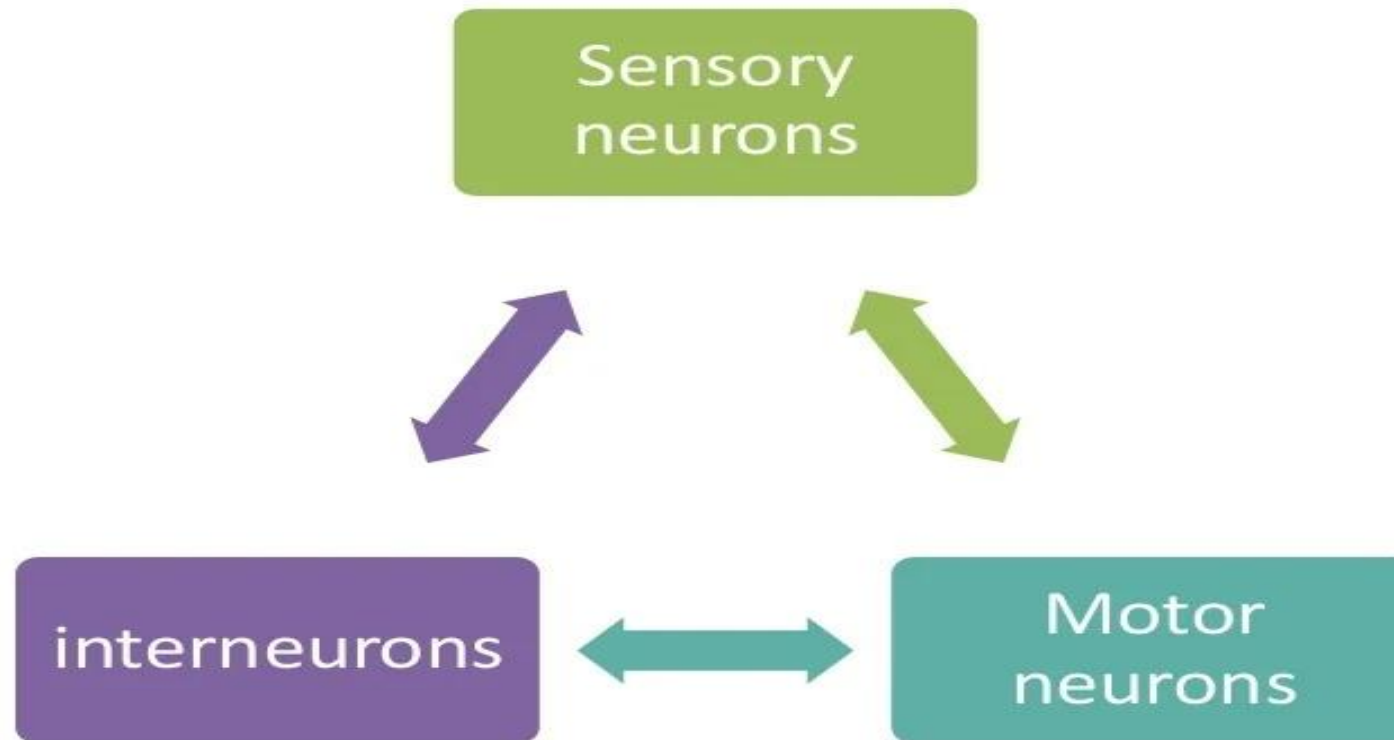
- MEISSNER's plexus
- Lies b/w the inner circular smooth muscle and the muscularis mucosae → and runs from the stomach to the anus.
- Bipolar/ unipolar → Sensory function
- Multipolar → interneurons.
- Controls mainly gastrointestinal secretions & local blood flow

ENS works independently to maintain



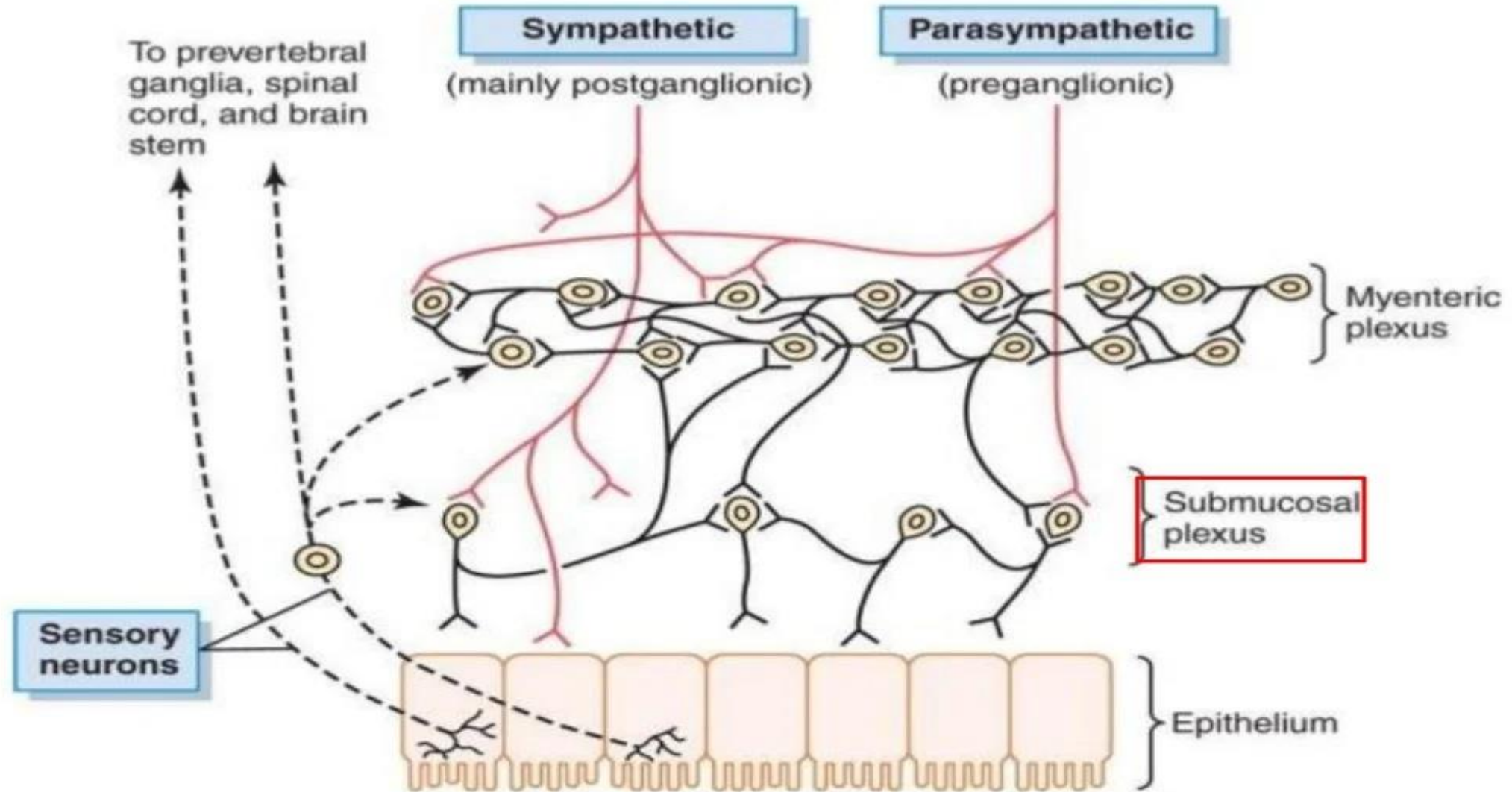


3 types of functional neurons:-



Sensory neurons

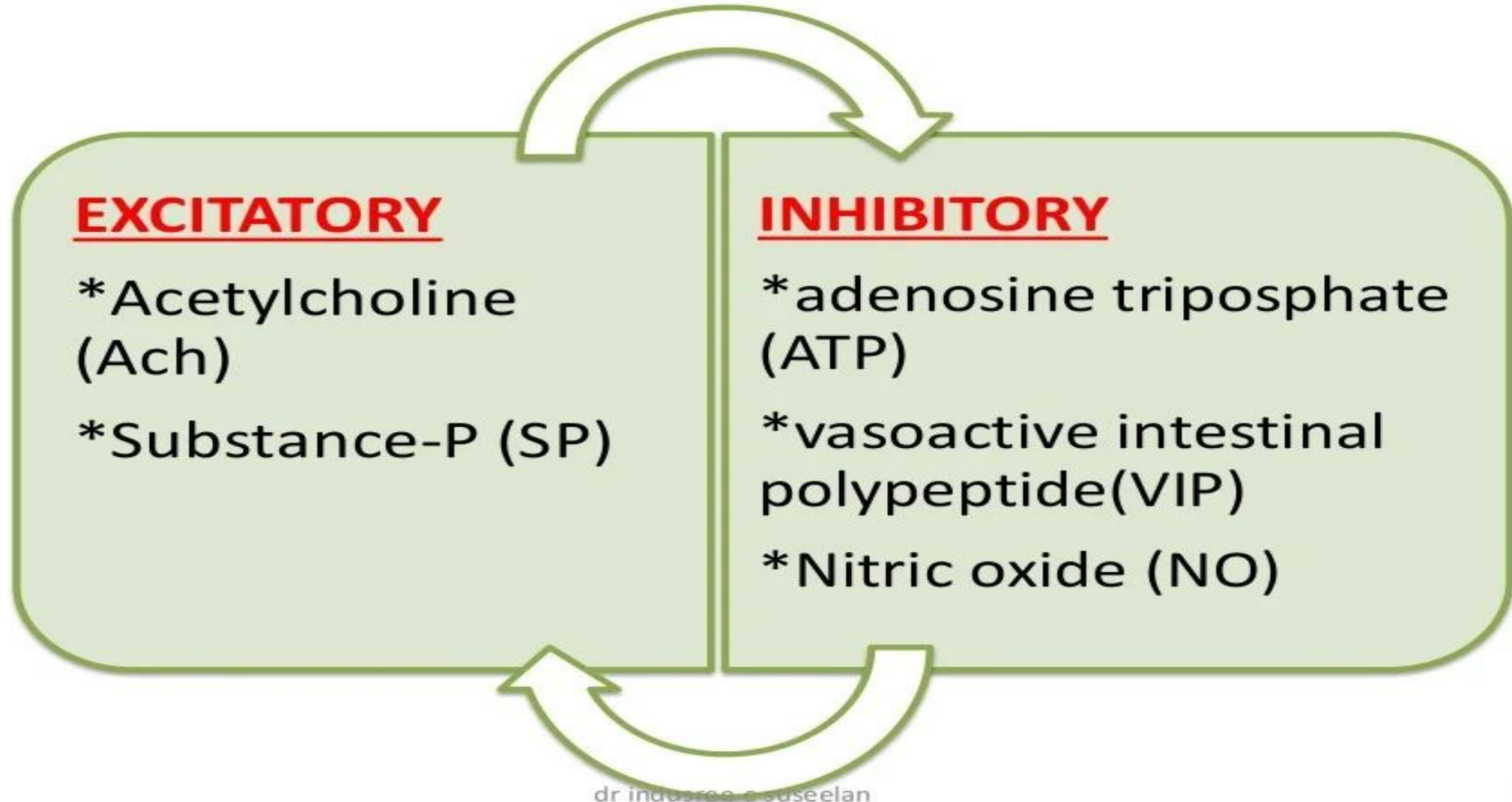
- Bipolar / unipolar neurons
- Confined in the Sub-mucous plexus
- Activated by- distension of gut wall- stretch receptors
- Receive chemical stimulation from mucosa- chemical receptors
- Axons synapses with interneurons located close to the circular muscle layer.



interneurons

- Their axons are projected longitudinally up & down to a series of motor neurons which are located mostly in the myenteric plexus & some in submucosal plexus

Motor neurons



MYENTERIC PLEXUS

- Controlling muscle activity along the length of the gut with specific effects:-
 - Increased muscle tone
 - Increased intensity of the rhythmical contractions
 - Slightly increased rate of the rhythm of contraction
 - Increased velocity of conduction of excitatory waves along gut wall, causing more rapid movement of gut peristaltic waves
- Composed of excitatory as well as inhibitory neurons

SUB-MUCOSAL PLEXUS

- Controlling function within the inner wall of each minute segment of intestine such as:-
 - Local intestinal secretion
 - Local absorption
 - Local contraction of sub-mucosal muscleThat causes various degrees of in-folding of G I mucosa.
- Composed of mainly excitatory neurons

SENSORY AFFERENTS

SPLANCHNIC NERVES

- Mixed nerves
- Sensory afferents from gut to spinal cord
- Sympathetic efferents to gut
- Cell bodies of sensory afferents are in dorsal root spinal ganglia

VAGAL FIBERS

- 80% of vagal fibres are sensory afferents
- transmit information from gut to CNS for processing

Stimulatory Function of the Myenteric Plexus

Stimulation of the myenteric nerves effects:

- 1) Increase tonic contraction, of the gut wall.
- 2) Increase intensity of the rhythmical contractions.
- 3) Increase rate of the rhythm of contraction.
- 4) Increased velocity of conduction of excitatory waves along the gut wall, causing more rapid movement of the gut peristaltic waves.

Inhibitory Function of the Myenteric Plexus

The fiber endings secrete an inhibitory transmitter, possibly *vasoactive intestinal polypeptide* or some other inhibitory peptide.

The inhibitory signals are especially useful for inhibiting some of the intestinal sphincter muscles such as the *pyloric sphincter*, which controls emptying of the stomach into the duodenum,

and the *sphincter of the ileocecal valve*, which controls emptying from the small intestine into the cecum.

Function of the Submucosal Plexus

The sensory nerves arising from GI epithelium together with submucosal plexus control

- 1) *Intestinal secretion.*
- 2) *Intestinal absorption.*
- 3) *Contraction of the submucosal muscle that causes various degrees of infolding of the gastrointestinal mucosa.*

