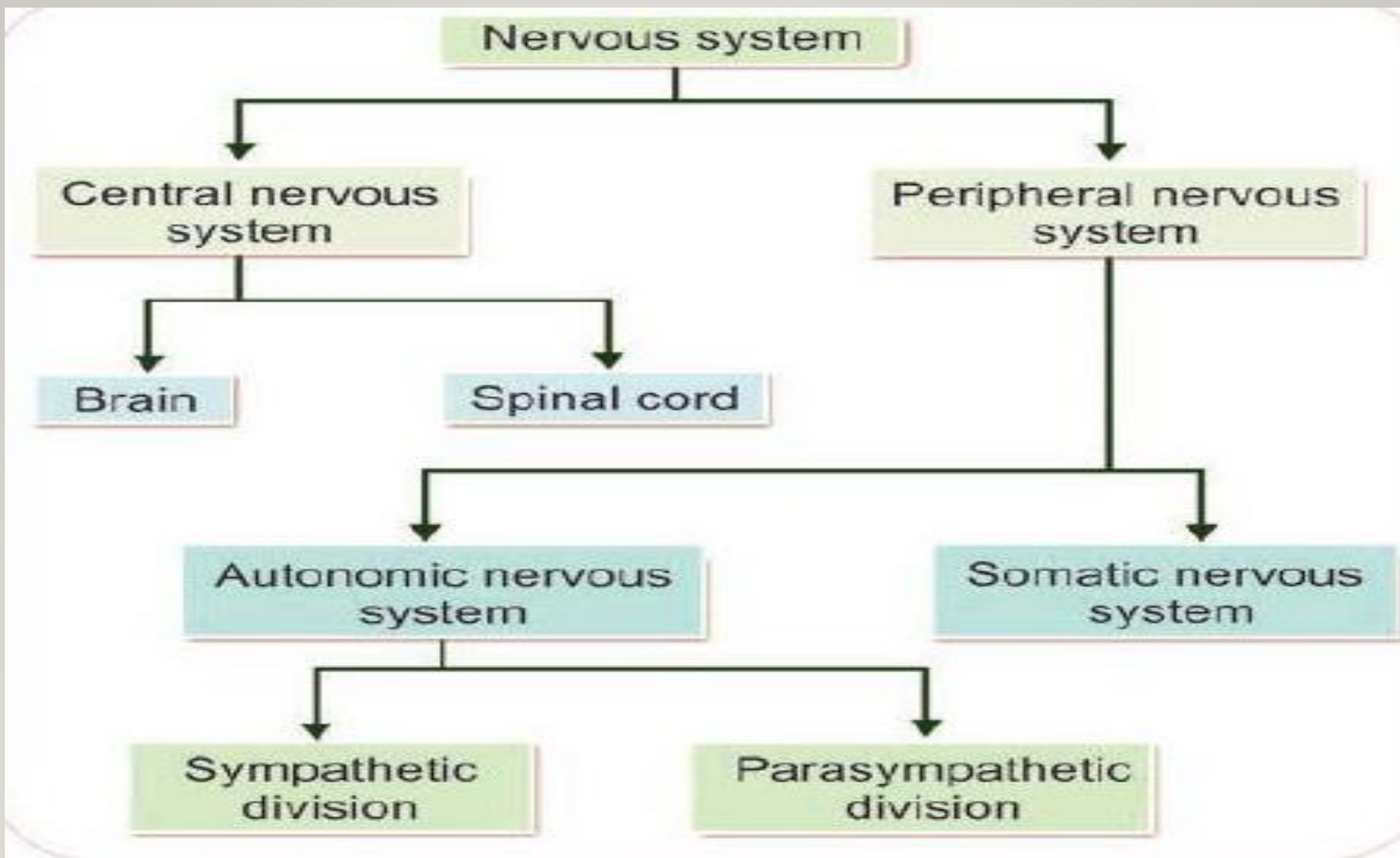


SYMPATHETIC NERVOUS SYSTEM

- ❑ KHIZRAN ZAHRA (ROLL # 61)
- ❑ ATIKA SHABBIR (ROLL # 05)
- ❑ SADIA ANUM (ROLL # 17)
- ❑ AQSA GHAFAR (ROLL # 59)

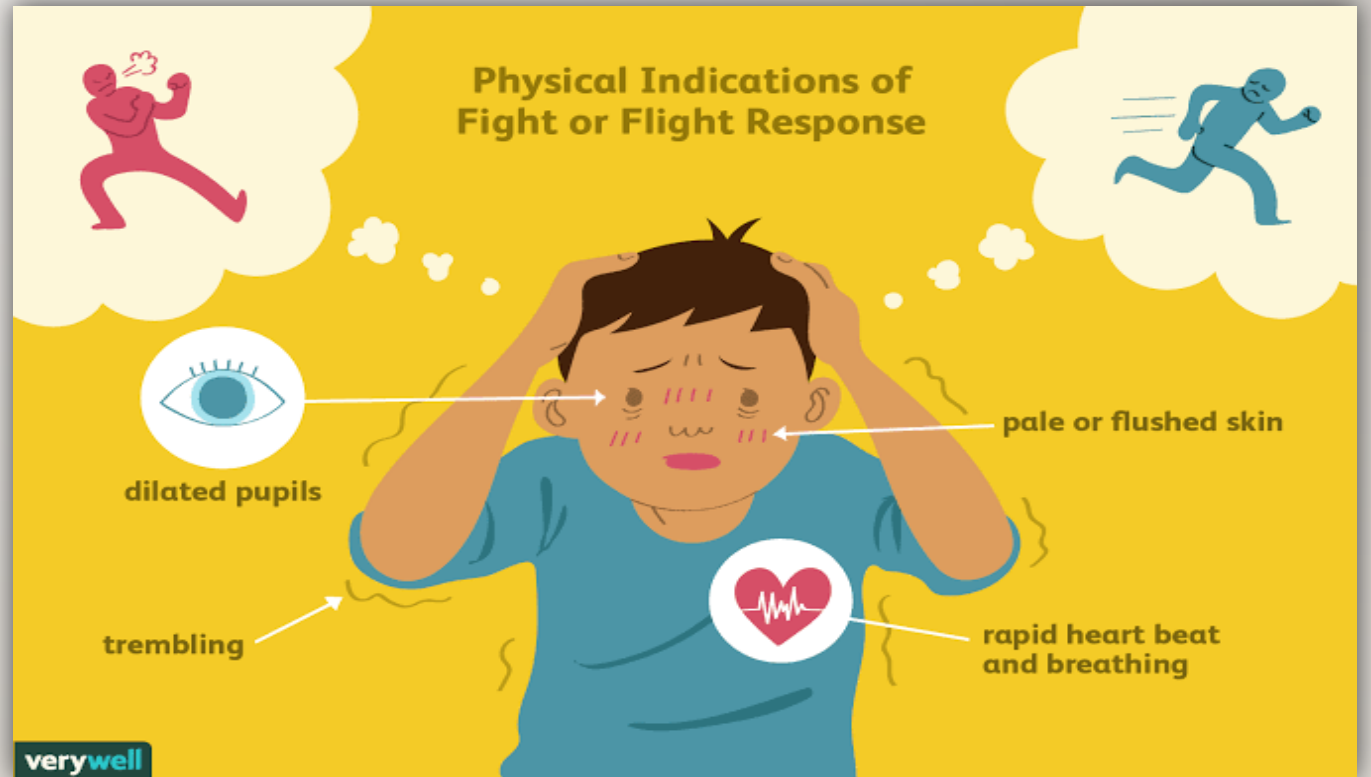
CONTENTS

- Definition
- Anatomy of sympathetic nervous system (SANS)
- Neurotransmitter of SANS
- Functions of SANS
- Receptors
- Vasomotor reversal phenomena



SYMPATHETIC NERVOUS SYSTEM (SANS)

- The part of nervous system that prepares body for “the **fight or flight**” response during any potential danger.



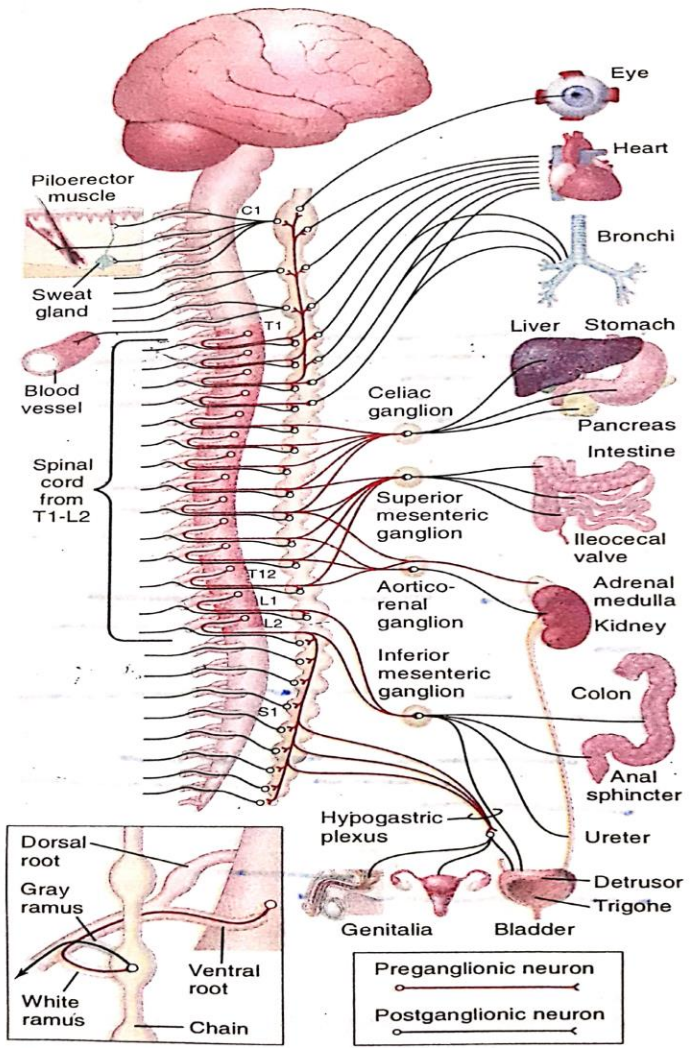
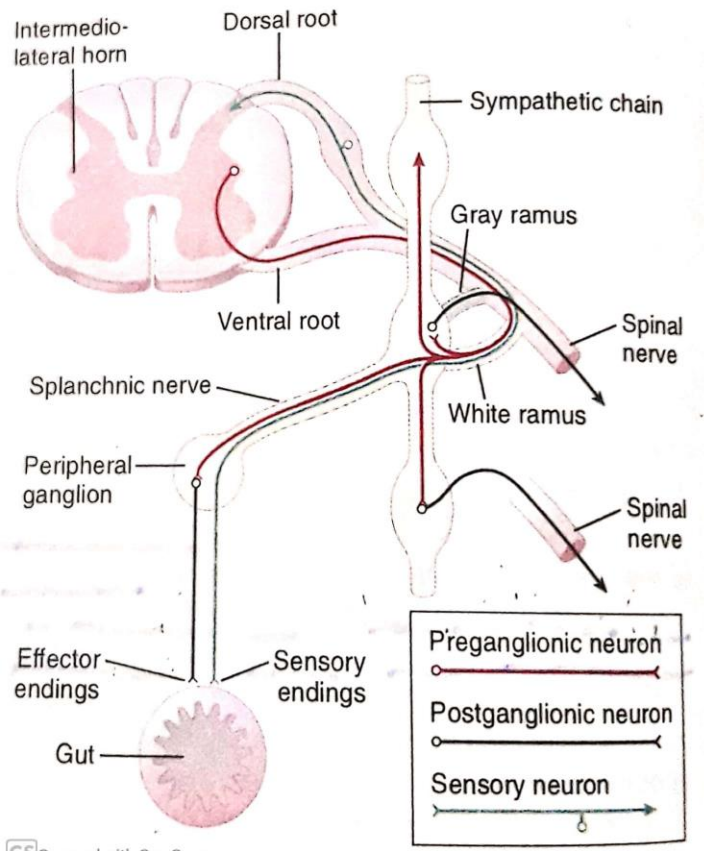


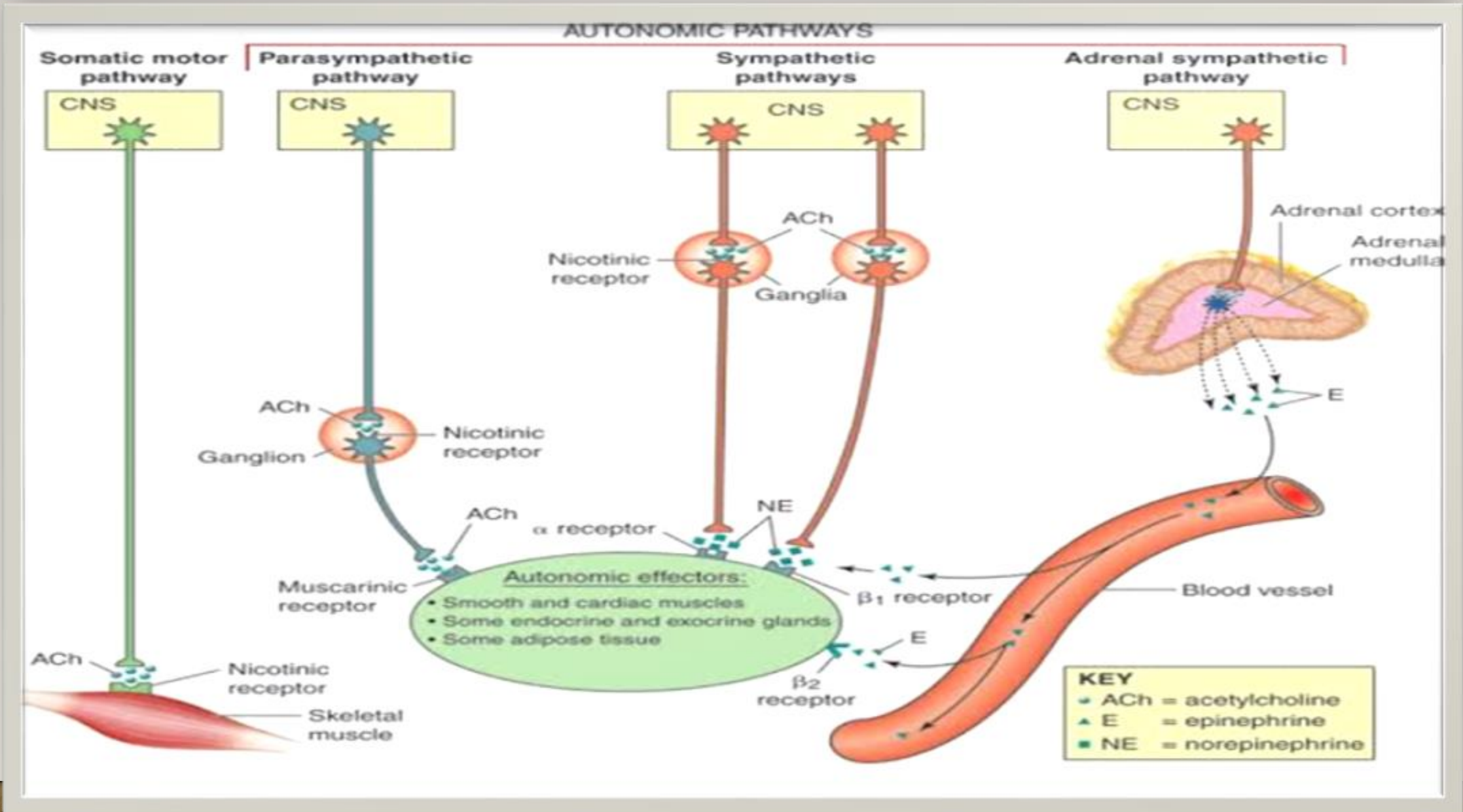
Figure 61-1. Sympathetic nervous system. The black lines represent postganglionic fibers, and the red lines show preganglionic fibers.

urophysiology

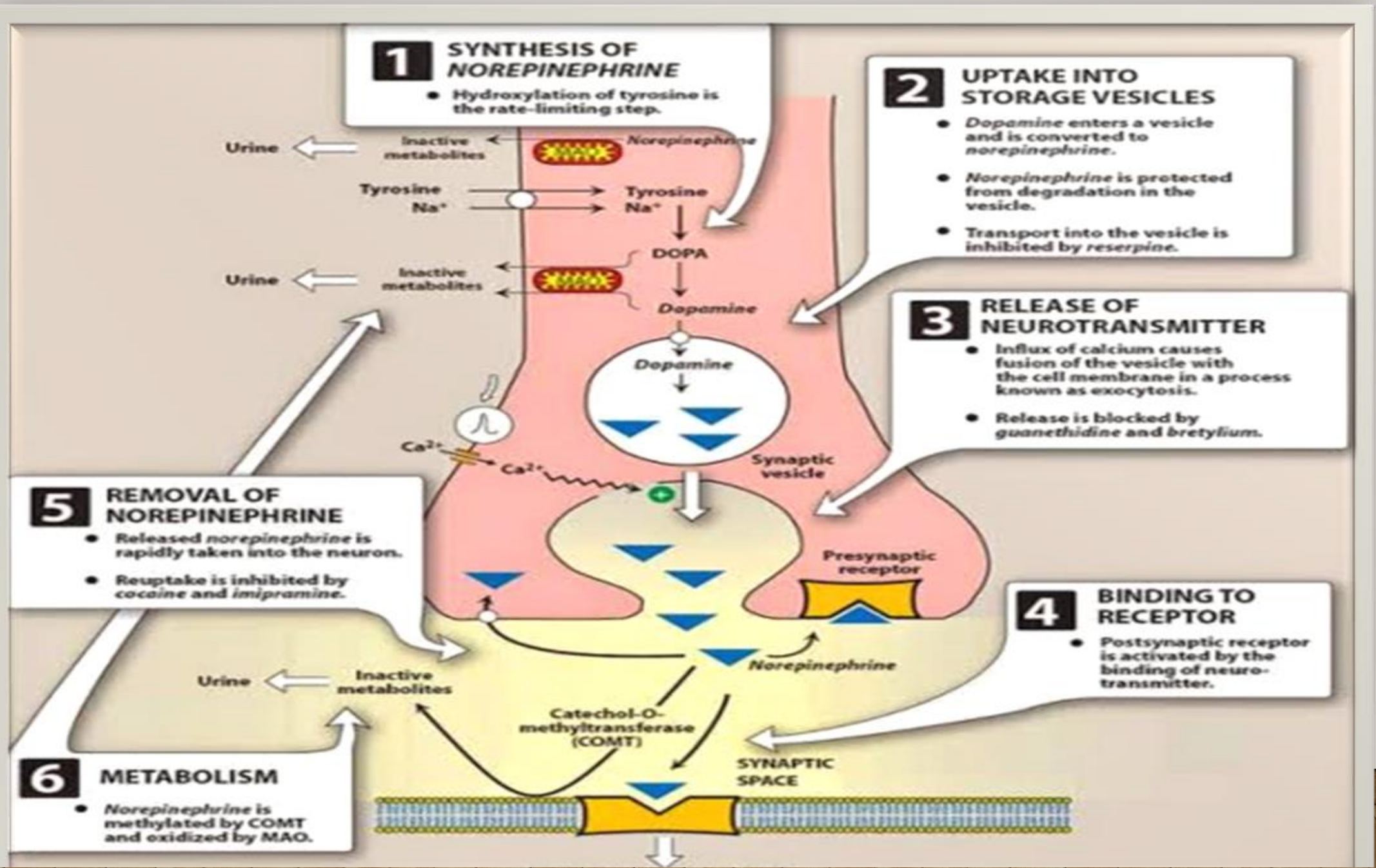


CS Scanned with CamScanner
Figure 61-2. Nerve connections between the spinal cord and the gut.

NEUROTRANSMITTERS OF SANS



SYNTHESIS OF NOREPINEPHRINE



FUNCTIONS OF SANS

Organ, Tract, or System		Effect of Sympathetic Stimulation ^a
Eyes	Pupil Ciliary body	Dilates pupil (admits more light for increased acuity at a distance)
Skin	Arrector muscles of hair Peripheral blood vessels Sweat glands	Causes hairs to stand on end ("goose-flesh" or "goose bumps") Vasoconstricts (blanching of skin, lips, and turning fingertips blue) Promotes sweating ^d
Other glands	Lacrimal glands Salivary glands	Slightly decreases secretion ^e Secretion decreases, becomes thicker, more viscous ^e
Heart		Increases the rate and strength of contraction; inhibits the effect of parasympathetic system on coronary vessels, allowing them to dilate ^e
Lungs		Inhibits effect of parasympathetic system, resulting in bronchodilation and reduced secretion, allowing for maximum air exchange
Digestive tract		Inhibits peristalsis, and constricts blood vessels to digestive tract so that blood is available to skeletal muscle; contracts internal anal sphincter to aid fecal continence
Liver and gall-bladder		Promotes breakdown of glycogen to glucose (for increased energy)
Urinary tract		Vasoconstriction of renal vessels slows urine formation; internal sphincter of bladder contracted to maintain urinary continence
Genital system		Causes ejaculation and vasoconstriction resulting in remission of erection
Suprarenal medulla		Release of adrenaline into blood

RECEPTORS

- In the sympathetic nervous system catecholamines act on specific receptors located on the cell surface of target organs. These receptors are called “**Adrenergic receptors**”
- Adrenergic receptors are of four types
 - α_1
 - α_2
 - β_1
 - β_2

Table 6-3. Characteristics of some important adrenoceptors in the ANS.

Receptor	Location	G Protein	Second Messenger	Major Functions
α_1 ✓	Effector tissues: smooth muscle, glands	G_q	$\uparrow IP_3, DAG$	$\uparrow Ca^{2+}$, causes contraction, secretion
α_2	Nerve endings, some smooth muscle	G_i	$\downarrow cAMP$	\downarrow Transmitter release, causes contraction
β_1	Cardiac muscle, juxtaglomerular apparatus	G_s ✓	$\uparrow cAMP$	\uparrow Heart rate, \uparrow force; \uparrow renin release
β_2	Smooth muscle, cardiac muscle	G_s ✓	$\uparrow cAMP$	Relax smooth muscle; \uparrow glycogenolysis; \uparrow heart rate, force
β_3	Adipose cells ✓	G_s	$\uparrow cAMP$	\uparrow Lipolysis
D_1	Smooth muscle	G_s	$\uparrow cAMP$	Relax renal vascular smooth muscle

ADRENOCEPTORS

α_1

- Vasoconstriction
- Increased peripheral resistance
- Increased blood pressure
- Mydriasis
- Increased closure of internal sphincter of the bladder

α_2

- Inhibition of norepinephrine release
- Inhibition of acetylcholine release
- Inhibition of insulin release

β_1

- Tachycardia
- Increased lipolysis
- Increased myocardial contractility
- Increased release of renin

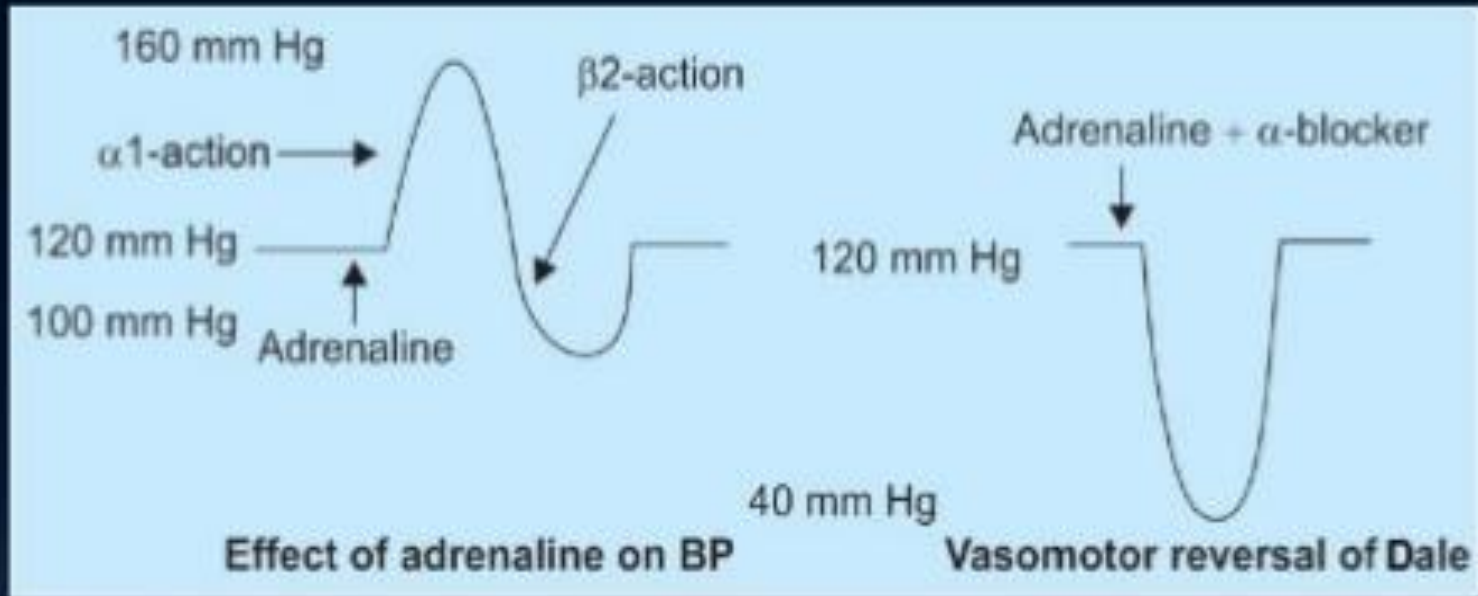
β_2

- Vasodilation
- Slightly decreased peripheral resistance
- Bronchodilation
- Increased muscle and liver glycogenolysis
- Increased release of glucagon
- Relaxed uterine smooth muscle

VASOMOTOR REVERSAL PHENOMENA OF DALE

- **Blood pressure Biphasic response** – a rise followed by a slight fall before returning to basal level.
- Alpha receptors are predominant in numbers.
- Beta receptors are more sensitive and action persistent.
- **Initial rise in BP-** predominant alpha action
- **Fall-** due to persistent beta 2 receptor action.
- **Dale vasomotor reversal-** following alpha blocker (phenoxybenzamine) only beta 2 stimulation-decrease in BP. This is Dale reversal.

Vasomotor reversal of dale





**THANK
YOU !**