NEURAL CONTROL AND COORDINATION PROBLEM SOLVING

BQ21Q543

Receptor sites for neurotransmitters are present on

NEET - 2017

(A) Membrances of synaptic vesicles

(B) Pre-synaptic membrane

(C) Tips of axons

(D) Post-synaptic membrane

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Ans [D]

The post synaptic membrane of the synapse of a neuron contains the receptors of neurotransmitters.

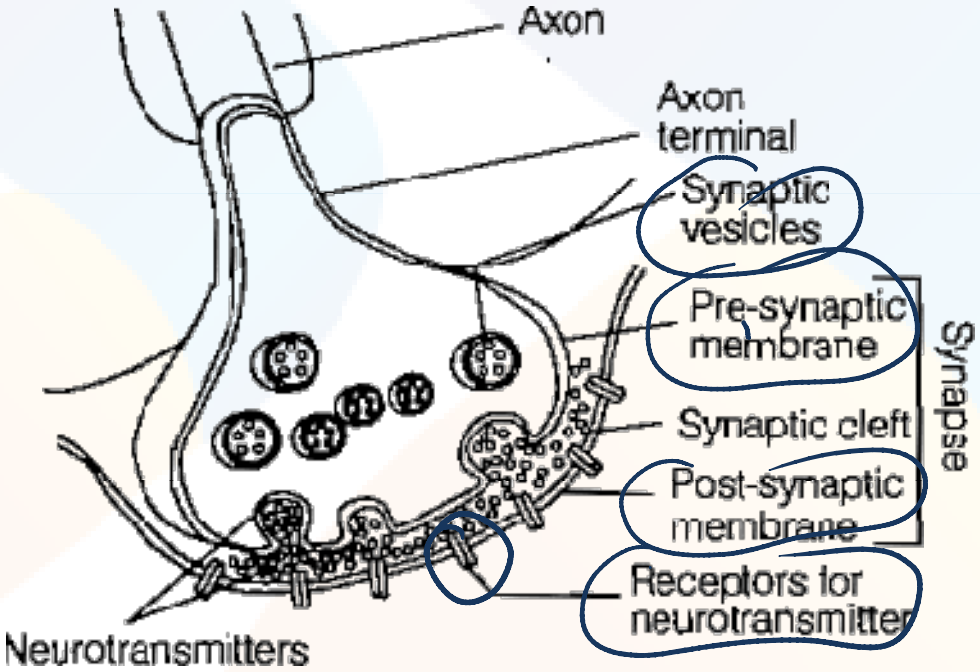

Diagram showing axon terminal and synapse

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Good vision depends on adequate intake of carotene rich food. **NEET - 2017**

Select the best option from the following statements.

I. Vitamin-A derivatives are formed from carotene.

II. The photopigments are embedded in the membrane discs of the inner segment.

III. Retinal is a derivative of vitamin-A.

IV. Retinal is a light absorbing part of all the visual photopigments.

(A) (I) and (II)

(B) (I), (III) and (IV)

(C) (I) and (III)

(D) (II), (III) and (IV)

BQ21S544

Ans [B]

Vitamin-A is a group of unsaturated nutritional organic compounds that includes retinol, retinal, retinoic acid and ß-carotene.

Vitamin-A is needed by the retina of eye in the form of retinal, which combines with protein opsin to form rhodopsin, the light absorbing molecule.

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Myelin sheath is produced by

(A) Schwann cells and Oligodendrocytes

(B) Astrocytes and Schwann cells

(C) Oligodendrocytes and Osteoclasts

(D) Osteoclasts and Astrocytes

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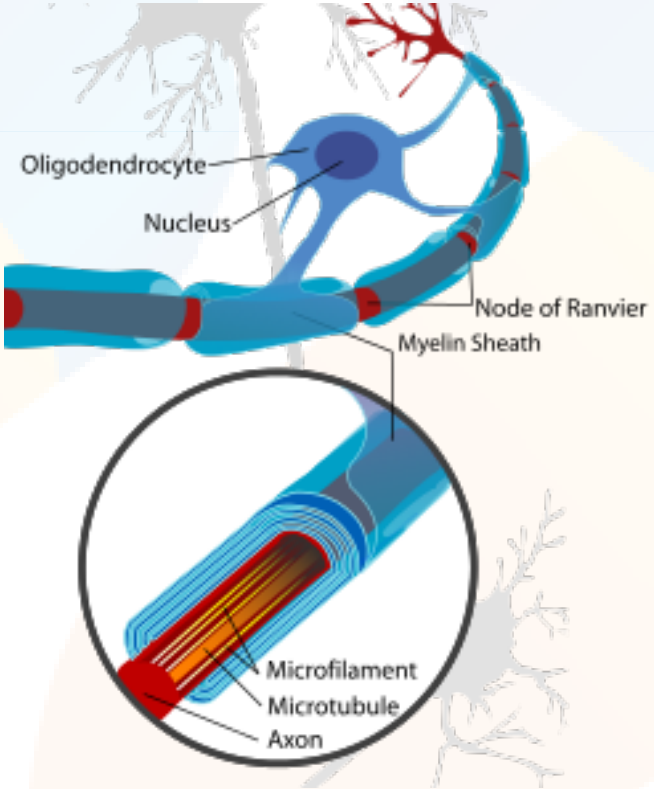
Ans [A]

The myelin sheath is a greatly extended and modified plasma membrane wrapped around the nerve axon in a spiral fashion. It is originated from Schwann cells in the peripheral nervous system and oligodendrocytes in the central nervous system.



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NEET - 2016

Photosensitive compound in human eye is made up of

(A) Opsin and Retinal

(B) Opsin and Retinol

(C) Transducin and Retinene

(D) Guanosine and Retinol

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Ans [A]

Photosensitive pigment rhodopsin in human eye is made up of opsin protein and retinal [aldehyde form of vitamin-A (Retinol) These pigments are present in the rod cells of retina layer of eye.

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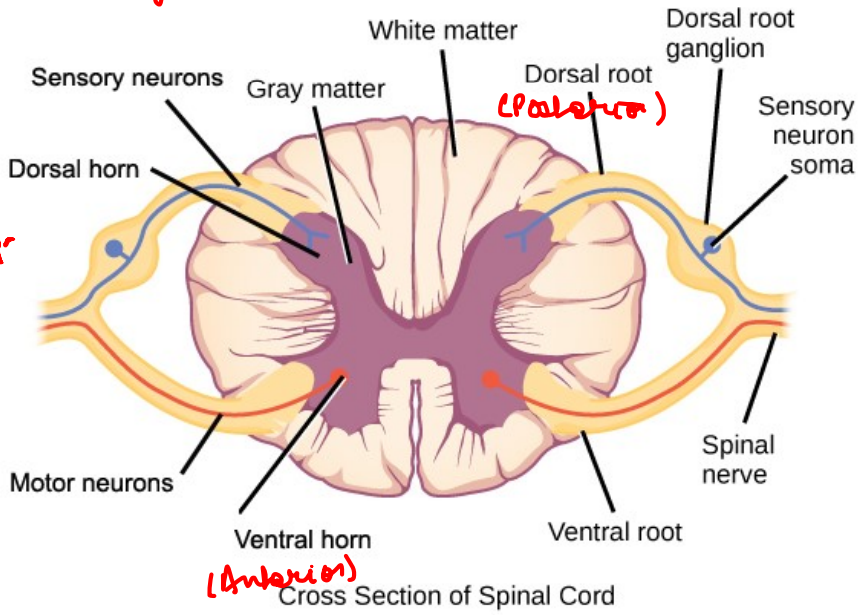
(Ventral)

Destruction of the anterior horn cells of the spinal cord would result in loss of

(A) Sensory impulses (B) Voluntary motor impulses **NEET - 2015**

(C) Commissural impulses (D) Integrating impulses

- Gray matter is found inside & white matter is found outside, gray matter on each side is projected & forms dorsal & ventral horn
- Bundles of nerve fibres are projecting from dorsal & ventral horn
  ↓
  dorsal root & ventral root
- Ventral Root - multipolar neurons (motor neuron)
- Dorsal Root - Pseudounipolar sensory stimuli

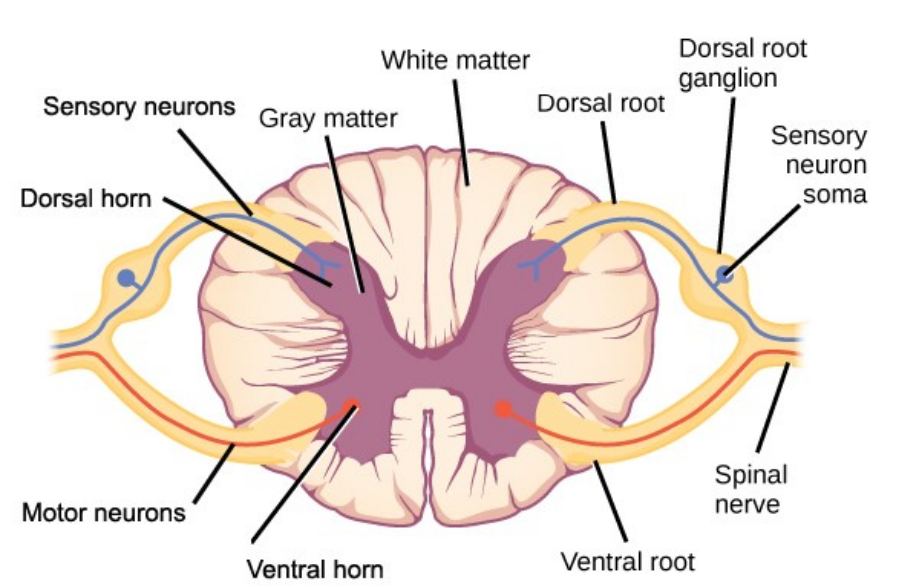


Cross Section of Spinal Cord

BQ21S548

Ans [B]

Destruction of the anterior horn cells of the spinal cord would result in loss of voluntary motor impulses. It is because the anterior horn cells (also called anterior grey column), which is the front column of grey matter in the spinal cord contains motor neurons that affect the axial muscles.



Cross Section of Spinal Cord

BQ21Q549

In mammalian eye, the 'fovea' is the center of the visual field, where

NEET - 2015

(A) High density of cones occur, but has no rods

(B) The optic nerve leaves the eye

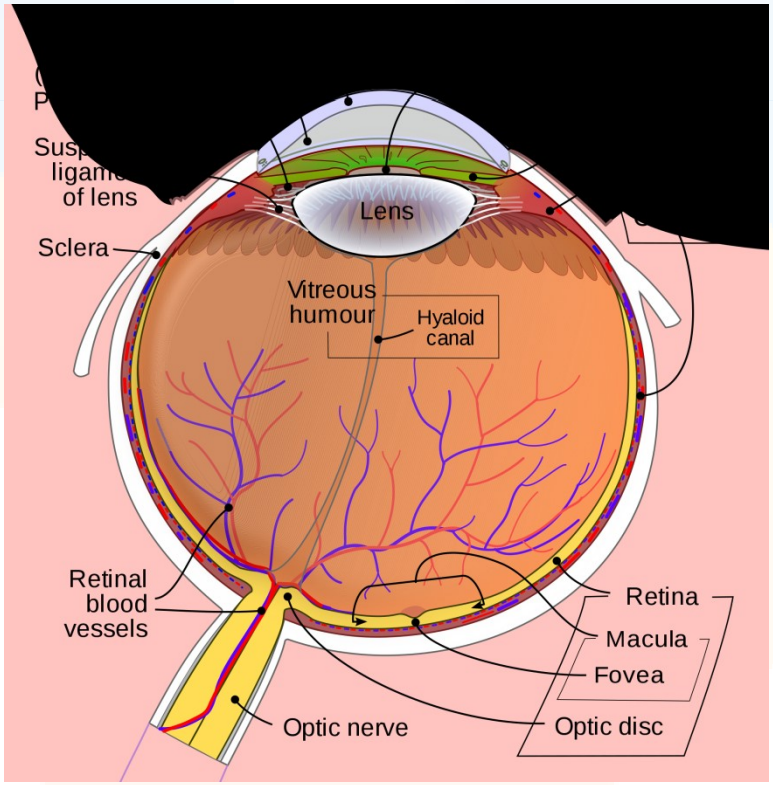
(C) Only rods are present

(D) More rods than cones are found

BQ21S549

Ans [A]

At the posterior pole of the eye lateral to the blind spot, there is a yellowish pigmented spot called macula lutea with a central pit called the fovea. It is a thinned-out portion of the retina where only the cones are densely packed. It is the point where the visual acuity (resolution) is the highest.



BQ21Q550

Stimulation of a muscle fibre by a motor neuron occurs at

NEET - 2014

(A) The neuromuscular junction

(B) The transverse tubules

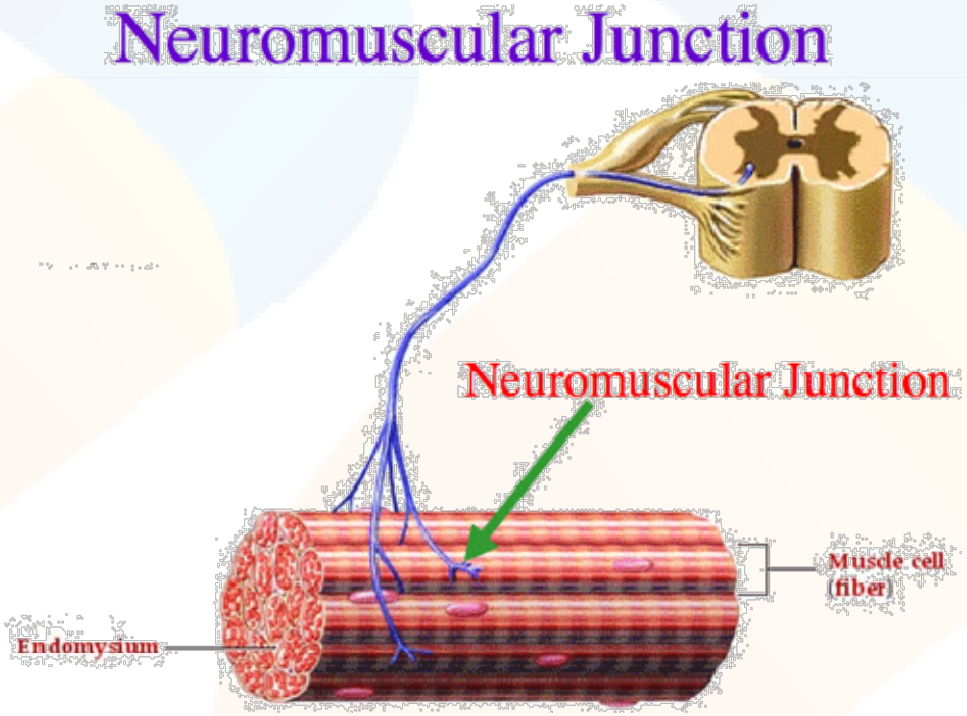
(C) The myofibril

(D) The sacroplasmic reticulum

BQ21S550

Ans [A]

Stimulation of a muscle fibre by a motor neuron occurs at neuromuscular junction. The area of contact between a nerve and muscle fibre. It is also called motor-end plate. At neuromuscular junction a neuron activates a muscle to contract during the excitation contraction coupling of vertebrate skeletal muscles.



BQ21Q551

Injury localised to the hypothalams would most likely disrupt **NEET - 2014**

(A) Short term memory

(B) Coordination during locomotion

(C) Executive function, such as decision making

(D) Regulation of body temperature

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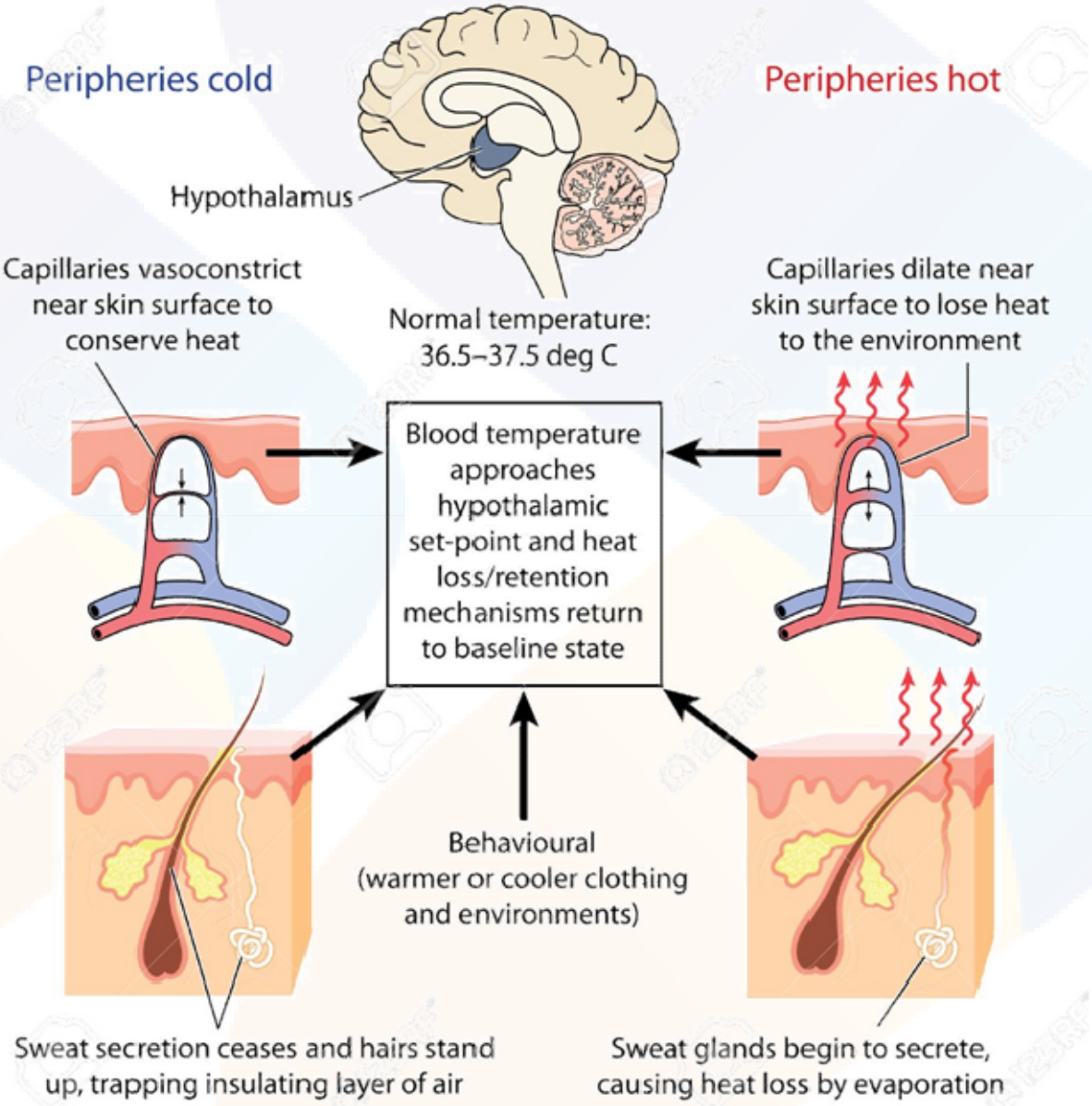
Ans [D]



BQ21Q552

Which one of the following statements is not correct? **NEET - 2014**

(A) Retinal is the light absorbing portion of visual photopigments

(B) In retina the rods have the photopigment rhodopsin, while cones have three different photopigments

(C) Retinal is a derivative of vitamin-C

(D) Rhodopsin is the purplish red protein present in rods only

BQ21S552

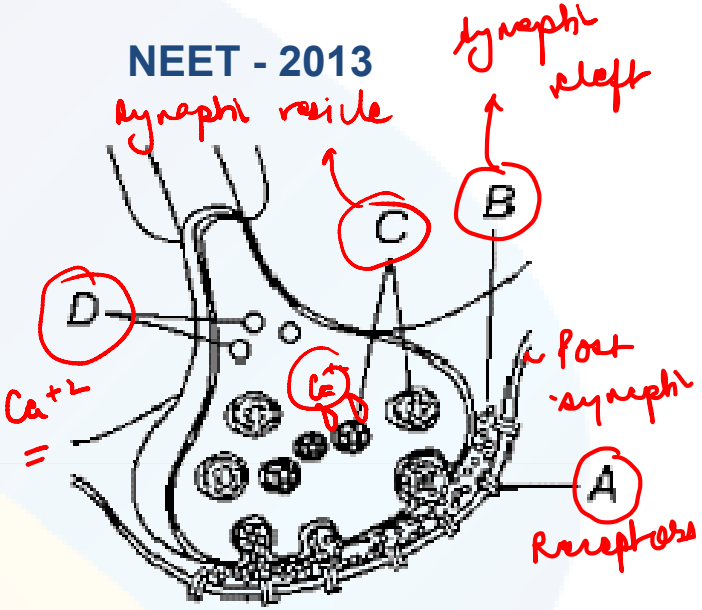
Ans [C]

A. Rods have rhodopsin pigment while cones have three photopigments, iodopsin, porpyrosin and cyanopsin.
B. Retinal is a derivative of vitamin A.
C. Rhodopsin is a purplish red protein, also known as visual purple and is associated with vision under low light.
D. Retinal is derivative of vitamin A and bound to light sensitive proteins called opsins. It absorbs light and sends signal brain.

BQ21Q553

A diagram showing axon terminal and synapse is given. Identify correctly least two of A-D

NEET - 2013



(A) A- Receptor - C-synaptic Vesicles

(B) B- Synaptic connection - D-K^+

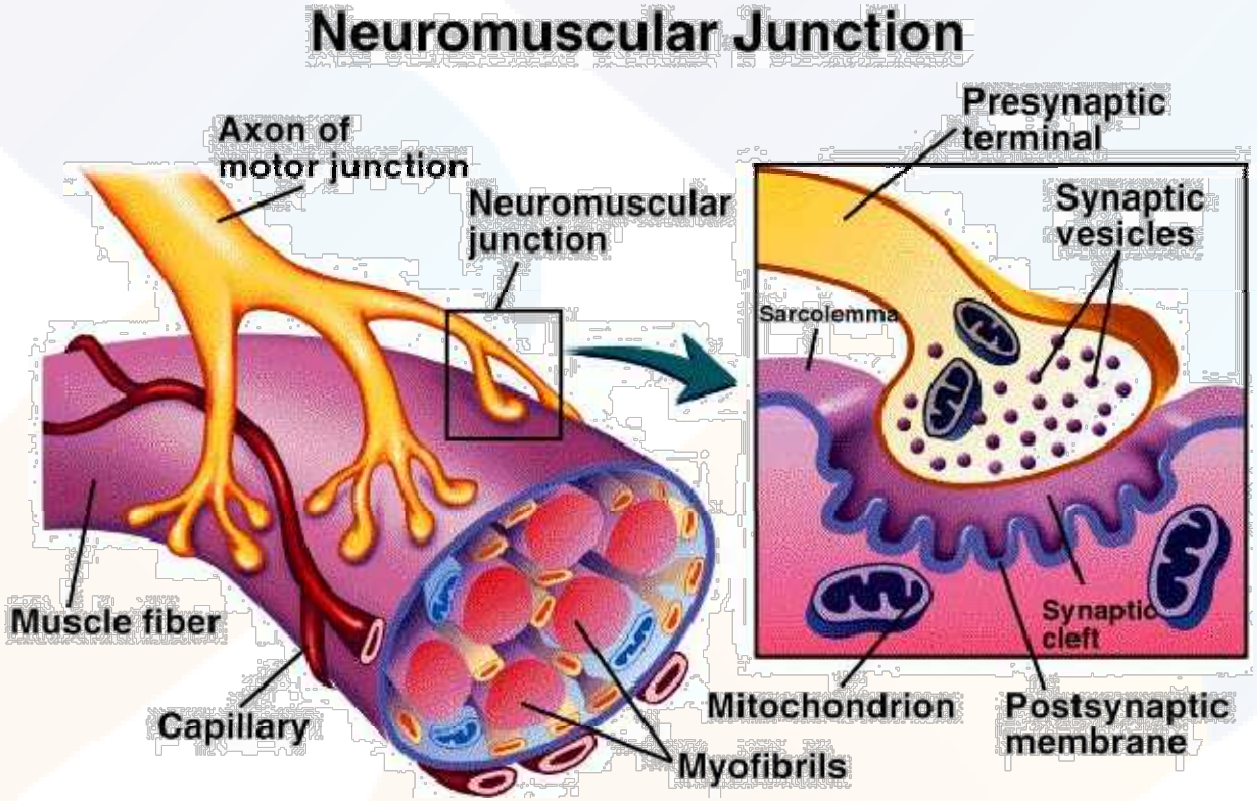
(C) A- Neurotransmitter - B-Synaptic cleft

(D) A- Neurotransmitter - B-Synaptic cleft

BQ21S553

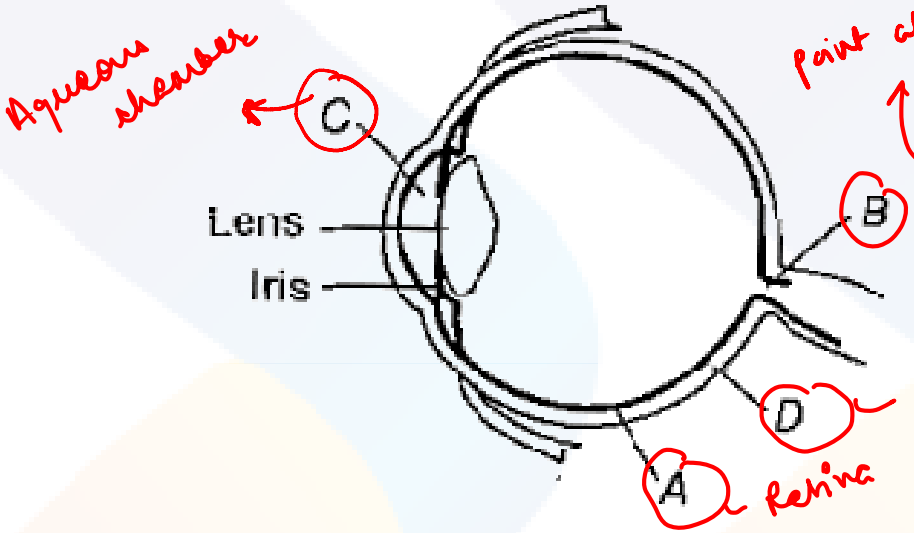
Ans [A]

A-receptor, B-synaptic cleft, C-synaptic vesicles and D-Ca^{2+}



BQ21Q554

Parts A, B, C and D of the human eyes are shown in the diagram. Select the option which gives correct identification along with its functions/characteristics



NEET - 2013

(A) A-retina-contains photoreceptors-rods and cones

(B) B-blind spot-has only a few rods and cones

(C) C-aqueous chamber-reflects the light which does not pass through the lens

(D) D-choroid ,its anterior part forms ciliary body

BQ21S554

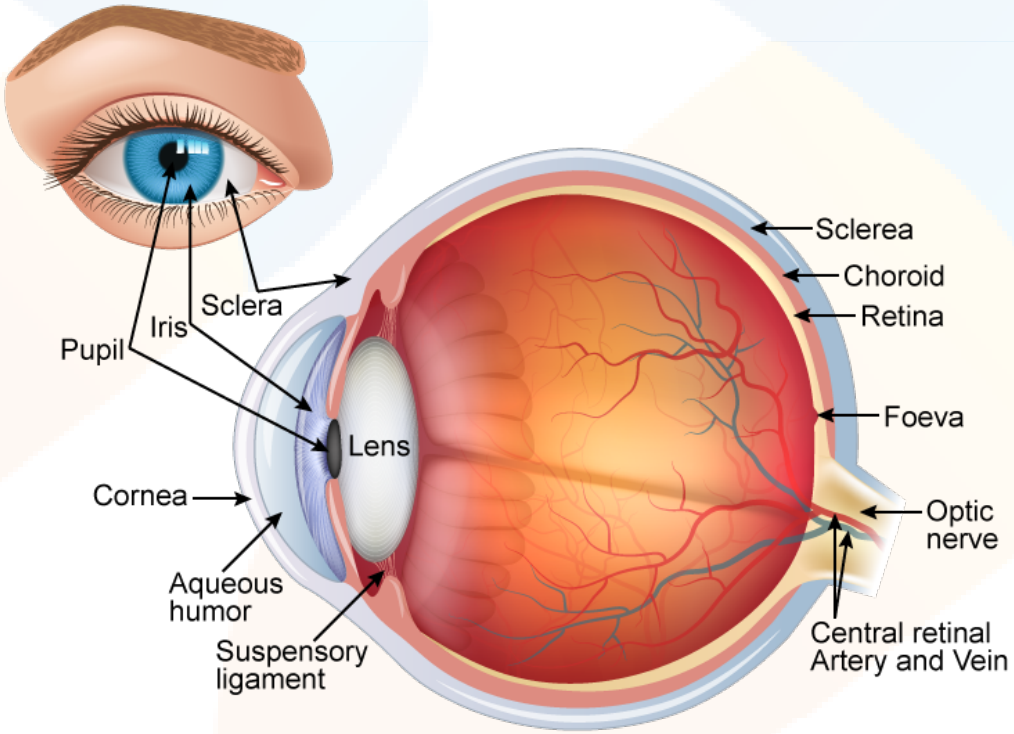
Ans [A]

A-Retina-contains photoreceptors rods and cones. The daylight vision is function of cones and twilight vision is related to rods.

B-Blind spot-Photoreceptor cells are not present in this part.

C-Aqueous chamber contains a thin watery fluid called aqueous humour.

D-Sclera is the external layer of eye having dense connective tissue.



BQ21Q555

Which part of the human ear plays no role in hearing as such but is otherwise very much required?

NEET - 2012

(A) Eustachian tube

(B) Organ of Corti

(C) Vestibular apparatus

(D) Ear ossicles

BQ21S555

Ans [C]

The inner ear contains a complex system called vestibular apparatus, located above the cochlea. It has no role in hearing but is influenced by gravity and movements. Its specific receptors called crista and macula are responsible for maintenance of balance of the body and posture

BQ21Q556

A person entering an empty room suddenly finds a snake right in front on opening the door. Which one of the following is likely to happen in his neurohormonal control system?

NEET - 2012

(A) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal medulla

(B) Neurotransmitters diffuse rapidly across the cleft and transmit a nerve impulse

(C) Hypothalamus activates the parasympathetic division of brain

(D) Sympathetic nervous system is activated releasing epinephrine and norepinephrine from adrenal cortex

BQ21S556

Ans [A]

Epinephrine and nor-epinephrine are secreted by adrenal medulla (under the control of sympathetic nervous system) in response to stress of any kind or during emergency situations. These are also called emergency hormones or hormones of flight, fight and fright (triple F hormone).

BQ21Q557

The purplish red pigment rhodopsin contained in the rods type of photoreceptor cells of the human eyes is a derivative of

NEET - 2011

(A) Vitamin-C

(B) Vitamin-D

(C) Vitamin-A

(D) Vitamin-B

BQ21S557

Ans [C]

There are two types of photoreceptor cells of retina, namely rods and cones. The rods contain a purplish red protein called the rhodopsin or visual purple, which contains a derivative of vitamin-A.

BQ21Q558

When a neuron is in resting state, ie, not conducting any impulse, the axonal membrane is

NEET - 2011

(A) Equally permeable to both Na^+ and K^+ ions

(B) Impermeable to both Na^+ and K^+ ions

(C) Comparatively more permeable to K^+ ions and nearly impermeable to Na^+ ions

(D) Comparatively more permeable to Na^+ ions and nearly impermeable to K^+ ions

BQ21S558

Ans [C]

Neurons are excitable cells because their membrane are in a polarised state. Different types of selectively permeable channels are present on the neural membrane. When not conducting any impulse. i.e., neuron is not conducting any impulse, ie, resting, the axonal membrane is comparatively more permeable to potassium ion (K^+) and nearly impermeable to sodium ion (Na^+).

BQ21Q559

The nerve centres which control the body temperature and the urge for eating are contained in

NEET - 2010

(A) Hypothalamus

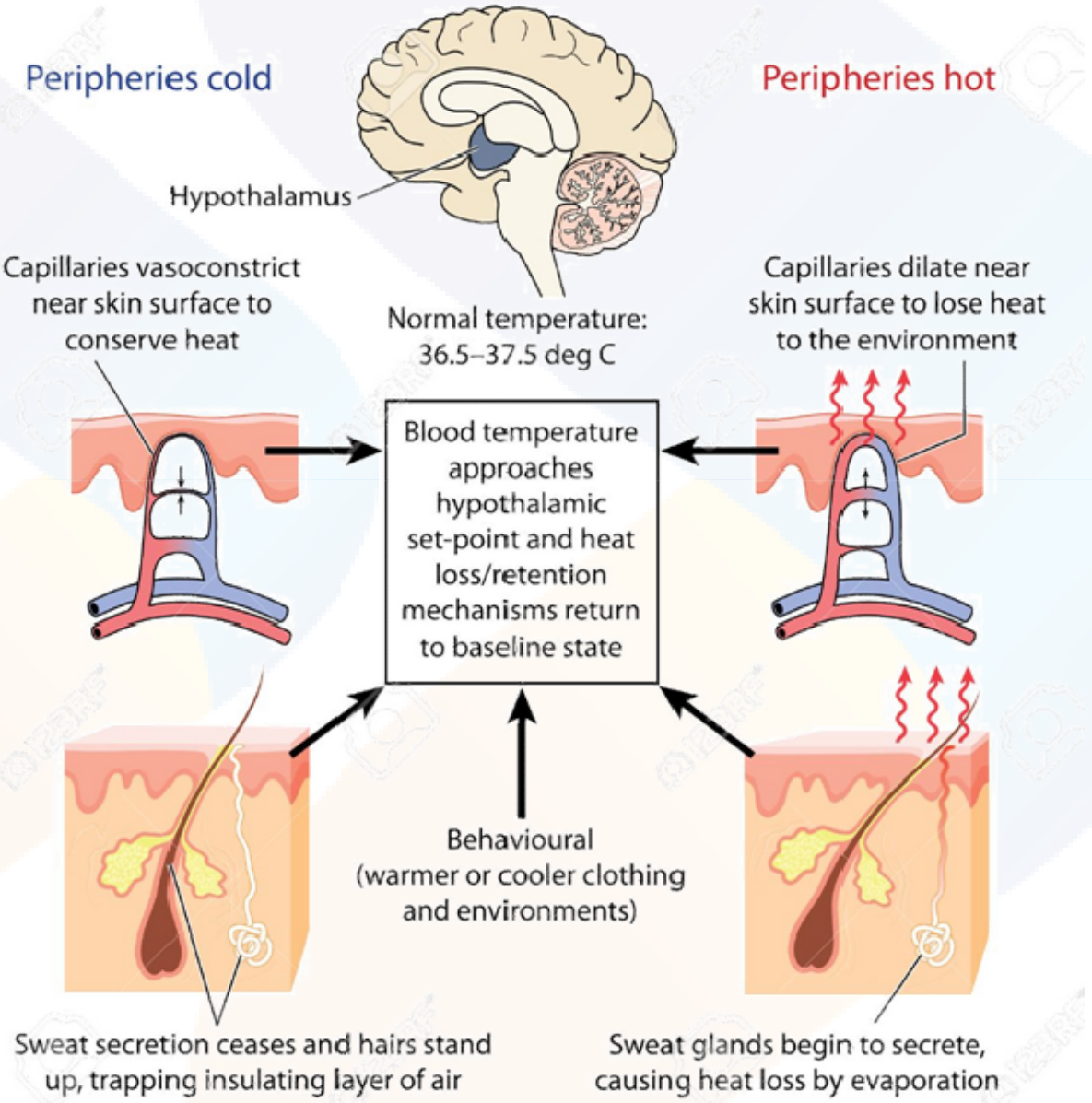
(B) Pons

(C) Cerebellum

(D) Thalamus

BQ21S559

Ans [A]



BQ21Q560

Alzheimer disease in humans is associated with the deficiency of **NEET - 2009**

(A) Dopamine

(B) Glutamic acid

(C) Acetylcholine

(D) Gamma Amino Butyric Acid

BQ21S560

Ans [C]

Alzheimer disease - deficiency of acetylcholine. Alzheimer's Disease (AD) is an irreversible, progressive disorder, in which brain cells (neurons) deteriorate, resulting in the loss of cognitive functions, primarily memory, judgement aned reasoning, movement coordination and pattern recognition. In advanced stages of the disease, all memory and mental functioning may be lost.

BQ21Q561

The kind of tissue that forms the supportive structure in our pinna (external ears) is also found in

NEET - 2009

(A) Vertebrae

(B) Nails

(C) Ear ossicles

(D) Tip of the nose

BQ21S561

Ans [D]

Yellow fibrous cartilage tissue is found in pinna (external ear). It is also found at the tip of the nose.

BQ21Q562

Cornea transplant in humans is almost never rejected. This is because.

(A) Its cells are least penetrable by bacteria **NEET - 2008**

(B) It has no blood supply

(C) It is composed of enucleated cells

(D) It is a non-living layer

BQ21S562

Ans [B]

Cornea is a transparent portion that forms the anterior one-sixth of the eyeball. The cornea admits and helps to focus light waves as they enter the eye. It is avascular, i.e., has no blood supply therefore, cornea transplant in human is almost never rejected.

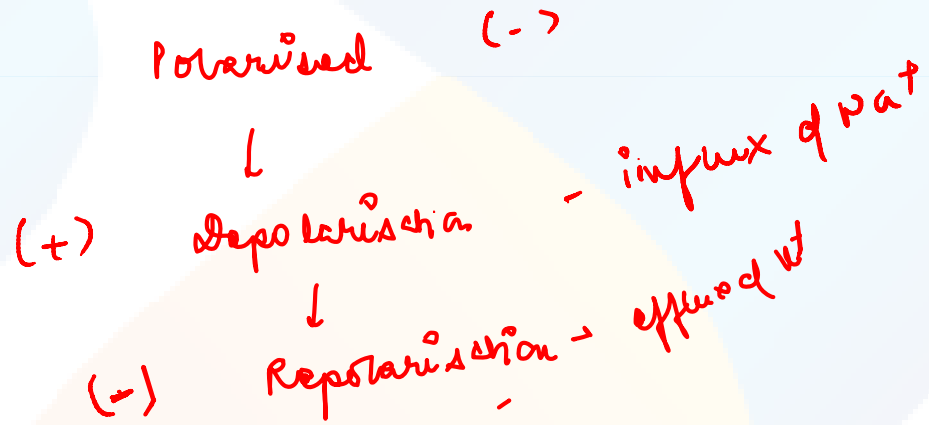
During the transmission of nerve impulse through a nerve fiber, the potential on the inner side of the plasma membrane has which type of electric charge? [AIPMT-2007]

(A) First positive, then negative and continue to be negative

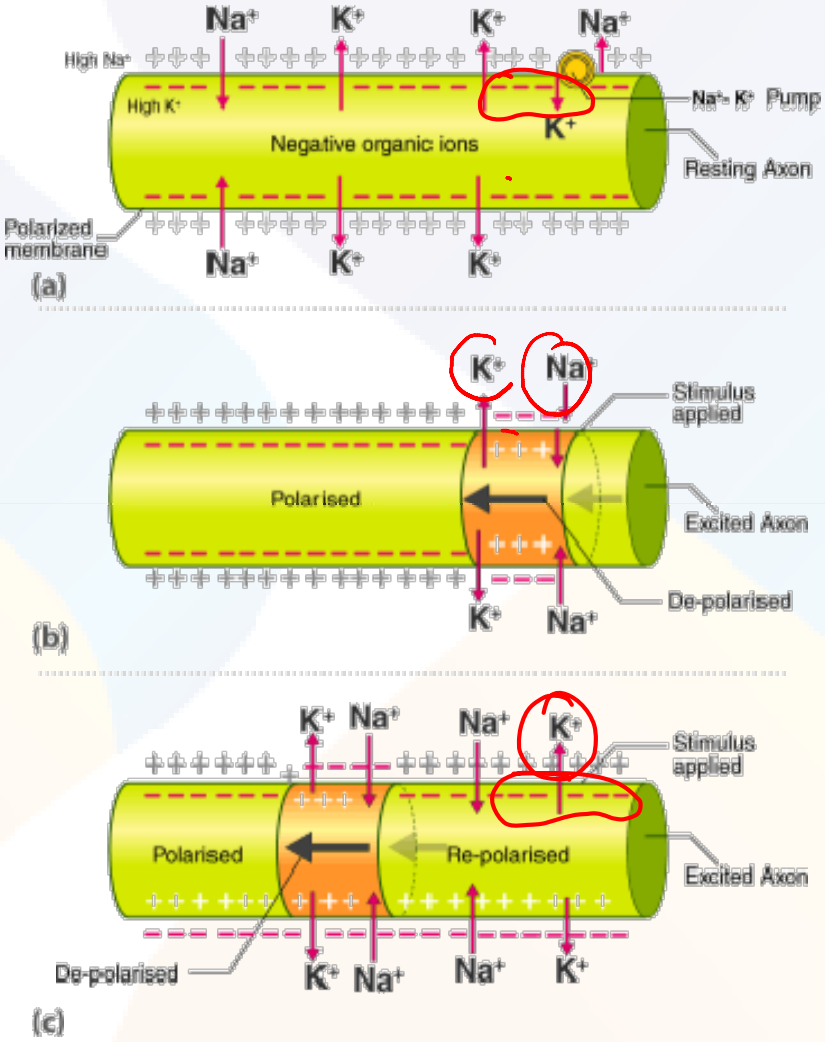
(B) First negative, then positive and continue to be positive

(C) First positive, then negative and again back to positive

(D) First negative, then positive and again back to negative



Ans [D]


Na+
K+
K+
Na+
High Na+
High K+
Negative organic ions
Na+- K+ Pump
Resting Axon
Polarized membrane
(a)
Stimulus applied
Polarised
Excited Axon
De-polarised
(b)
Re-polarised
(c)

Select the answer with correct matching of the structure, its location and function **[CBSE PMT (Mains) 2010; WB JEE 2016]**

	Structure	Location	Function
(a)	Eustachian tube	Anterior part of internal ear	Equalizes air pressure on either sides of tympanic membrane
(b)	Cerebellum	Mid brain	Controls respiration and gastric secretions
(c)	Hypothalamus	Fore brain	Controls body temperature, urge for eating and drinking
(d)	Blind spot	Near the place where optic nerve leaves the eye	Rods and cones are present but inactive here

Outer most covering of brain is called :-

(A) Choroid

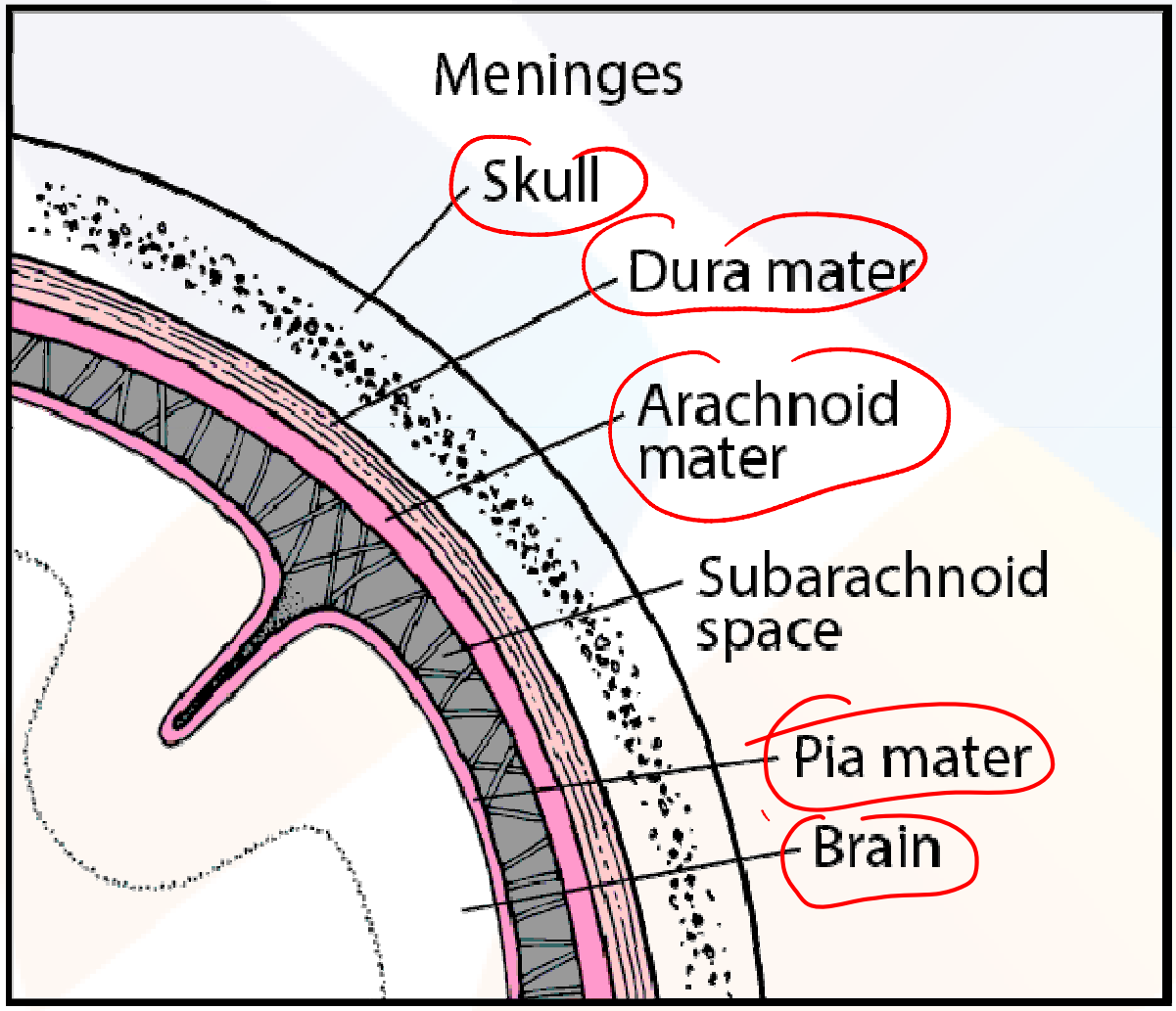
(B) Duramater

(C) Piamater

(D) Arachnoid

Duramater (outer most covering)
↑
Arachnoid
↑
Piamater

Ans [B]


Meninges
Skull
Dura mater
Arachnoid mater
Subarachnoid space
Pia mater
Brain

GABA (gama amino butyric acid) is a :-

(A) Inhibitory neurohormone

(B) Neuro hormone transmit impulse

(C) Anti coagulant

(D) None

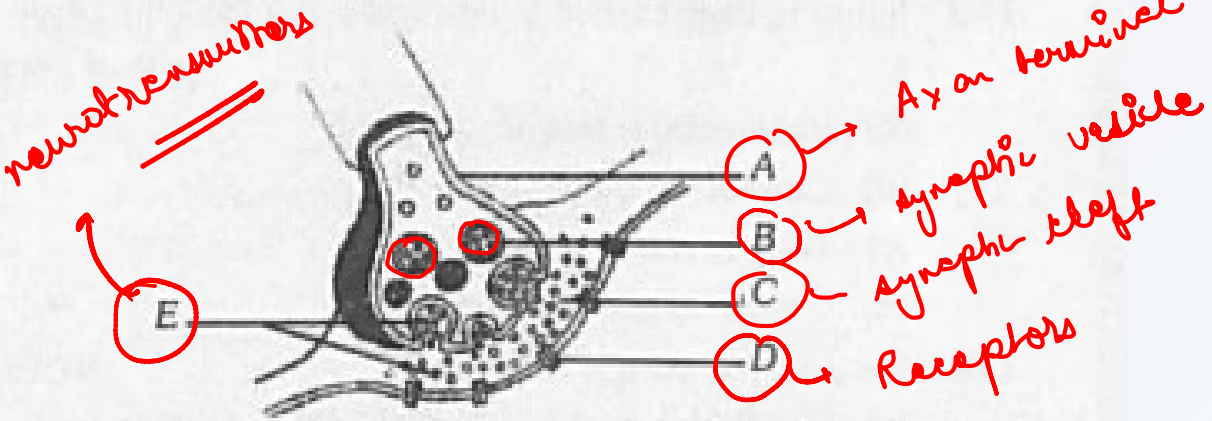
Ans [A]

A neurotransmitter is the body's chemical messenger. They are molecules that transmit signals from neurons to muscles, or between different neurons. The transmission of signals between two neurons occurs in the synaptic cleft. The electrical signals that travel along the axon are briefly converted into chemical signals through neurotransmitters.

Gamma aminobutyric acid (**GABA**) is a naturally occurring amino **acid** that works as a neurotransmitter in your brain. Neurotransmitters function as chemical messengers. **GABA** is considered an inhibitory neurotransmitter because it blocks, or inhibits, certain brain signals and decreases activity in your nervous system.

In the following diagram showing axon terminal and synapse, A, B, C, D and E respectively represents

[Kerala PMT 2010; NEET 2013; NEET (Karnataka) 2013]



(a) Axon terminal, synaptic cleft, synaptic vesicles, neurotransmitters and receptors

(b) Axon terminal, synaptic vesicles, synaptic cleft, receptors and neurotransmitters

(c) Synaptic cleft, synaptic vesicles, axon terminal, neurotransmitters and receptors

(d) Synaptic cleft, axon terminal, synaptic vesicles, neurotransmitters and receptors

(e) Synaptic vesicles, axon terminal, synaptic cleft, receptors and neurotransmitters

Nissl's bodies found in neurons are :-

(A) Made of DNA

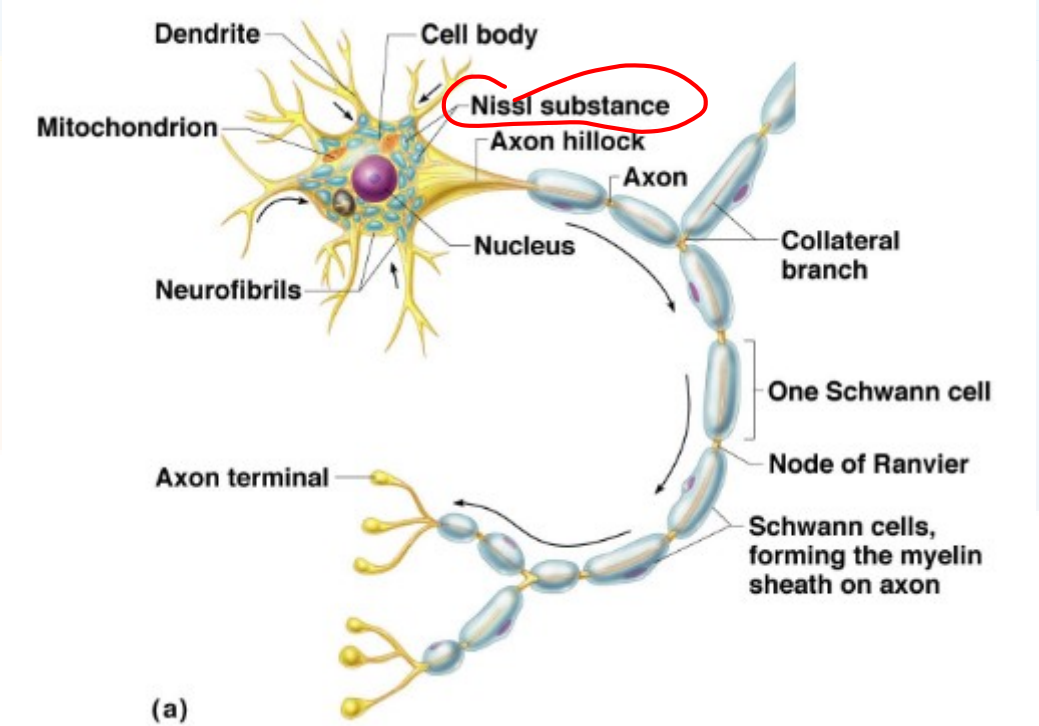
(B) Masses of ribosome and RER

(C) Help in formation of neurofibrils

(D) Masses of mitochondria

Ans [B]

Nissl bodies found in the cell body of the neurons are the granules of rough endoplasmic reticulum (RER) with rosettes of free ribosomes.The main function of Nissl bodies within neurons is to aid in the production and dispersal of chemical substances such as proteins and peptides.



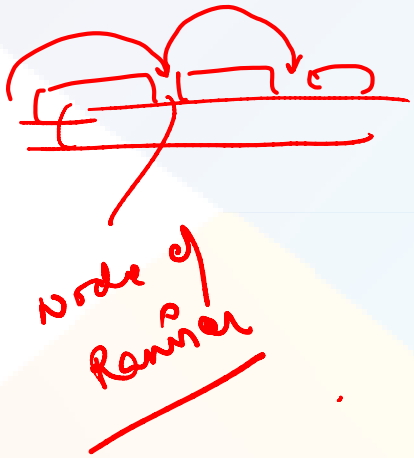
Saltatory conduction occurs in :-

(A) Non-myelinated fibers

(B) Myelinated fibers

(C) Both of them

(D) None of them



Ans [B]

Saltatory conduction is the propagation of action potentials along myelinated axons from one node of Ranvier to the next node, increasing the conduction velocity of nerve impulses.

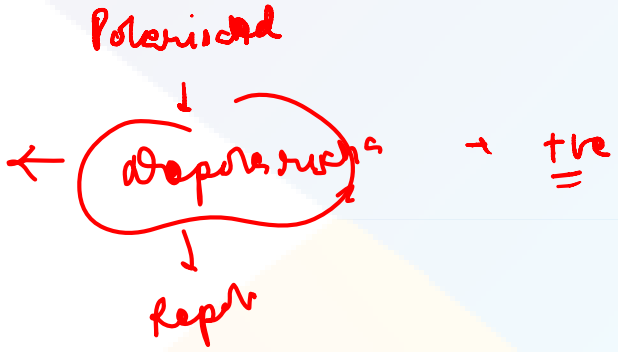
When a nerve fibers is stimulated the inside of the membrane becomes :-

(A) Filled with acetyl choline

(B) Negatively charged

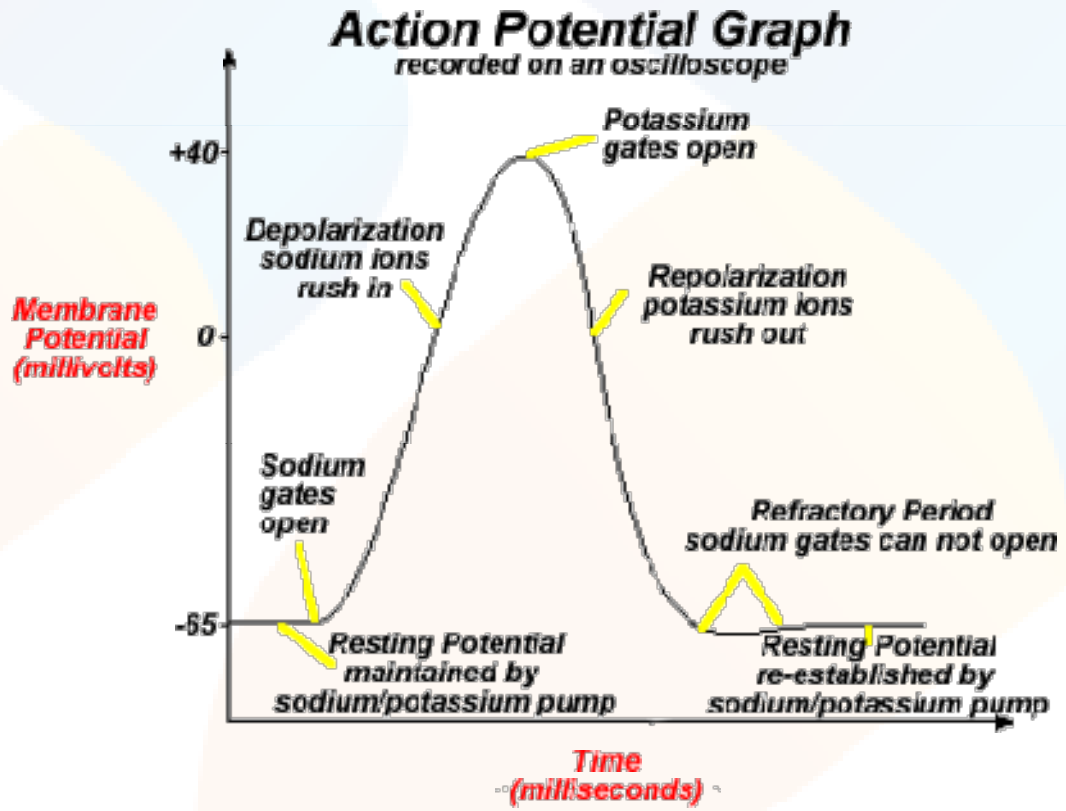
(C) Positively charged

(D) Neutral



Ans [C]

When a nerve cell is **stimulated**, ion channels in the plasma **membrane** open and Na+ instantly diffuses down its concentration gradient into the cell. These cations override the negative charges in the intracellular fluid, so the **inside of the membrane** briefly **becomes** positive.



The parts of the neurons that perform basic cellular functions such as protein synthesis etc. :–

(A) Axons

(B) Dendrites

(C) Synaptic knobs

(D) Soma

Ans [D]

The cell body (soma) is the factory of the neuron. It produces all the proteins for the dendrites, axons and synaptic terminals and contains specialized organelles, such as the mitochondria, Golgi apparatus, endoplasmic reticulum, secretory granules, ribosomes and polysomes to provide energy.