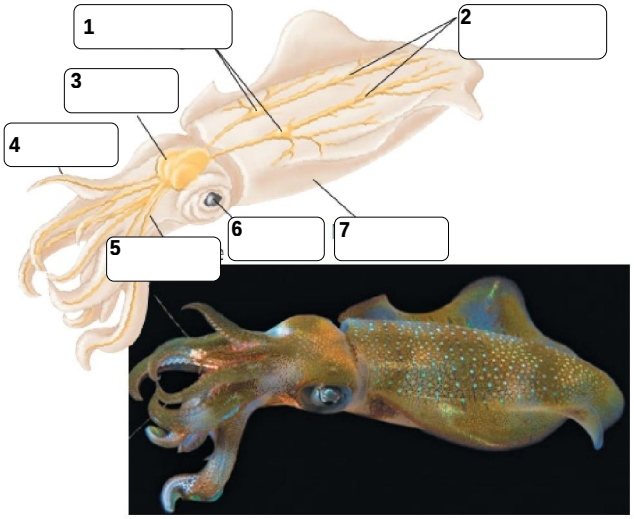
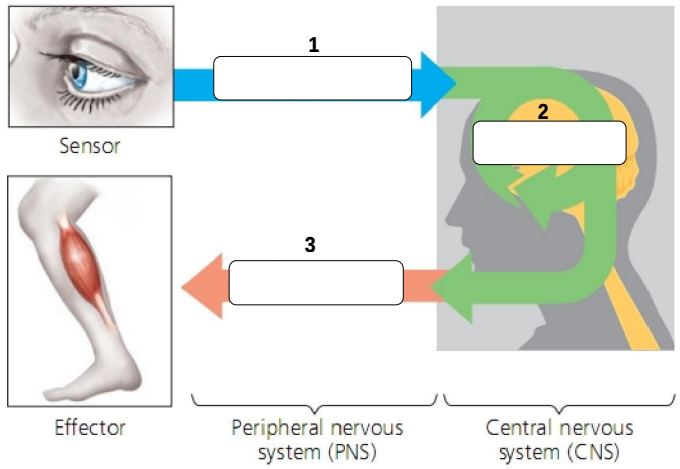
Sistem Koordinasi

Neuron dan Impuls

Sebelum mempelajari tentang neuron secara tersendiri mari kita amati secara garis besar aliran informasi pada tubuh hewan. Di sini akan digunakan contoh pada gurita yang memiliki sel saraf/neuron yang tidak biasa besarnya yang memegang peranan yang krusial dalam mengungkapkan tramisi siynal.

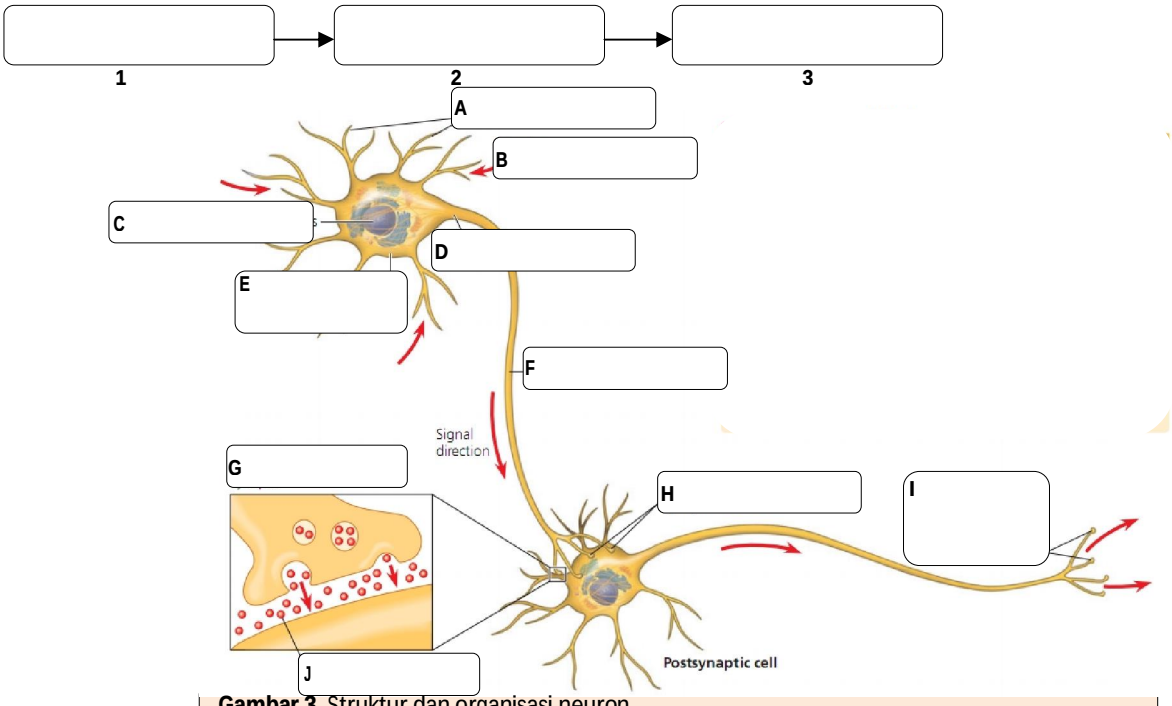


Gambar 1. Ringkasan pemrosesan informasi pada gurita



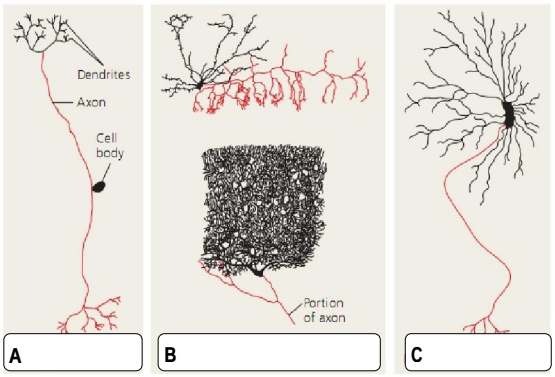
Gambar 2. Ringkasan pemrosesan informasi

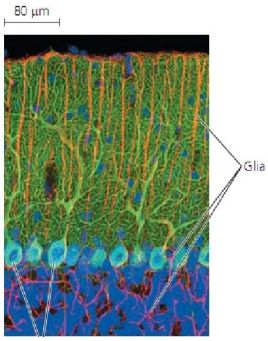
Pemrosesan informasi oleh system saraf terjadi dalam tiga tahap yaitu : (masukkan istilah berikut ke kolom di bawah ini (integrasi , output motoris , input sensoris)

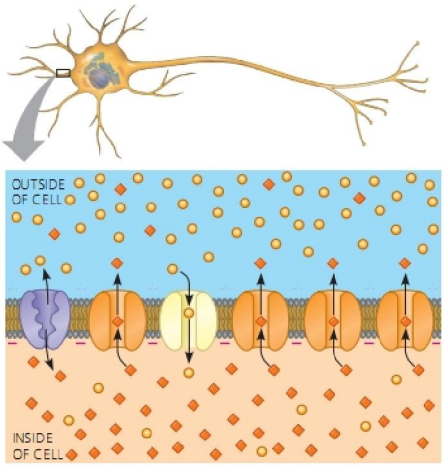


Gambar 3. Struktur dan organisasi neuron

Gambar 4. Macam-macam neuron



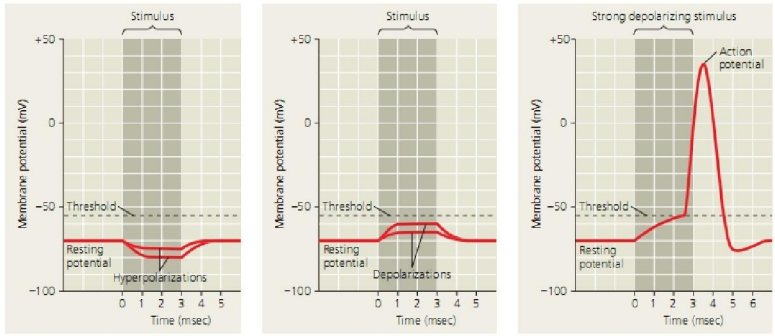


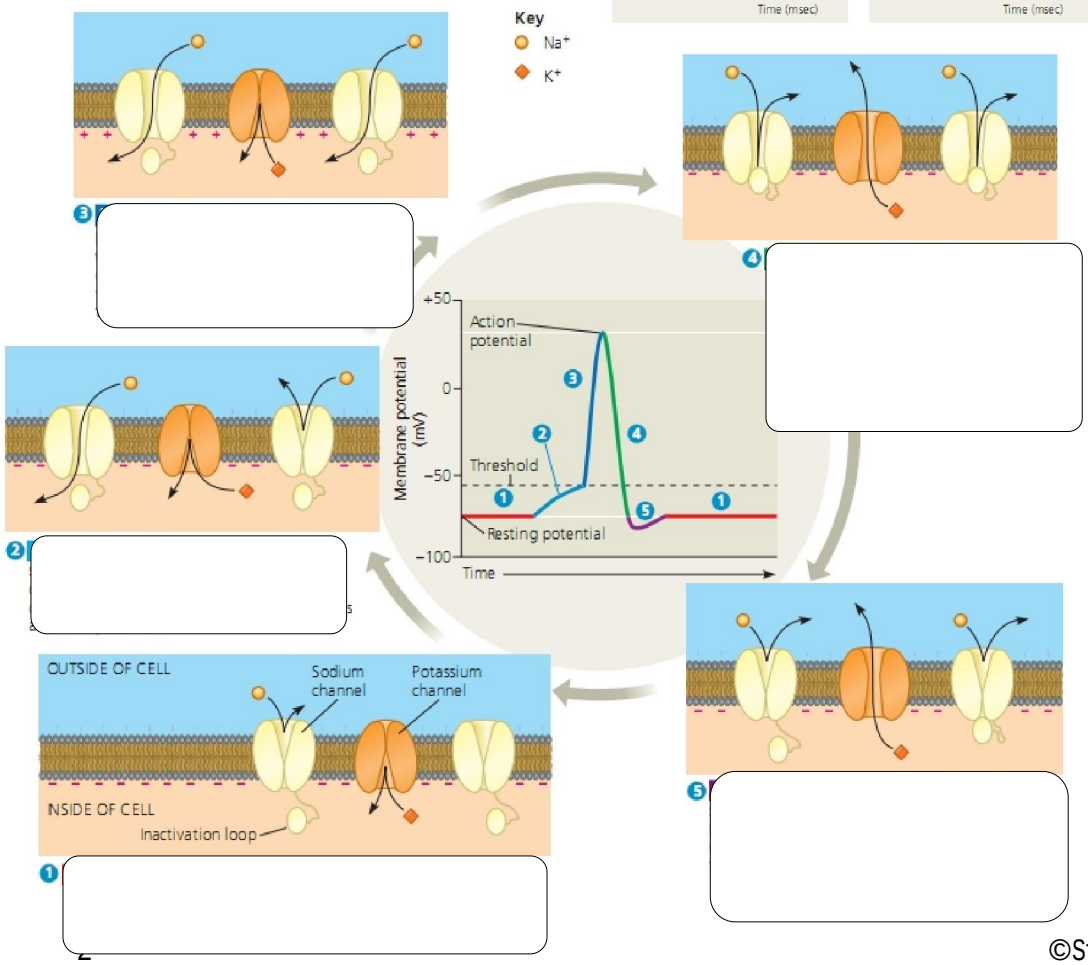


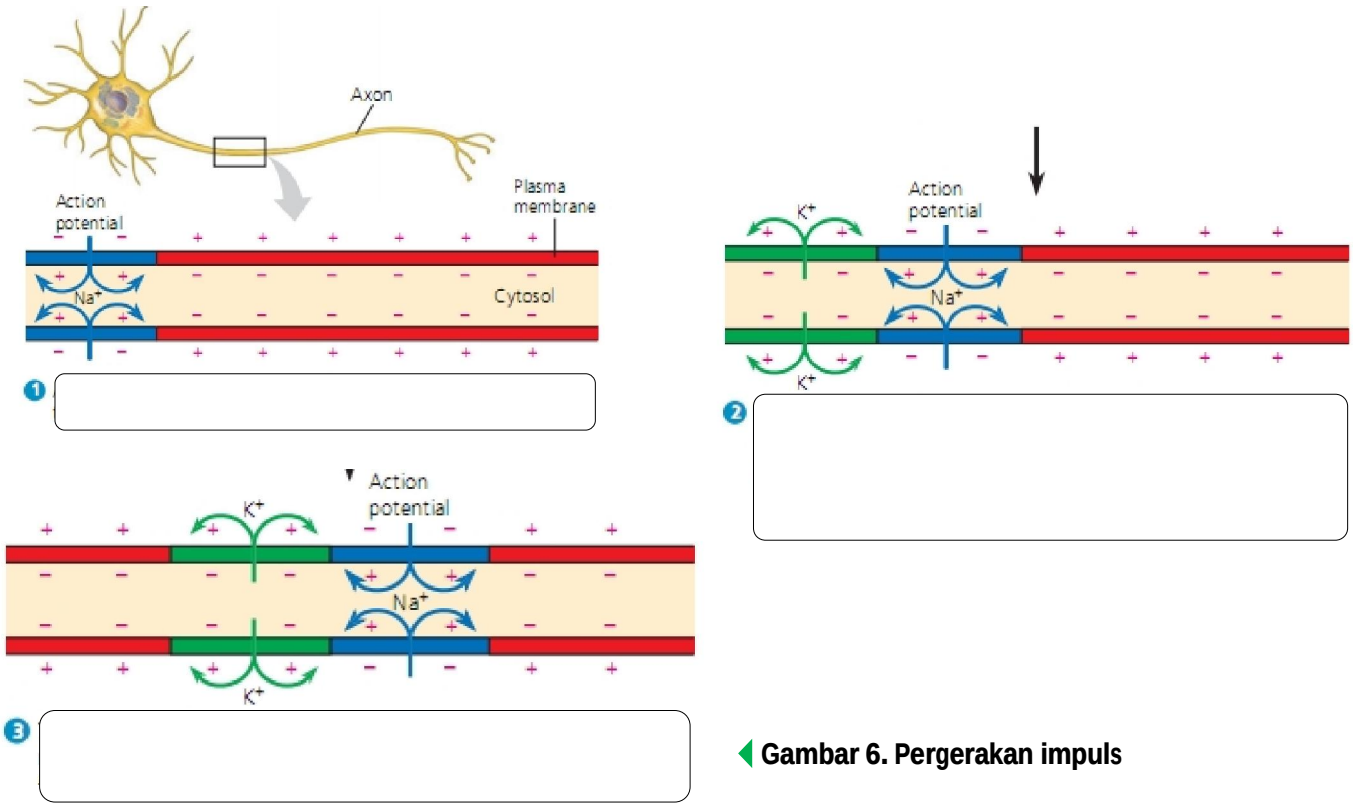
Gambar 5. Potensial istirahat

Table 48.1 Ion Concentrations Inside and Outside of Mammalian Neurons

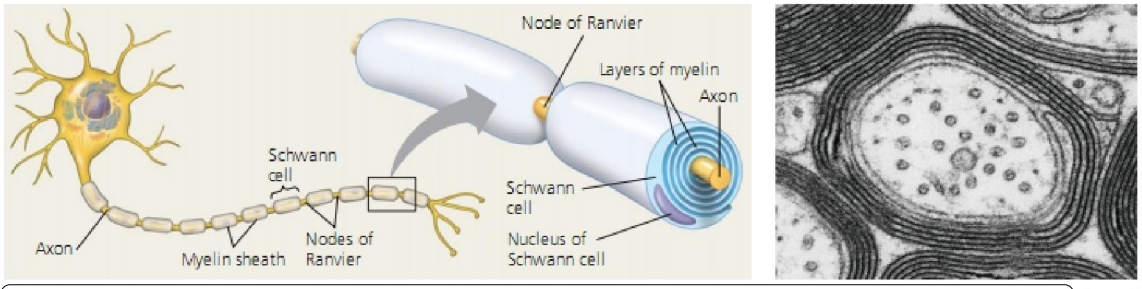
Ion	Intracellular Concentration (mM)	Extracellular Concentration (mM)
Potassium (K^+)	140	5
Sodium (Na^+)	15	150
Chloride (Cl^-)	10	120
Large anions (A^-) inside cell, such as proteins	100	(not applicable)





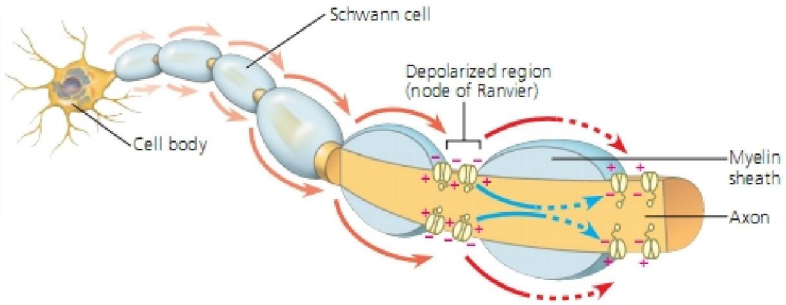


Gambar 6. Pergerakan impuls

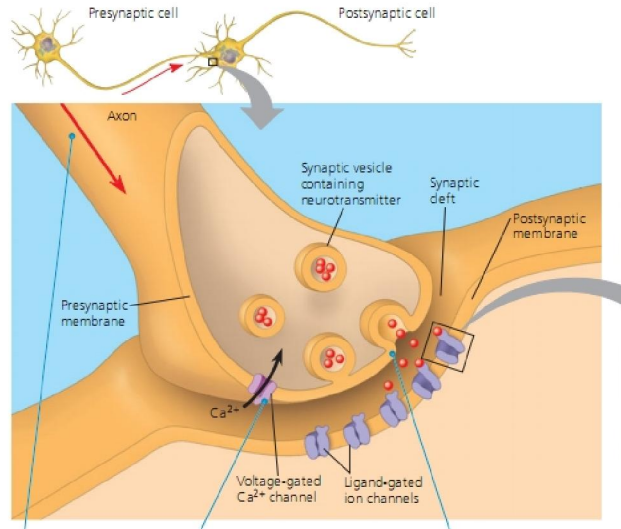


Gambar 7. Sel saraf dan selubung mielin

Gambar 8. Konduksi saltatori



Gambar 9. Transmisi impuls antar neuron



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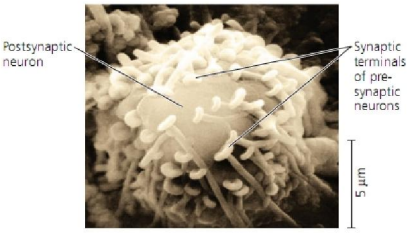


▲ **Figure 48.16** **Synaptic terminals on the cell body of a postsynaptic neuron** (colorized SEM).

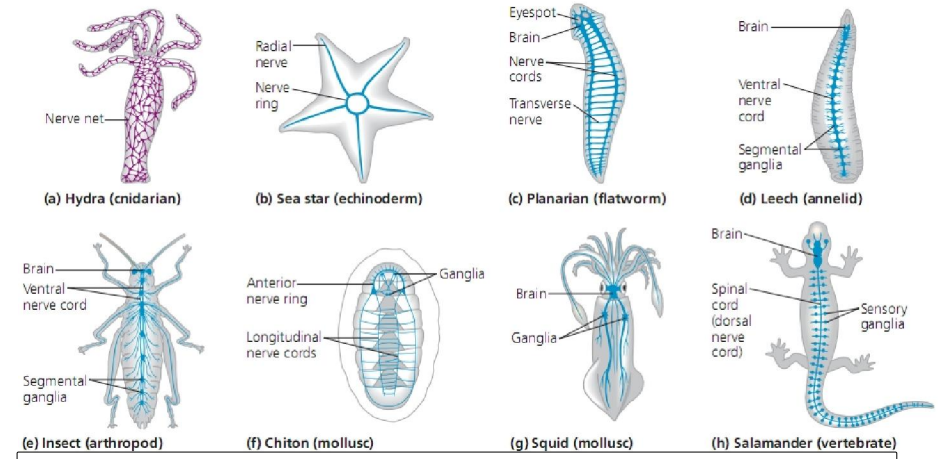
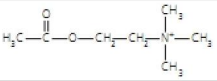
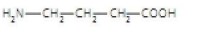
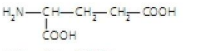
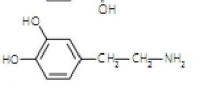
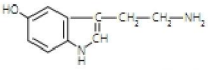
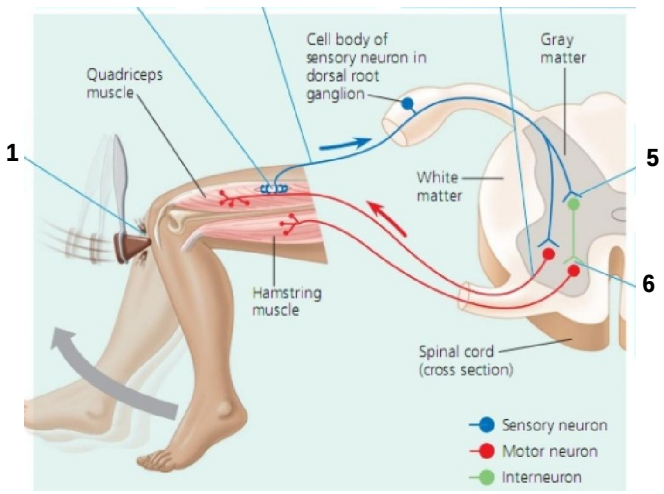


Table 48.2 Major Neurotransmitters

Neurotransmitter	Structure
Acetylcholine	
Amino Acids	
GABA (gamma-aminobutyric acid)	
Glutamate	
Glycine	
Biogenic Amines	
Norepinephrine	
Dopamine	
Serotonin	
Neuropeptides (a very diverse group, only two of which are shown)	
Substance P	Arg—Pro—Lys—Pro—Gln—Gln—Phe—Phe—Gly—Leu—Met
Met-enkephalin (an endorphin)	Tyr—Gly—Gly—Phe—Met
Gases	
Nitric oxide	N=O

▲ **Gambar 10 . Organisasi sistem saraf.**

2 3 4



1 5 6

Gambar 11 . Jalur gerak refleks.

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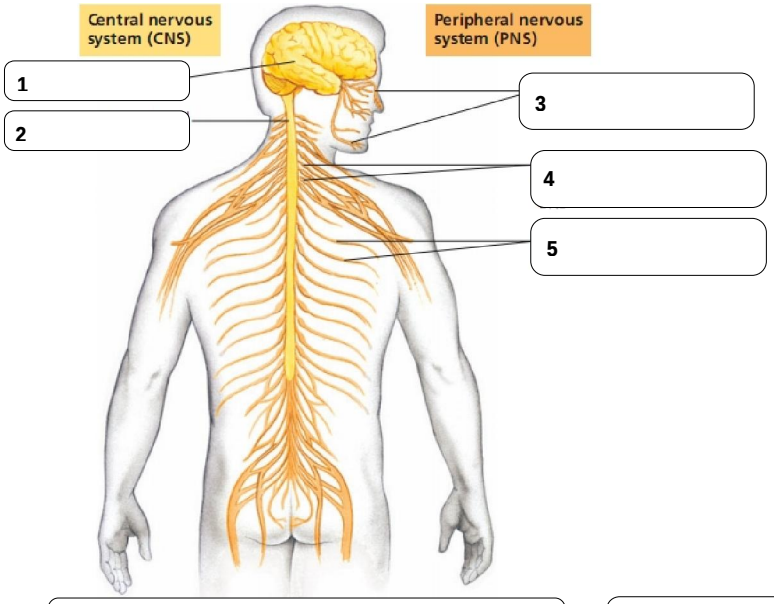
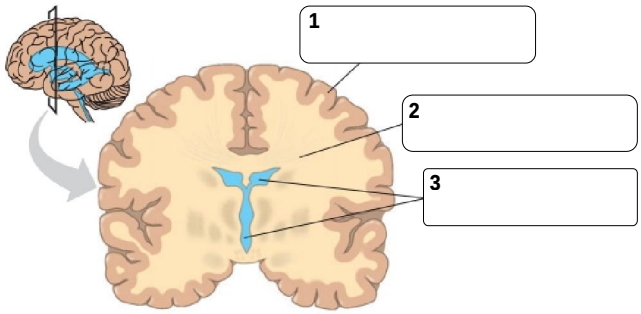
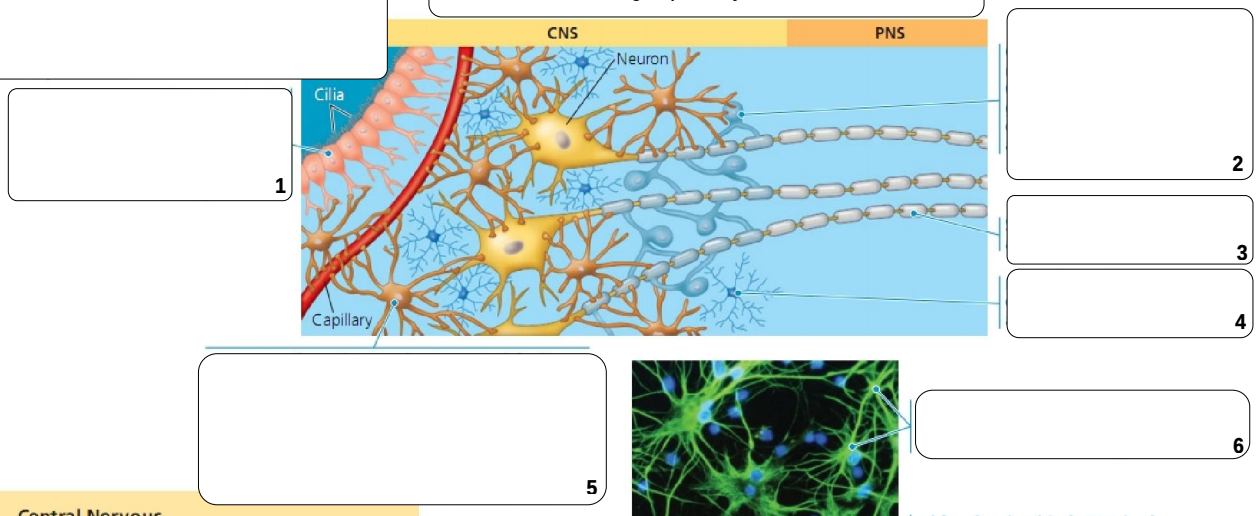


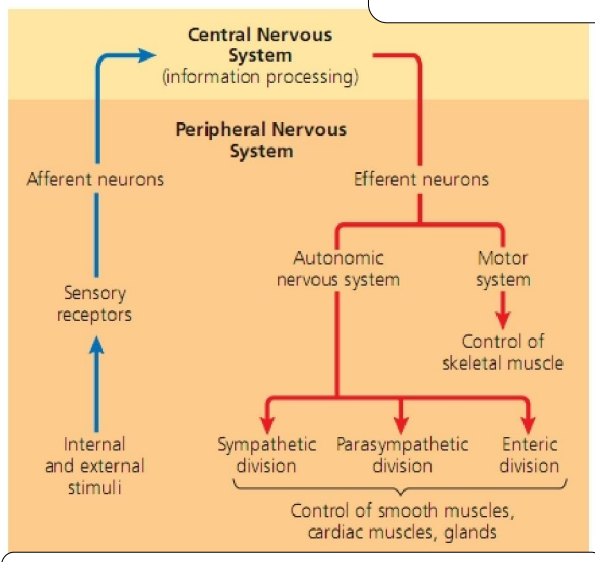


Gambar 12. Model belahan otak manusia

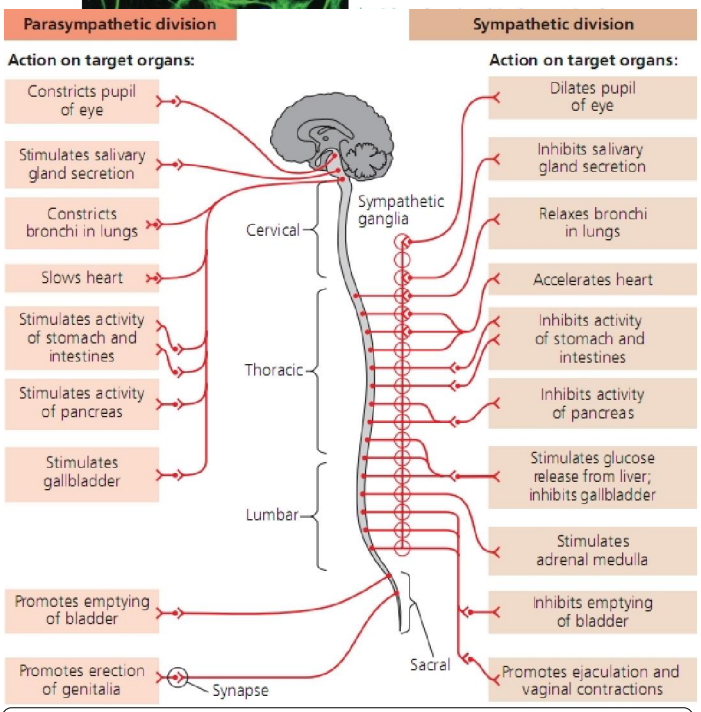
Gambar 13. Sistem saraf pada manusia

Gambar 14. Sel glia pada system saraf

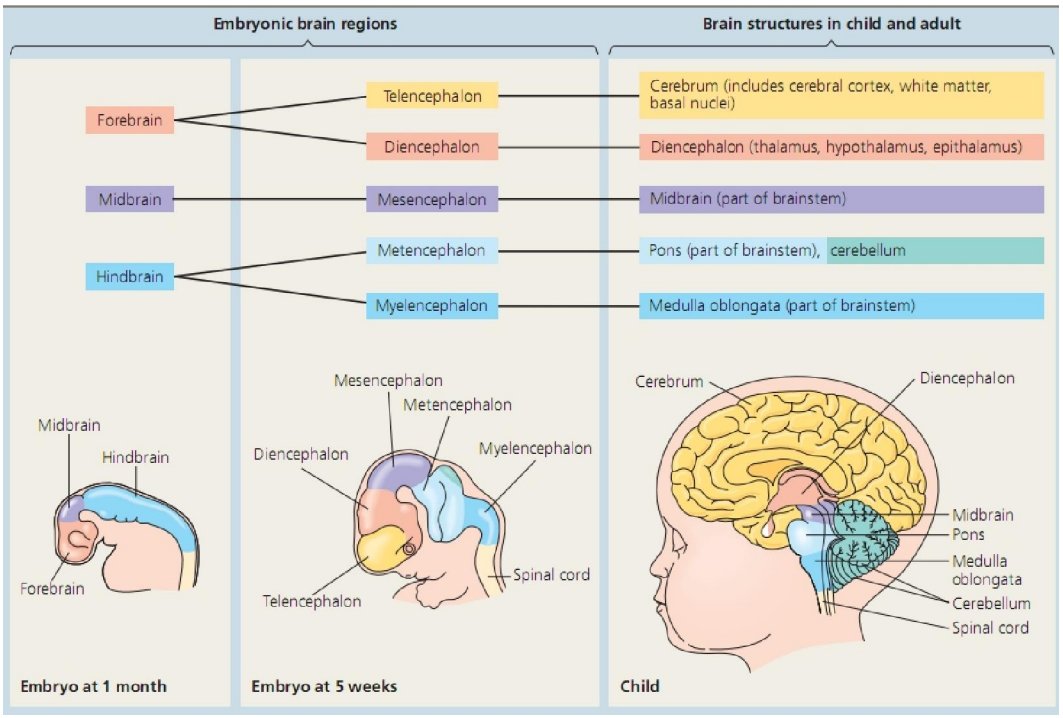


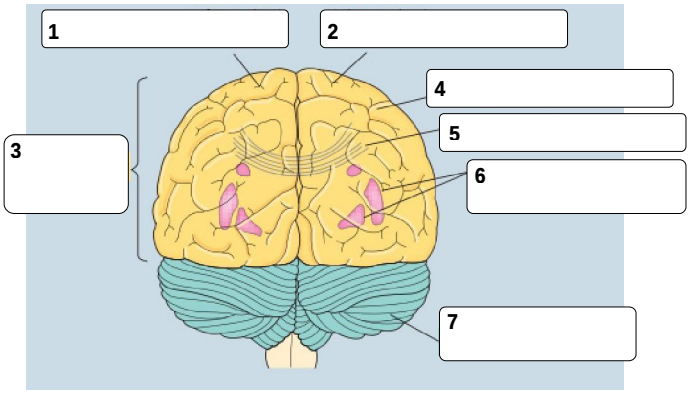


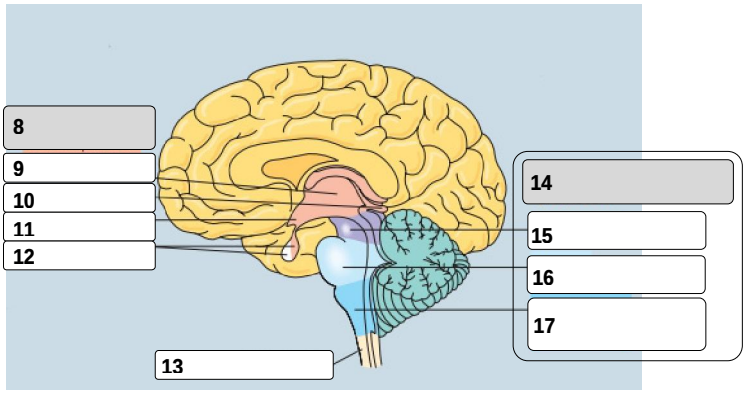
Gambar 15. Hirarki fungsional vertebra periferal sistem saraf

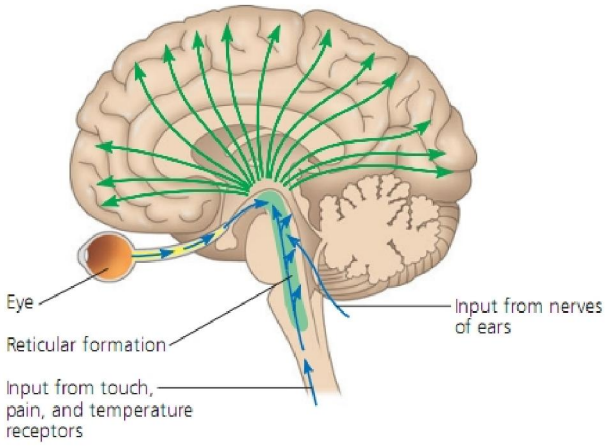


Gambar 16 . Pembagian Simpatetik dan parasimpatetik dari sistem saraf otonom

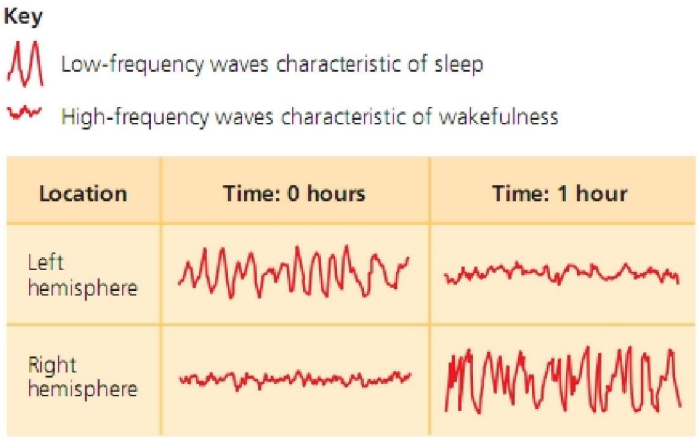




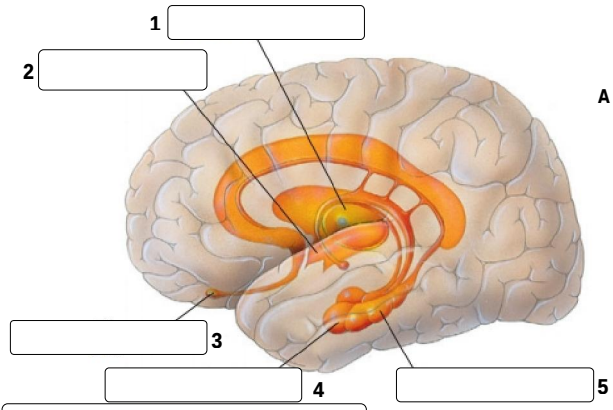




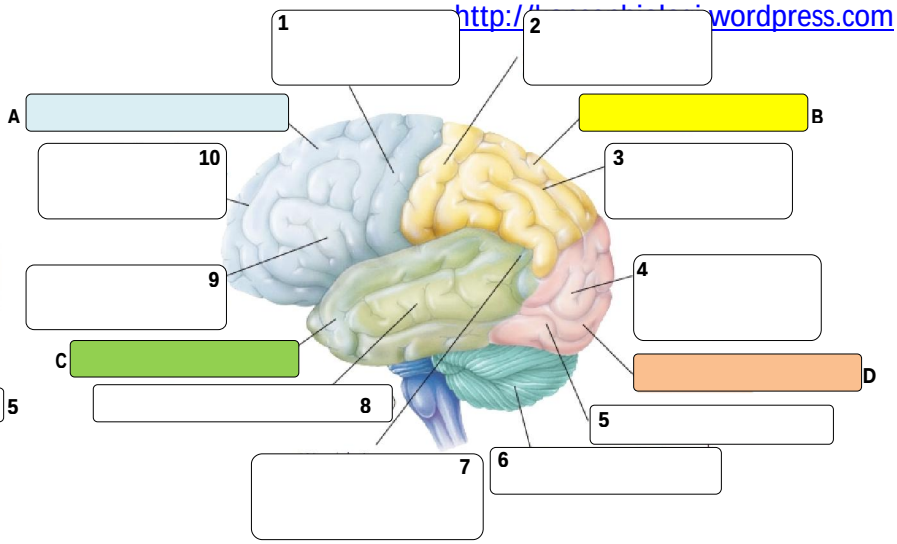
▲ **Gambar 17 . The reticular formation.** This system of neurons distributed throughout the core of the brainstem filters sensory input (blue arrows), blocking familiar and repetitive information that constantly enters the nervous system. It sends the filtered input to the cerebral cortex (green arrows).

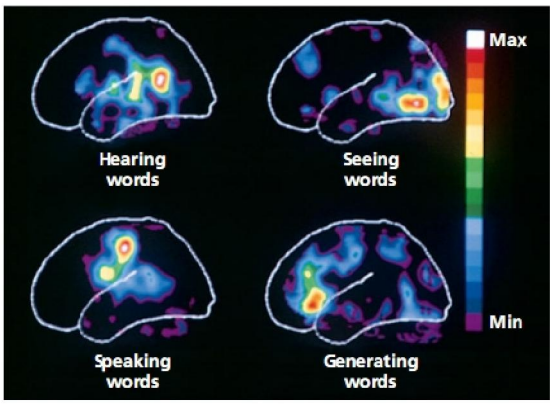


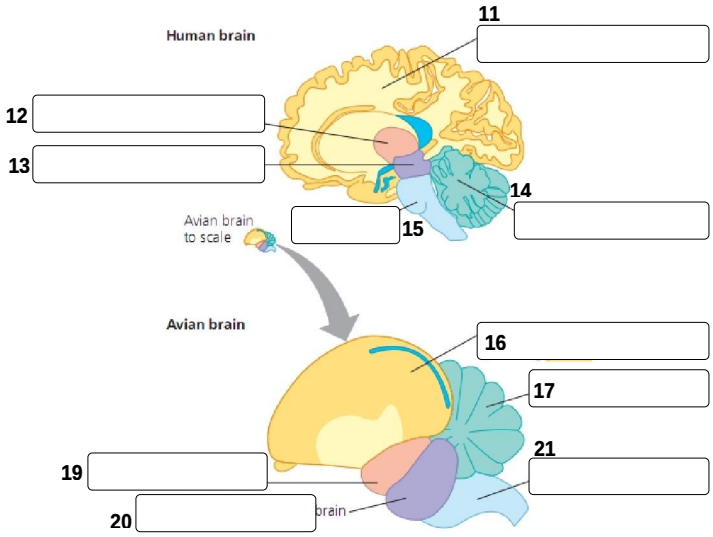
▲ **Gambar 18. Dolphins can be asleep and awake at the same time.** EEG recordings were made separately for the two sides of a dolphin's brain. Low-frequency activity was recorded in one hemisphere while higher-frequency activity typical of being awake was recorded in the other hemisphere.



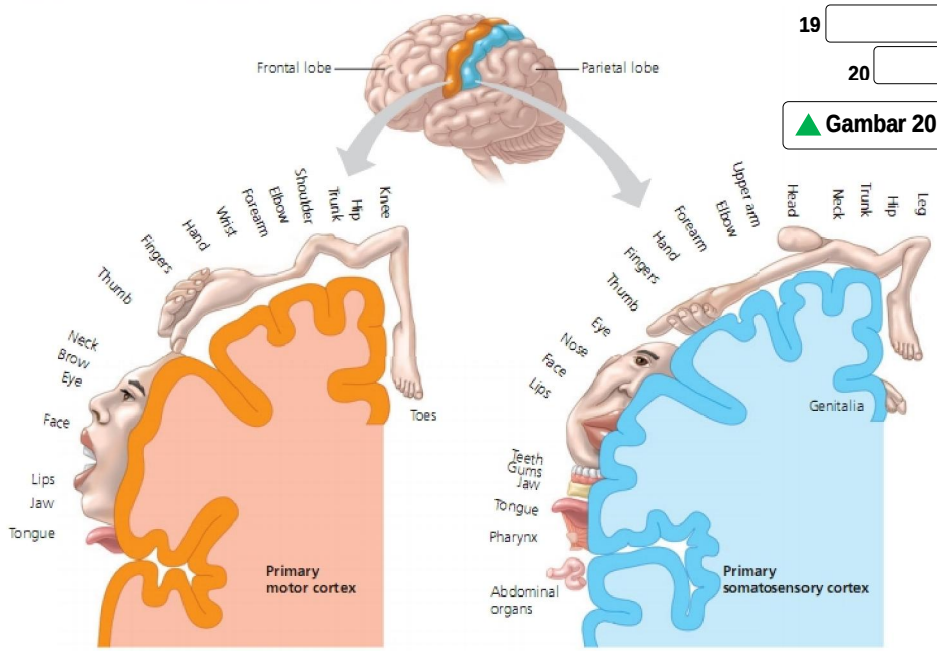
▲ **Gambar 19** . Sistem limbik



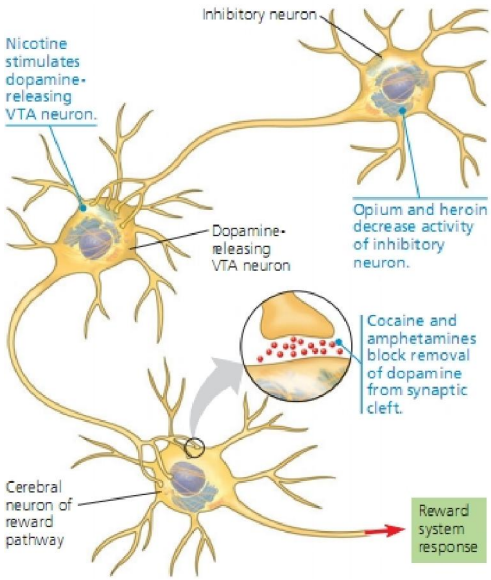




▲ **Gambar 20** . Perbandingan otak manusia dan *Avian*



▲ **Gambar 21** . Representatif bagian tubuh dalam kaitannya dengan daerah motorik primer dan somatosensoris primer

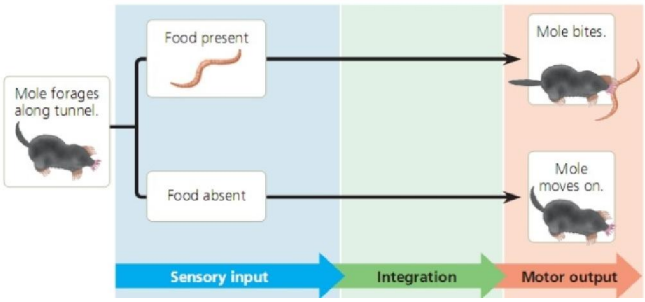


▲ **Gambar 22** . Efek zat aditif pada otak mamalia

Mekanisme motoris dan sensoris

1. Macam-macam stimulus. Berdasarkan sumbernya ada dua macam stimulus yaitu:
   a. Dalam contohnya adalah .....:
   b. Luar contohnya adalah: ....., ..., ..., ..., dan .....
2. Meskipun hewan banyak cara untuk menerima stimulus pada prinsipnya .....
   .....

3. Berikut ini adalah tahapan jalur sensoris



   a. Resepsi sensoris.

   b. Transduksi

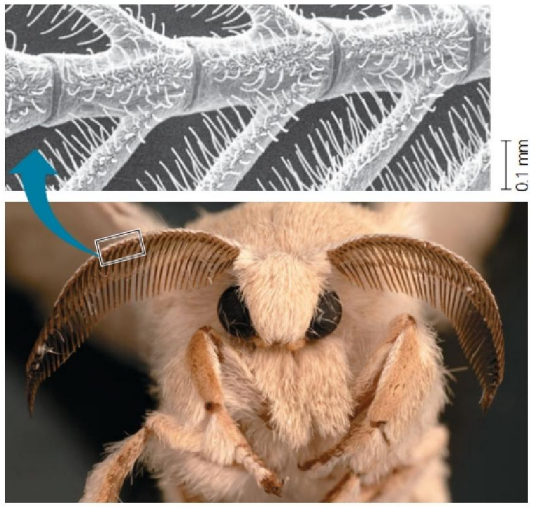
   c. Transmisi

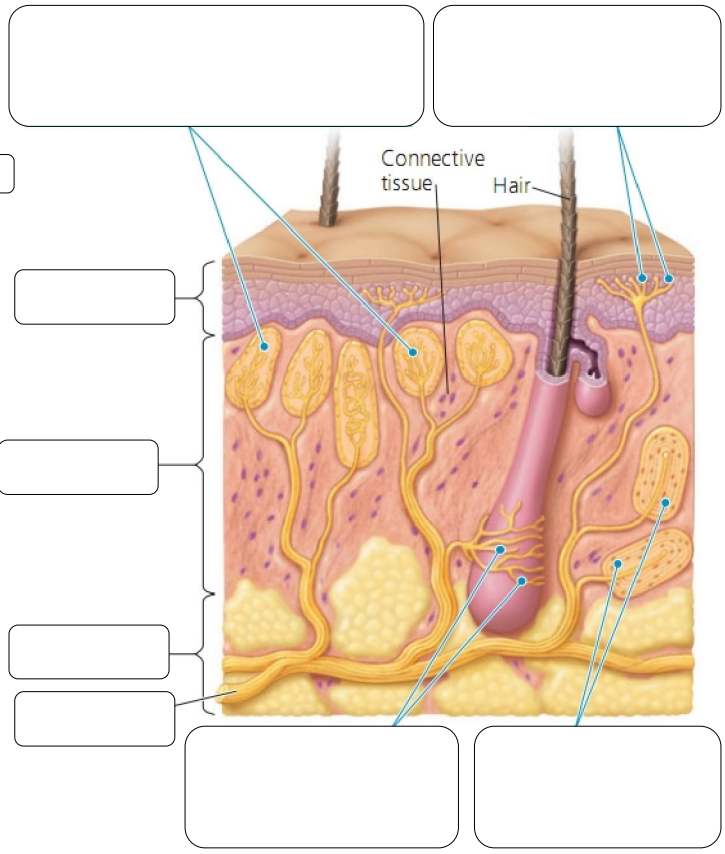
   d. Persepsi

4. Jelaskan HUBUNGAN tranduksi dan potensial aksi/impuls saraf.

5. Tipe reseptor sensoris
   a. Mekanoreseptor :
      mendeteksi stimulus berupa :

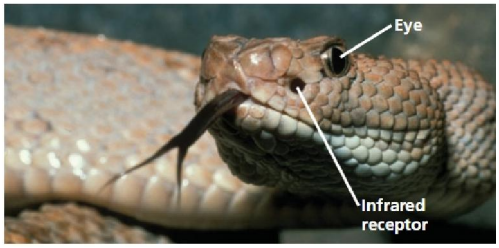
   b. Kemoreseptor





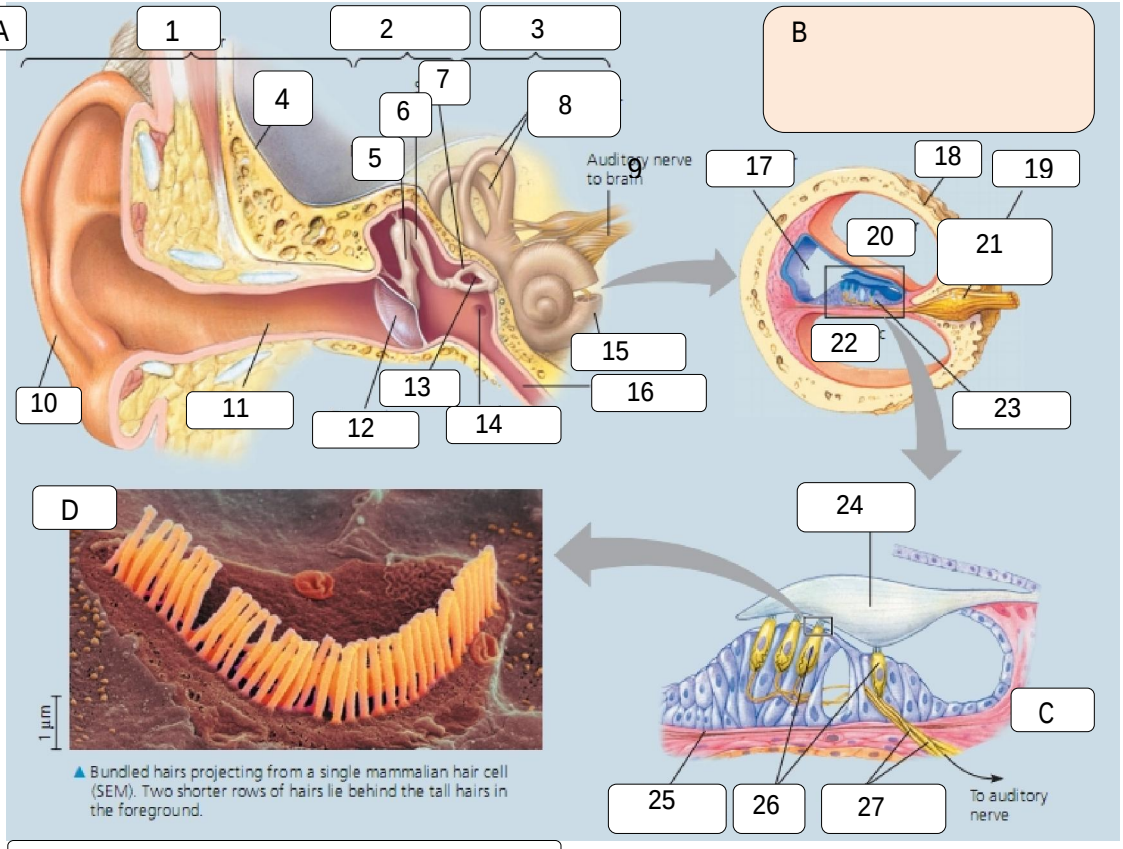
▲ **Gambar 24** . reseptor pada kulit manusia

   c. Elektromagnetik reseptor detect various forms of electro-magnetic energy, such as visible light, electricity, and magnetism



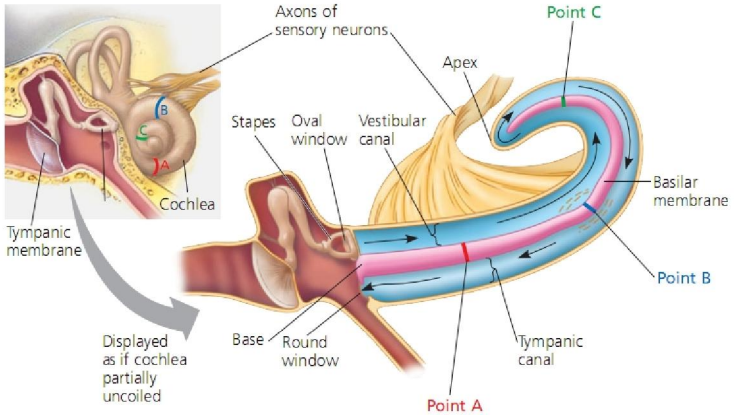
   d. Termoreseptor
      Mendeteksi panas dan dingin. Lokasinya di kulit dan hipotalamus anterior. Termorespetor mengirimkan informasi ke thermostat tubuh di hipotalamus posterior.
   e. Nosiseptor (necere to hurt) .
      Memicu reaksi pertahanan

6. Pendengaran dan keseimbangan pada mamalia



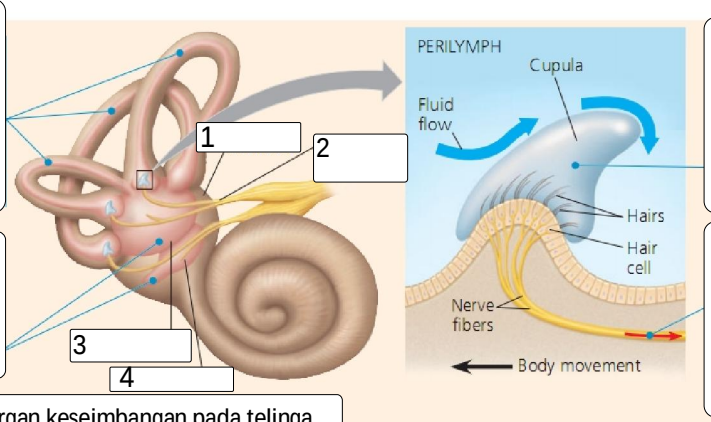
Gambar 25 . anatomi indera pendengar manusia

Keterangan gambar 24



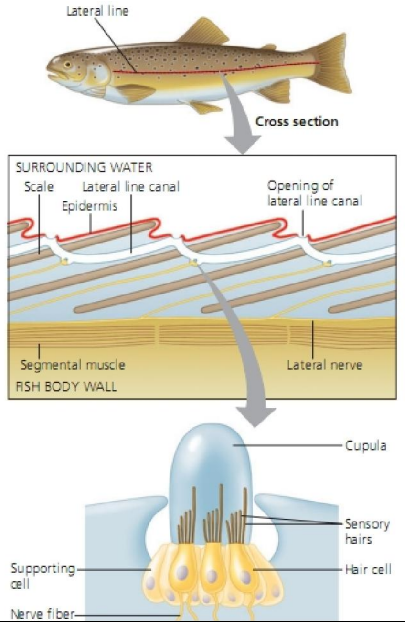
Gambar 26. Proses getaran pada koklea

catatan

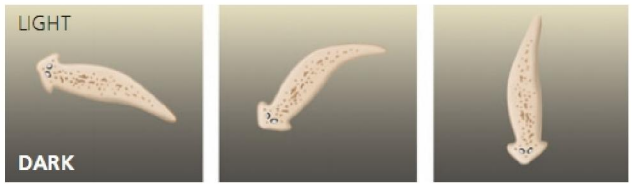


Gambar 27. Organ keseimbangan pada telinga

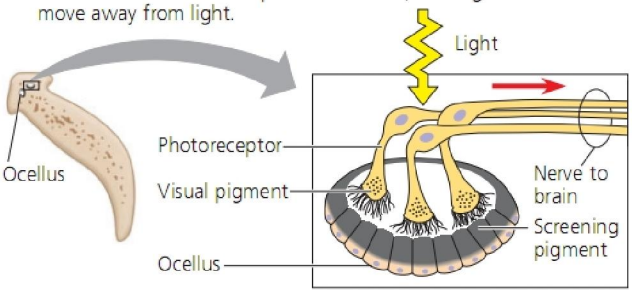
Berikut ini adalah beberapa macam contoh alat indera pada hewanyang perlu diketahui



▲ **Gambar 28**. Sistem garis lateral pada ikan



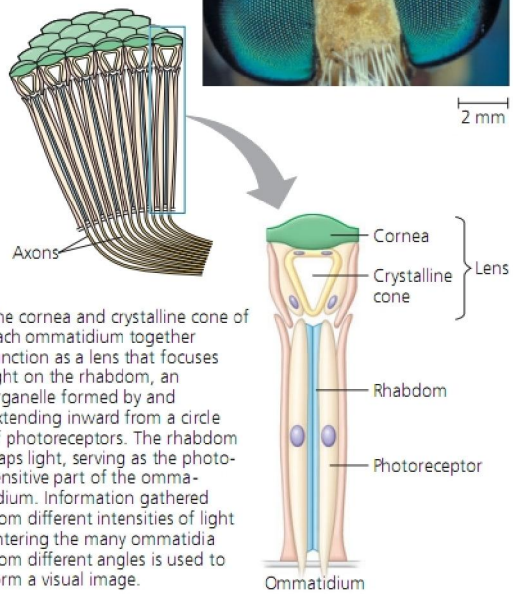
(a) The planarian's brain directs the body to turn until the sensations from the two ocelli are equal and minimal, causing the animal to move away from light.



(b) Whereas light striking the front of an ocellus excites the photoreceptors, light striking the back is blocked by the screening pigment. In this way, the ocelli indicate the direction of a light source, triggering the light avoidance behavior.

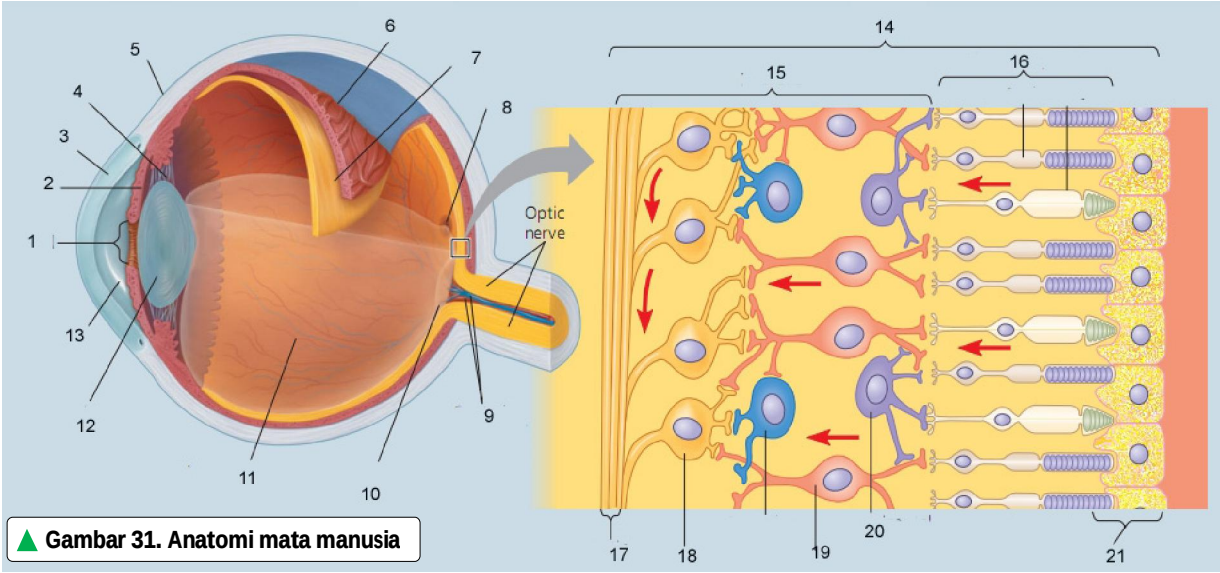
▲ **Gambar 29**. Oceli dan orientasi pada planarian

(a) The faceted eyes on the head of a fly form a repeating pattern visible in this photomicrograph.



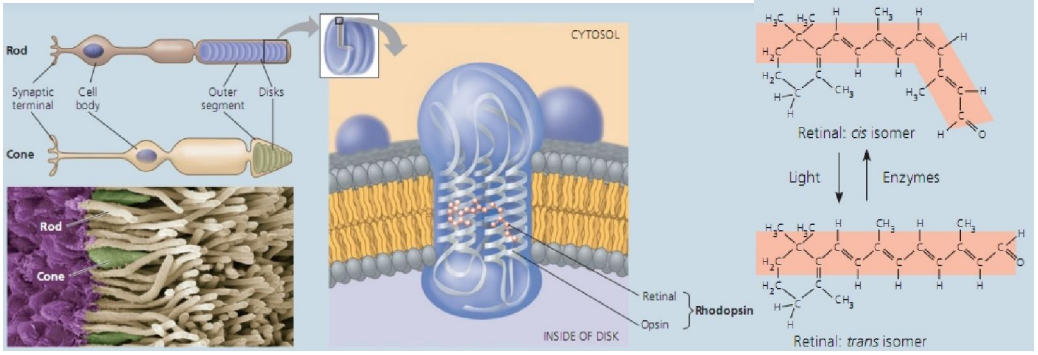
(b) The cornea and crystalline cone of each ommatidium together function as a lens that focuses light on the rhabdom, an organelle formed by and extending inward from a circle of photoreceptors. The rhabdom traps light, serving as the photosensitive part of the ommatidium. Information gathered from different intensities of light entering the many ommatidia from different angles is used to form a visual image.

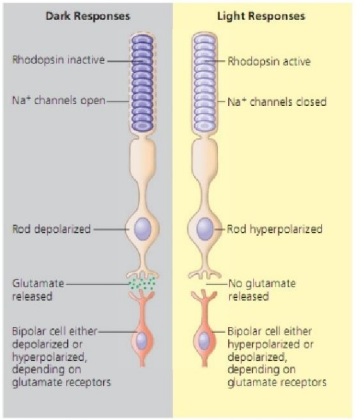
▲ **Gambar 30. Mata facet/mata majemuk**

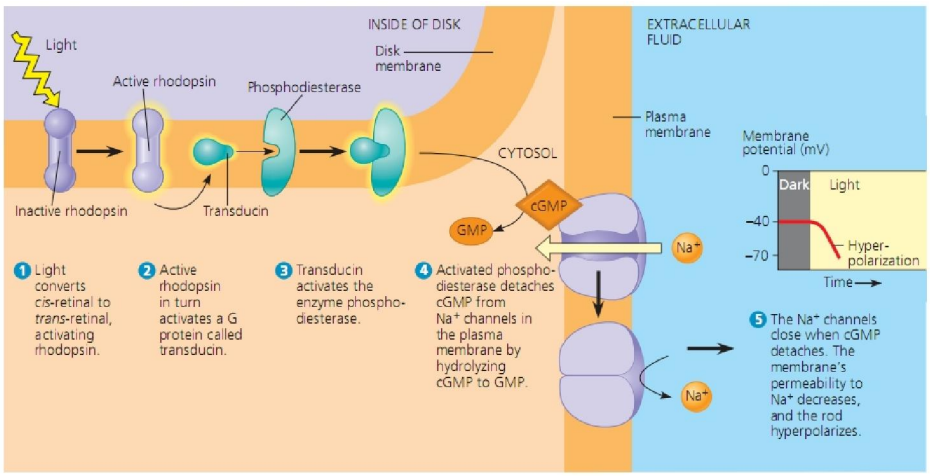


▲ **Gambar 31. Anatomi mata manusia**

Keterangan

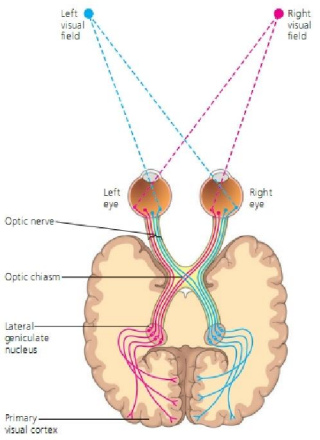




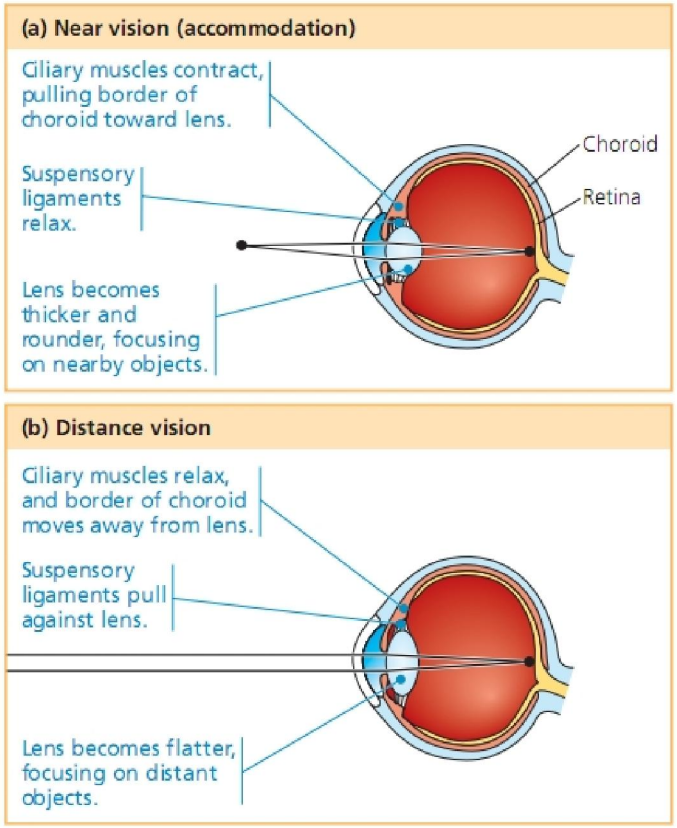


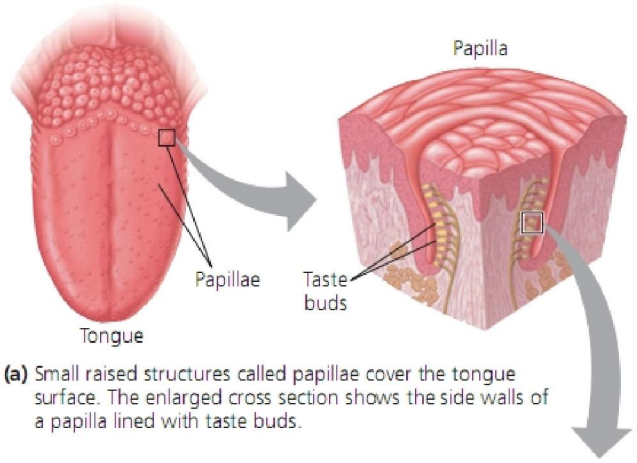
▲ **Figure 50.18 Production of the receptor potential in a rod cell.** In rods (and cones), the receptor potential triggered by light is a hyperpolarization, not a depolarization.

▲ **Figure 50.19 Synaptic activity of rod cells in light and dark.**

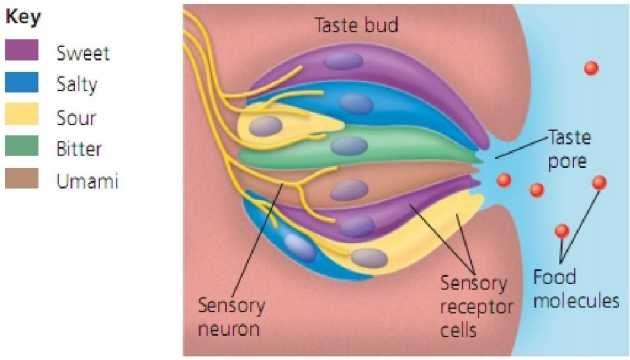


▼ **Figure 50.22 Focusing in the mammalian eye.** Ciliary muscles control the shape of the lens, which bends light and focuses it on the retina. The thicker the lens, the more sharply the light is bent.



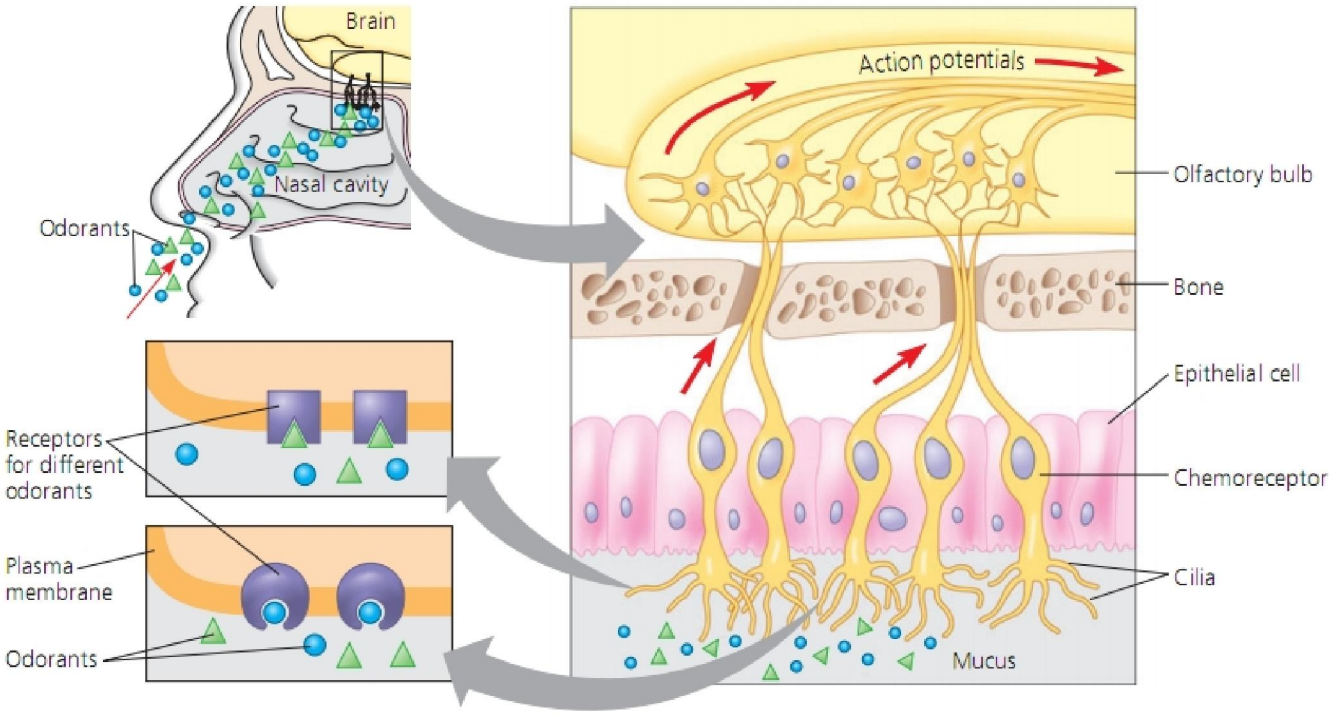


(a) Small raised structures called papillae cover the tongue surface. The enlarged cross section shows the side walls of a papilla lined with taste buds.



(b) Taste buds in all regions of the tongue contain sensory receptor cells specific for each of the five taste types.

▲ **Figure 50.24 Human taste receptors.**



▲ **Figure 50.25 Smell in humans.** Odorant molecules bind to specific receptor proteins in the plasma membrane of olfactory receptor cells, triggering action potentials.

WHAT IF? *If you spray an "air freshener" in a musty room, would you be affecting detection, transmission, or perception of the odorants responsible for the musty smell?*

Soal latihan