

## Pressure Inside the Human Body

Q1. Define pressure and state its common unit in medicine.

Answer: Pressure is the force applied per unit area. In the SI system it is measured in Pascal (Pa), but in medicine it is commonly expressed in millimeters of mercury (mmHg).

Q3. What are the two main types of pressure relative to atmospheric pressure?

Answer:

1. Positive pressure: Pressure greater than atmospheric pressure (e.g., blood pressure).
2. Negative pressure: Pressure lower than atmospheric pressure (e.g., lung pressure during inhalation).

Q4. What are normal pressure values in different parts of the human body?

Answer:

- Arterial blood pressure: 100–140 mmHg (systolic), 60–90 mmHg (diastolic)
- Venous pressure: 3–7 mmHg
- Capillary pressure: 30 mmHg (arterial end), 10 mmHg (venous end)
- Eye pressure: 12–23 mmHg
- CSF pressure: 5–12 mmHg
- Intrathoracic pressure: ~10 cmH<sub>2</sub>O

Q5. What instrument is used to measure blood pressure and what are its types?

Answer: The instrument is a sphygmomanometer. It has two types:

1. Mercury type (uses a mercury column).
2. Aneroid type (uses a flexible diaphragm and needle).

Q6. What is intraocular pressure and what disease is caused by its increase?

Answer: Intraocular pressure is the pressure of fluids inside the eye (aqueous humor). Normal range is 12–23 mmHg. Increased pressure causes glaucoma, which can lead to vision loss.

Q7. What is cerebrospinal fluid (CSF) pressure and what happens if it increases?

Answer: CSF pressure normally ranges from 5–12 mmHg. If it increases due to blockage, it causes hydrocephalus, leading to enlargement of the skull, especially in infants.

Q8. Explain pressure changes in the urinary bladder.

Answer: Bladder pressure increases with urine volume. The urge to urinate occurs at about 30 cmH<sub>2</sub>O. In normal voiding, pressure ranges between 20–40 cmH<sub>2</sub>O and may exceed 100 cmH<sub>2</sub>O in prostate obstruction.

Q9. What is Hyperbaric Oxygen Therapy (HOT)? Give two uses.

Answer: It is treatment using high-pressure oxygen chambers to increase oxygen dissolved in blood.

Uses:

1. Treatment of carbon monoxide poisoning.
2. Treatment of gas gangrene.

Electricity of the Body

Q10. What is the role of electricity inside the human body?

Answer: Electricity generated within the body controls the function of nerves, muscles, and organs.

Q11. What is a neuron and what are its main parts?

Answer: A neuron is the basic structural unit of the nervous system responsible for transmitting electrical signals.

Main parts:

1. Cell body
2. Dendrites
3. Axon

Q12. What is the resting potential of a neuron? Answer: It is the electrical potential difference between the inside and outside of a neuron membrane, usually 60–90 mV, with the inside being more negative.

Q13. What is action potential?

Answer: Action potential is the temporary change in membrane potential that occurs when a neuron is stimulated, allowing the signal to propagate along the axon.

Q14. What is the difference between myelinated and unmyelinated nerves?

- Myelinated nerves are covered by myelin sheath and conduct signals faster using saltatory conduction.
- Unmyelinated nerves lack myelin and conduct signals more slowly.

Q15. What factors affect nerve conduction velocity?

1. Internal resistance of the axon.
2. Membrane capacitance.

Lower resistance and lower capacitance increase conduction speed.

Q16. What is an ECG and what does it measure?

Answer: ECG (Electrocardiogram) records the electrical potentials generated by the heart on the surface of the body.

Q17. Name the main waves of a normal ECG.

- P wave: Atrial depolarization
- QRS complex: Ventricular depolarization

- T wave: Ventricular repolarization

Q18. What is an EEG and what does it record?

Answer: EEG (Electroencephalogram) records the electrical activity of the brain using electrodes placed on the scalp.

Q19. What are the main types of EEG waves?

- Alpha waves: 8–13 Hz
- Beta waves: >13 Hz
- Theta waves: 4–7 Hz
- Delta waves: 0.5–3.5 Hz

Q20. What is the difference between ERG and EOG?

- ERG (Electroretinogram) records retinal response to light stimulation.
- EOG (Electrooculogram) records electrical activity due to eye movement.

### Electricity of the Body – Analytical and Conceptual Questions

1. Explain how the nervous system acts as the body's electrical communication network.
2. What is the functional difference between the central nervous system (CNS) and the autonomic nervous system (ANS)?

3. Describe the structure of a neuron and explain how its parts contribute to electrical signal transmission.
4. What is meant by the term polarization of a neuron?
5. Why is the inside of a resting neuron more negative compared to the outside?
6. Define resting potential and action potential in your own words.
7. Explain why neurons are described as being electrically excitable cells.
8. How does an axon differ from dendrites in both structure and function?
9. Why is the myelin sheath essential for rapid nerve conduction?
10. Describe how an action potential travels along an unmyelinated axon.