Neurophysiology , M 202

Research Topics for 2nd Year Physiotherapy

Dr. Ayman Saied Soliman

ayman.samaan@med.bsu.edu.eg

1- Pain control

N.B. Discuss the following objectives in detail and support your research with diagrams.

- ★ Gate theory of pain.
- ★ Different types of pain.
- ★ Opiates receptors.
- ★ Levels of pain control.
- ★ Neurotransmitters contribute in control of pain.

2- Sensory coding

N.B. Discuss the following objectives in detail and support your research with diagrams.

- ➢ Definition and parameters used for coding of sensory information.
- ➢ Modality of sensation:
- ➢ Adequatestimulus
- ➢ Muller's low of specific nerve energy
- ➢ Labeled line principle
- ➢ Locality of the stimulus

- Projection theory and phantom limb.
- Intensity of the stimulus
- Weber-Fechner principle
- Steven's power

3- Neurotransmitters

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Definition of neurotransmitters
- General characters of chemical transmitters
- Give examples for excitatory and inhibitory transmitters and include the release, mechanism of action and removal of the neurotransmitter.

4- Synaptic potentials

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Functional anatomy of synapse
- Mechanism of synaptic transmission.
- Release and binding of chemical transmitter.
- Generation of post-synaptic potential.
- Removal of the transmitters.
- Ionic basis of pre - and post-synaptic potentials.

5- Motor cortex

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Illustrate different areas of the motor cortex.
- Primary motor area
- Premotor area
- Supplemental motor area
- Organization of the motor cortex function.
- Connections of cortical motor area.

6- Cerebellum and its role in control motor activity

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Deep cerebellar nuclei.
- Cerebellar connections.
- Functional unit of cerebellar cortexand the different neuronal circuits.
- Servo-comparator and damping functions of cerebellum.
- Planning and timing function of cerebellum.
- Role of cerebellum in equilibrium and controlling muscle tone.

7- Basal ganglia

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Neuronal connections of basal ganglia
- Caudate and putamen circuits.
- Role of basal ganglia in control voluntary movement.
- Role of dopamine and different neurotransmitter in basal ganglia.
- Disorders of basal ganglia

8- Role of stretch reflex in control the voluntary movement

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Functional anatomy of muscle spindle
- Effect of stimulation of gamma motor neuron.
- Supraspinal control of gamma discharge.
- Stretch reflex and its role in muscle tone
- Servo-assistant and damping function of stretch reflex.

9- Control of food intake

N.B. Discuss the following objectives in detail and support your research with diagrams.

★ Role of hypothalamus in regulation of food intake

★ Satiety and feeding center

★ Role of arcuate nuclei in food control and production of: POMC, NPY and AGRP.

★ Short term regulation of food intake.

★ Intermediate term regulation of food intake (lipostatic theory and glucostatic theory).

★ Obesity: causes and complications

★ Disorders of food intake.

10- Regulation of body temperature

N.B. Discuss the following objectives in detail and support your research with diagrams.

- Role of hypothalamus in regulation of body temperature.
- Anti-rise measures.
- Evaporative and non-evaporative heat loss.
- Anti-drop measures.
- Shivering: mechanism of stimulation, characteristics and its role in regulation of body temperature.
- Role Sympathetic stimulation and thyroid hormones in heat production.
- Abnormalities of heat regulation.

Instructions: Text include (cover page , objectives of the research , list of contents ,list of diagrams and pictures , titles in bold times new roman 18 , each paragraph not more than 6 lines times new roman 16 , references, numbering of pages). each one participation should be determined and illustrated.