

Exercise I: (2pts)

Indicate the true statement(s) and correct the false one(s)

1. The Parkinson disease is due to the degeneration of the acetylcholine producing neurons
2. The resting potential is the result of the difference of the ionic composition between the intracellular and the extracellular medium.
3. The efferent part of the peripheral nervous system is sensory.
4. The nervous message is different before and after the nervous center.

Exercise II: (4 pts)

Read the following text then answer the questions:

We know actually many chemical substances capable of modifying the transmission of the nervous message at the level of synapses. Among these substances, we list the following:

- ✓ The Amphetamines which are molecules penetrating inside the terminals of the axons of dopamine neurons. They induce the release of dopamine out of their synaptic vesicles leading to the outflow of high amount of dopamine into the synaptic cleft. They either act by blocking their recapture by the presynaptic neuron.
- ✓ The Heroin acts by blocking the postsynaptic receptors.
- ✓ The Reserpine inhibits the storage and thus the release of the neurotransmitters.
- ✓ The Cocaine blocks the normal process of dopamine recapture by the presynaptic neuron, the dopamine is thus entrapped in the synaptic cleft and its activity is more intense. Likely almost all the drugs, the cocaine act not only on the dopamine but on the quantity of other neurotransmitters.

1. Pick up from the text:

- a. The sentence describing the exocytosis process.
- b. Name the substances acting by blocking the process of recapture
- c. Name the neurotransmitter mentioned.
- d. Complete, referring to the text, the following table by putting a cross in the appropriate column:

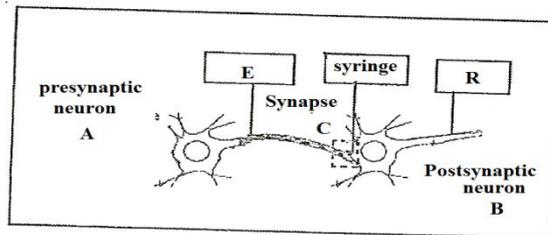
	Excitatory effect on the postsynaptic neuron	Inhibitory effect on the postsynaptic neuron
Amphetamines		
Cocaine		
Heroin		
Reserpine		

2. In case of normal functioning, describe how the neurotransmitter intervenes in the synaptic transmission.

Exercise III: (8.5 pts)

We intend to search how is the nervous information coded at the level of a nerve fiber and at the level of a synapse (document 1), this is why we placed:

- Stimulating micro-electrodes (E) at the level of a nerve fiber A.
- A micro syringe used for the extraction of the liquid found in the synaptic cleft (C).
- Receptor micro-electrodes (R) at the level of the nerve fiber (B).



Document 1

The table of document 2 represents the experiments performed and the results obtained:

	Case 1	Case 2
Stimulation exerted at the level of E	Weak	Strong
Electric signals Recorded at the level of the fiber B		
Percentage of Glutamate(chemical substance extracted from the synaptic cleft (C))	30%	90%

Document 2

1. What does each electric signal of the nervous message represent?
2. Pick up the problem searched in this experiment.
3. Analyze the recordings obtained in the 2 cases, and deduce the mode of coding of the nervous message along the nerve fiber.
4. Compare the % of glutamate in the two cases and deduce the mode of coding of the nervous message at the level of a synapse.
5. Formulate a hypothesis explaining the relation between the frequency of action potentials along the postsynaptic neuron and the concentration of the chemical substances at the level of the synapse.

Exercise IV: (5.5 pts)

The following table represents the number of corpuscles responsible for tactile (touching) sense at different parts of the hand:

Part of the hand	Extremity of fingers	The rest of the finger	Palm of the hand
Number of the corpuscles/cm ³	140	40	20

1. Construct a histogram illustrating the results given in the table
2. Interpret the results obtained, and deduce the part having the maximum tactile sensation in the hand.

Good Work