

الاسم: مسابقة في الثقافة العلمية – مادة علوم الحياة
الرقم: المدة: ساعة واحدة

Exercise 1 (5 points)

True or False

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

- 1- At the level of a synapse, neurotransmitters are found in the synaptic vesicles of the postsynaptic neuron.
- 2- The arrival of presynaptic nervous messages triggers the exocytosis of neurotransmitters.
- 3- The transmission of the nervous message across a synapse is unidirectional: from the postsynaptic neuron towards the presynaptic neuron.
- 4- Marasmus is a disease caused by global food deficiency.
- 5- The neurotransmitter released at the level of the synaptic cleft binds to specific receptors of the presynaptic neuron.

Exercise 2 (7.5 points)

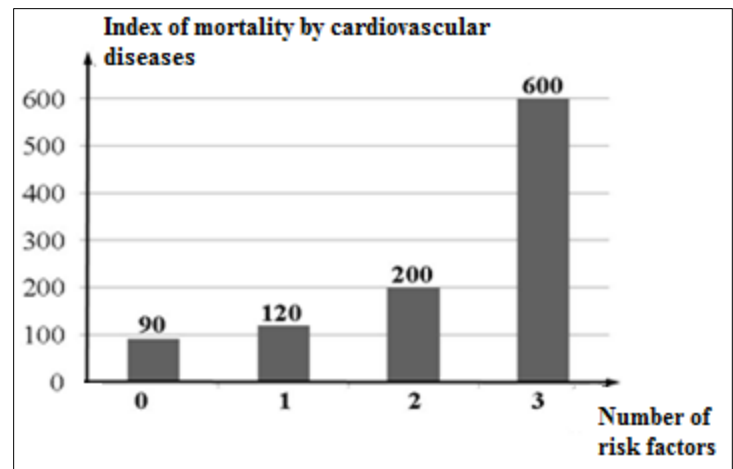
Cardiovascular Diseases

Cardiovascular diseases are the primary cause of death in the world. They constitute a set of disorders affecting the heart and blood vessels. The main risk factors of cardiovascular diseases are high blood pressure, high level of cholesterol and consumption of tobacco.

- 1- Pick out from the text above, the main risk factors of cardiovascular diseases.

Document 1 represents the variation of the index of mortality by cardiovascular diseases as a function of the number of risk factors.

- 2- Represent in a table the results shown in document 1.
- 3- Show, by referring to document 1, that the accumulation of risk factors amplifies the mortality by cardiovascular diseases.



Document 1

Document 2 represents the variation of the frequency of cardiovascular diseases as a function of the cholesterol level in the blood (mg.dl⁻¹)

- 4- Name the lipoproteins that transport cholesterol.
- 5.1- Analyze the obtained results.
- 5.2- What can you conclude?
- 6- Propose two measures that an individual can take to prevent the development of cardiovascular diseases.

Cholesterol level in the blood (mg.dl ⁻¹)	≤ 120	150	220	≥250
Frequency of cardiovascular diseases in the population (%)	3	4	6	8

Document 2

Exercise 3 (7.5 points)

Drugs

We call “drug” any psychotropic or psychoactive substance which disturbs our central nervous system; consequently our perception, our thoughts and our behavior.
 There are three main groups of drugs: Depressants (like heroin), stimulants (like cocaine) and hallucinogens (like cannabis).

1- Pick out from the text:

- 1.1- The definition of drugs.
- 1.2- The different groups of drugs.

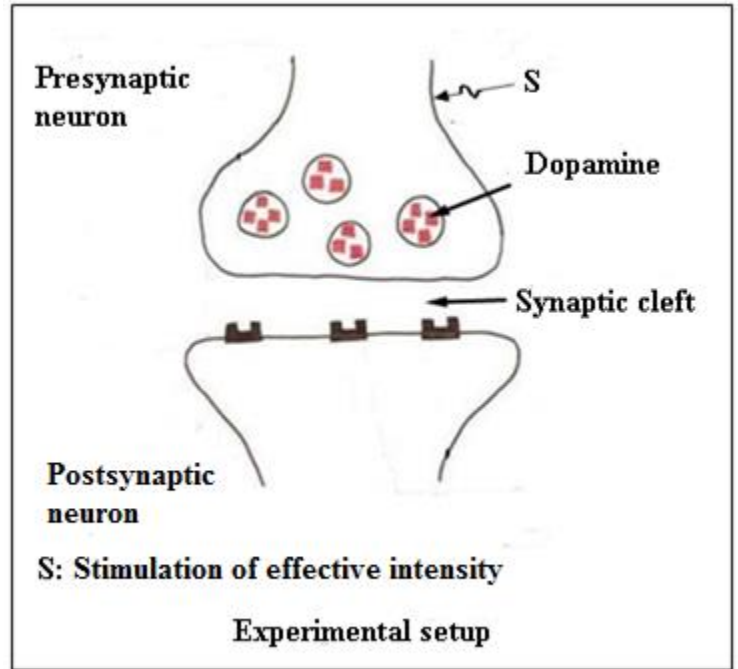
In order to study the action of the drug, cocaine, at the level of the dopamine synapse, an experiment is performed.
 The experimental setup and the obtained results are presented in documents 1 and 2 respectively.

2- List the different steps of the synaptic transmission obtained after an effective intensity of stimulation (S).

3- Draw out, by referring to document 2, the role of dopamine.

4- Determine, by referring to document 2, the effect of dopamine on the sensation of pleasure.

5- State two consequences which are common to the consumption of all drugs.



Document 1

Condition	Dopamine level in the synaptic cleft (a.u)	Sensation of pleasure
S	500	Moderate
S + Cocaine injection	1000	Intense

Document 2

مسابقة في الثقافة العلمية – مادة علوم الحياة
اسس التصحيح

Exercise 1

The synapse

Q.	Correction	Note
1	False. At the level of a synapse, neurotransmitters are found in the synaptic vesicles of the presynaptic neuron.	1
2	True	1
3	False. The transmission of the nervous message across a synapse is unidirectional: from the presynaptic neuron towards the postsynaptic neuron.	1
4	True	1
5	False. The neurotransmitter released at the level of the synaptic cleft binds to specific receptors of the postsynaptic neuron.	1

Exercise 2

Cardiovascular Diseases

Q.	Correction	Note										
1	The main risk factors for cardiovascular diseases are high blood pressure, high level of cholesterol and tobacco use.	1										
2	<table border="1"> <thead> <tr> <th>Number of risk factors</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>Index of mortality by cardiovascular diseases</td> <td>90</td> <td>120</td> <td>200</td> <td>600</td> </tr> </tbody> </table>	Number of risk factors	0	1	2	3	Index of mortality by cardiovascular diseases	90	120	200	600	2
Number of risk factors	0	1	2	3								
Index of mortality by cardiovascular diseases	90	120	200	600								
3	According to document 1, when the number of risk factors increases from 0 to 3, the Index of mortality by cardiovascular diseases increases from 90 to 600, then the accumulation of risk factors amplifies the index of mortality by cardiovascular diseases	1										
4	HDL and LDL	1										
5.1	When the level of cholesterol in the blood increases from ≤ 120 mg.dl-1 to ≥ 250 mg.dl-1, the frequency of cardiovascular diseases in the population increases from 3% to 8%.	1										
5.2	Cholesterol is a risk factor of cardiovascular diseases.	0.5										
6	<ul style="list-style-type: none"> • Avoid smoking • Reduce the consumption of food rich in lipids • Practice regular physical activity • 	1										

Exercise 3**Drugs**

Q.	Correction	Note
1.1	We call “drug” any psychotropic or psychoactive substance which disturbs our central nervous system; consequently our perception, our thoughts and our behavior.	1
1.2	Depressants (like heroin), stimulants (like cocaine) and halucinogens (like cannabis).	1
2	The steps of the synaptic transmission: <ol style="list-style-type: none">1. Arrival of nerve message to the presynaptic terminal bud.2. Liberation of neurotransmitters into the synaptic cleft by exocytosis.3. Fixation of neurotransmitters on the specific receptor on the postsynaptic membrane.4. Generation of nerve message at the level of postsynaptic neuron5. Recapture and/or degradation of neurotransmitters	2
3	Dopamine is responsible for the sensation pleasure.	1
4	Dopamine is responsible for the sensation of pleasure. Since the stimulation of the dopamine neuron accompanied with the injection of cocaine increases the level of the dopamine in the synaptic cleft from 500 a.u (S only) to 1000 a.u. intensifies thus the sensation of pleasure, then cocaine amplifies the sensation of pleasure.	1
5	Tolerance and dependence	1.5