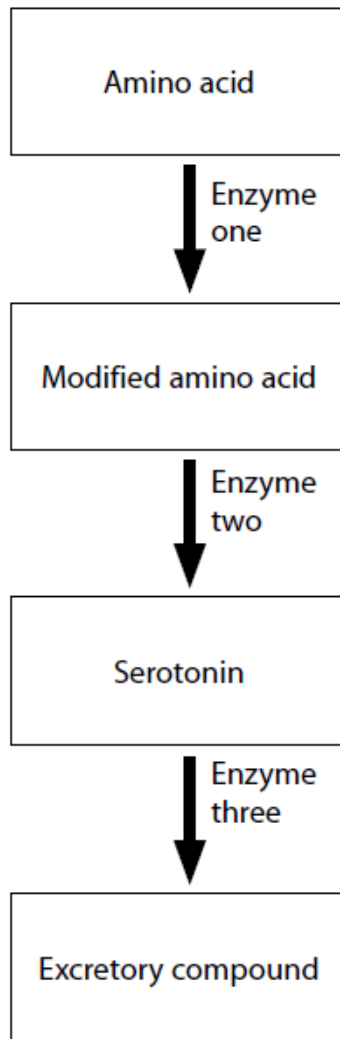


Synaptic Transmission - Questions by Topic

Q1.

Serotonin is a neurotransmitter. It is kept at optimum levels to maintain a feeling of well-being. Serotonin is involved in the metabolic pathway shown in the flow chart.



(a) Explain how the level of activity of these enzymes, in this metabolic pathway, will ensure that optimum levels of serotonin are maintained.

(3)

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(b) Drugs called selective serotonin re-uptake inhibitors (SSRIs) are used to reduce depression. They work by inhibiting the reabsorption of serotonin at a synapse.

Explain how SSRIs help to maintain a feeling of well-being.

(3)

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(Total for question = 6 marks)

Q2.

The scientific article you have studied is adapted from several sources.

Use the information from the scientific article and your own knowledge to answer the following questions.

The reward system in humans involves the neurotransmitter dopamine pathway (paragraph 7).

Describe how dopamine acts as a neurotransmitter.

(4)

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(Total for question = 4 marks)

Q3.

Voltage-gated K^+ and Na^+ channels are involved in the transmission of impulses in sensory and motor neurones.

Describe the differences in the structure of a myelinated sensory neurone and a myelinated motor neurone.

(3)

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Q4.

Serotonin is found in the brain and is important in health and wellbeing.

An imbalance of serotonin can lead to problems such as depression. An individual with symptoms of depression may have low serotonin levels in the brain.

The use of drugs such as MDMA (ecstasy) can cause an imbalance of chemicals in the brain.

(i) Describe how the use of MDMA could affect the transmission of impulses in the brain.

(2)

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(ii) Individuals who use MDMA may develop the symptoms of depression.

Explain how the use of MDMA could result in the development of these symptoms.

(2)

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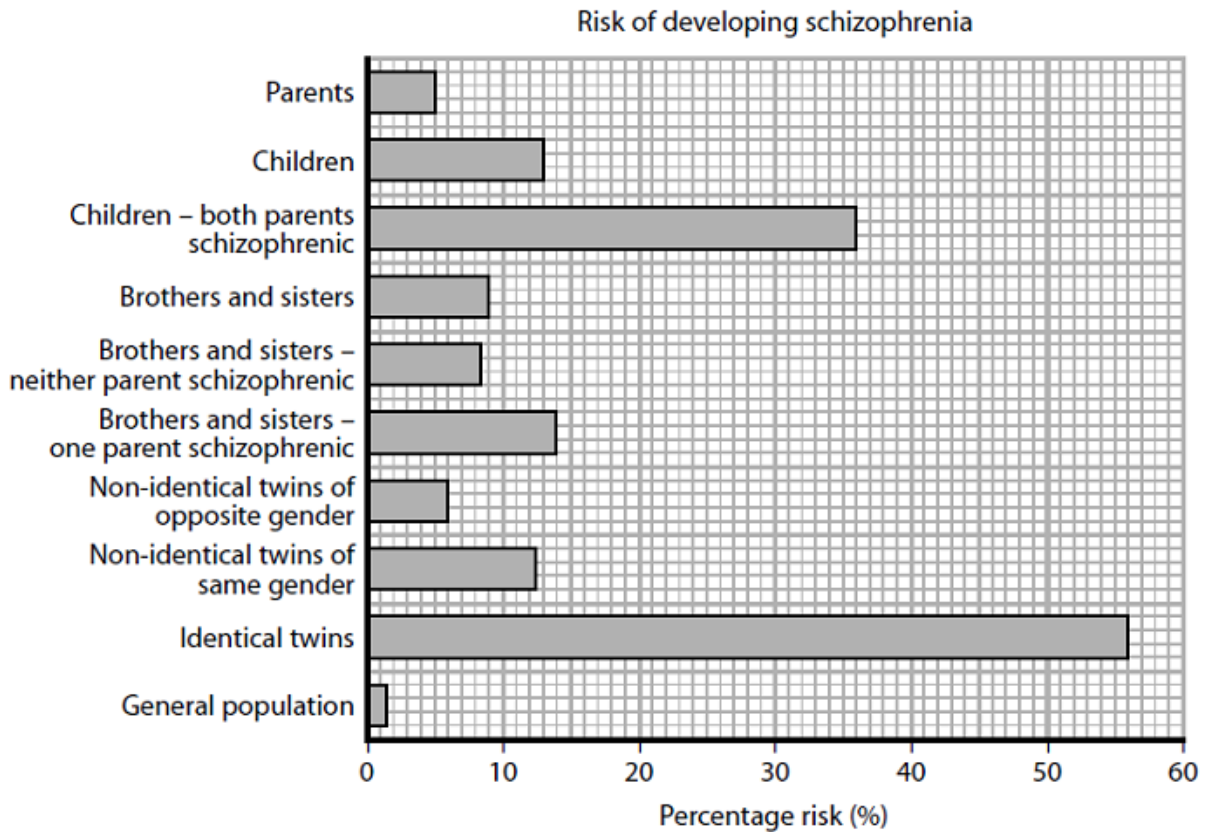
(Total for question = 4 marks)

Q5.

Schizophrenia is a disorder that affects brain structure and function and has a variety of symptoms.

The bar graph shows how the relationship to a family member suffering from schizophrenia affects the risk that the individual will also develop schizophrenia.

The percentage risk of schizophrenia in the general population is included for comparison.



© Courtesy of Dr. Debby Tsuang, University of Washington/VAPuget Sound Health Care System, Seattle, WA, USA.

(a) Explain the difference between the percentage risks of developing schizophrenia in identical twins and non-identical twins of the same gender.

(2)

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(b) Some early studies of schizophrenia included identical twins raised in separate families

(i) Explain how the design of these studies allows the influence of environmental factors on development of schizophrenia to be investigated.

(2)

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(ii) The conclusions based on these early studies of identical twins raised in separate families are said to lack validity.

Give **two** reasons why these studies may lack validity.

(2)

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(c) Schizophrenia has been linked to abnormally high levels of a neurotransmitter in the brain.

Explain how the action of the drugs used to treat schizophrenia may lead some patients to experience symptoms similar to those of Parkinson's disease.

(5)

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(Total for question = 11 marks)