Dr. P. H. Mallick

Paper ZOO-402;
Neuroendocrinology;
'SYNAPSE'

TEST #3

NB:

- Question numbers are not in proper serial, please rectify & answer sequentially.

Practice MCQ

Synaptic Transmission

1. Calcium ions are crucial to synaptic transmission
   a. they are required for manufacture of neurotransmitter in the Golgi complex
   b. because they bind to the postsynaptic receptor inducing a permeability change in the membrane
   c. Since decreases in the intracellular calcium level induce neurotransmitter release
   d. since Localised increases in the intracellular calcium level induce neurotransmitter release from the presynaptic element
   e. none of the above

2. A synapse that relies on ionotropic transmitter gated channels
   a. Is selective to a particular ion e. g. gated for Na+ only
   b. Is fast and detects chemicals and voltage
   c. Involves a 2^{nd} messenger cascade
   d. Is said to be electrically coupled
   e. Is one of the largest type of synapse in the body

3. Neurotransmitters exert their effect on their target cell
   a. by binding to the appropriate protein in the post synaptic membrane at the synapse in question
   b. by altering the enzyme activity in the post synaptic cell following entry through specific channels or pores
   c. by forming sodium or potassium channels in the plasma membrane of the target cell and thus inducing membrane depolarisation
   d. by forming chloride channels in the plasma membrane of the target cell and thus inducing membrane hyperpolarisation
   e. both b and c occur depending on the actual neurotransmitter

4. Signals are usually transmitted between neurons in the human nervous system due to
   a. ions diffusing across to the post synaptic membrane
   b. carrier molecules (proteins) facilitating the process
   c. the passage of electricity from the pre-synaptic cell to the post-synaptic membrane
   d. chemical transmission across the synaptic cleft to the post-synaptic membrane
   e. b and d are both used extensively in the adult human nervous system

5. An EPSP
   a. is an inhibitory hyperpolarisation
   b. is the transient postsynaptic depolarisation due to neurotransmitter release
   c. may be due to an excitatory neurotransmitter like glutamate
   d. may bring the membrane close to threshold for an action potential
   e. b, c and d above

Neurotransmitter systems

1. Which statement is CORRECT about neurotransmitters?
   a. Depending on the frequency of the incoming signal, a neuron will always synthesise and release more than one neurotransmitter
   b. Depending if the incoming signal is inhibitory or stimulatory, a neuron will synthesise and release one or another neurotransmitter
   c. Depending on the integrated signal derived from both inhibitory and excitatory signals, a neuron will synthesise and release one or another neurotransmitter
   d. b and c are equally correct
   e. Each neuron will usually synthesise, store and release one neurotransmitter

2. For which of the following neurotransmitters is degradation in the synaptic cleft the principal means by which its effects are terminated?
   a. Neurotensin
   b. acetylcholin**e**
   c. dopamine
   d. monoamine oxidase
   e. ATP

3. Which of the following ARE NOT examples of transmitter-gated channels?
   a. nicotinic acetylcholine receptors
   b. AMPA-gated channels
   c. metabotropic glutamate receptors
   d. NMDA-gated channels
   e. $GABA_A$ receptors

4. Changes in the intracellular concentration of which ion(s) occur when glycine-gated channels are activated?
   a. magnesium
   b. chloride
   c. phosphate
   d. potassium
   e. sodium AND calcium

7. Activation of a neuron via G-protein-coupled receptors can lead to:
   a. changes in the intracellular concentration of cyclic AMP
   b. changes in the cytosolic concentration of calcium
   c. changes in the intracellular concentration of potassium
   d. a, b and c can all occur depending on the G-protein-coupled receptor sub-type

8. Most neurotransmitters are derived / synthesised from amino acids, e. g., glutamate, serotonin, nor adrenalin, dopamine; while some are essentially small amino acids that may also work as neurotransmitters e.g. Glutamate, Glycine, GABA TRUE or FALSE

12. Which neurotransmitter is found in motor neurons and is responsible for producing muscle contraction through its release at the neuromuscular junction?
a) adenosine.
b) acetylcholine.
c) dopamine.
d) serotonin.
e) glutamate
