



1. Three of the four are subtypes of opiate receptors. Select the exception!

(1 point)

- a. Mu
- b. Kappa
- c. Beta
- d. Delta

Why is it an exception? c) because there are 4 major subtypes of opioid receptors: delta, kappa, mu, nociceptin receptor (and there is zeta, but its function is different)

2. Three of the four are subtypes of amine transmitters. Select the exception!

(1 point)

- a. Glycine
- b. Glutamate
- c. Noradrenaline
- d. Vasopressin

Why is it an exception? d) it's a peptide hormone (agyalapi mirigy, más néven hipofízis hormonjai peptidek a vazopresszin az agyalapi mirigy hátsó lebenyében szintetizálódik)

3. Three of the four are subtypes of ionotropic receptors. Select the exception!

(1 point)

- a. AMPA receptor
- b. NMDA receptor
- c. GABA-B receptor
- d. Glycine receptor

GABA-B receptors are G protein-coupled receptors, also called metabotropic receptors (the other 3 are ionotropic)

Why is it an exception? c)

4. Pair each of the receptors (connect by drawing lines) with its ligand!

(4 points)

Muscarinic acetyl-choline

Serotonin

NMDA

Adrenaline

AMPA+NMDA = glutamate

AMPA

Glutamate

5HT 1 serotonin

Acetyl-choline

5. Signal transduction. Select the right ions and molecules to fulfill the criteria phrased in the following sentences!

More than one selection is possible.

(3 points)

1. Mg^{++}

2. Diacylglycerol

3. Ca^{++}

4. IP_3

5. Cl^-

It is stored in and can be released from the SER.

3

It can be a messenger molecule released after activation of a metabotropic receptor.

2,3,4

It can block the cation inflow into the cell through NMDA receptors.

1



1. Three of the four cellular events does not exist at the presynaptic site. Which one does exist? (1 point)

- a. IP₃ secondary messenger activation
- b. Mg²⁺ - outflux
- c. Neuropeptide resynthesis
- d. Neurotransmitter reuptake

Why is it an exception? d)

2. Three of the four are released from the pituitary gland. Select the exception! (1 point)

- a. Glucagon
 - b. Oxytocin
 - c. GH (Growth hormone)
 - d. Vasopressin
- pituitary gland stores oxytocin and ADH-> antidiuretic hormone = vasopressin and synthesizes prolactin, growth hormone (GH), ACTH, TSH,LS,FSH

Why is it an exception? a) glucagon is synthesized by pancreas (hasnyálmirigy->Langerhans szigetei)

3. Three of the four are a second messenger molecule. Select the exception! (1 point)

- a. cAMP
 - b. cGMP
 - c. cATP
 - d. DAG (Diacyl-glycerole)
- ciklikus AMP van, ciklikus ATP nincs (kösszalló, igazán értelmes kérdés)

Why is it an exception? c) cATP doesn't exist and the other 3 are second messengers

4. Pair each of the ligands (connect by drawing lines) with its receptor! (4 points)

Dopamine	D2 (G-protein coupled too)	Kainate receptors
Acetylcholine	nicotinic	D2 type receptors
Glutamate	kainate	G-protein coupled receptors
Kisspeptin	G-protein	Nicotinic receptors

5. Neurotransmitters. Enroll the different neurotransmitters and peptides to fulfill the criteria phrased in the following sentences! More than one selection is possible! (3 points)

1. Glycine

2. Serotonin

3. Noradrenaline

4. Oxytocin

5. Adrenaline

It acts via both ionotropic and metabotropic receptor.

2

It differs from vasopressin in only two amino acid residues.

4

Plasma membrane transporters participate in their recycling.

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