

# *Endocrine biochemistry*

## *past papers*

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# *Lectures 1+2*

*One of the following isn't produced from a specific large precursor:*

*A- ACTH*

*B- TSH*

*C- MSH*

*D- B-Endorphin*

*E - Enkephalin*

***Ans: B***

*In autocrine signaling:*

- A. The messenger molecules are usually rapidly degraded and hence can only work over short distances.*
- B. The cell producing the messenger expresses receptors on its surface that can respond to that messenger.*
- C. Messenger molecules travel only short distances through the extracellular space to different cell types that are in close Proximity to the cell that is generating the message.*
- D. Messenger molecules reach their target cells via passage through bloodstream.*
- E. No answer describes it well.*

**Ans: B**

*This is the largest hormone in size:*

**A. Dihydrotestosterone**

**B. Thyroxine**

**C. Glucagon**

**D. Vasopressin**

**E. Angiotensin 1**

**Ans: C**

**A. Cholesterol derivative**

**B. Amino acid derivative**

**C. Protein**

**D. Peptide**

**E. Peptide**



*The order from largest to smallest would be:*

**1. Protein**

**2. Peptide**

**3. Amino acid derivative**

**4. Cholesterol derivative**

*The hormone with the longest  $t_{1/2}$  is :*

*A. insulin*

*B. epinephrine*

*C. glucagon*

*D. progesterone*

*"Lipophilic hormones bind to plasma protein carriers, protecting hormones from degradation and decreasing clearance."*

**Ans: D**

*Regardless of how a signal is initiated, the ligand-binding event is propagated via 2nd messengers or protein recruitment. What is the ultimate or final outcome of these binding effects:*

- a. A protein at the top of an intracellular signaling pathway is deactivated.*
- b. A protein at the top of an intracellular signaling pathway is activated.*
- c. A protein at the top of an extracellular signaling pathway is activated.*
- d. A protein in the middle of an intracellular signaling pathway is activated.*
- e. A protein at the bottom of an intracellular signaling pathway is activated.*

**Ans: E**

*which statement of the following is incorrect regarding steroid hormone synthesis:*

*A- Oxidation of the 18-methyl group of corticosterone produces aldosterone.*

*B- Hydroxylation of progesterone occurs to synthesize androgens.*

*C- Testosterone can be produced by estrogen methylation.*

*“Steroidogenesis”*

**Ans: C**



*If you know that the dissociation Constant  $K_d$  equals to 30 ng: At which concentration the receptors will be saturated:*

*A- 300 Mg*

*B- 0.6 ug*

*C- 0.03 Mg*

**Ans: B**

*which hormone Has the least number of peptides*

**A- ADH**

**B- TRH**

**C- CRH**

**Ans: B**

*Which one doesn't use cAMP as 2nd messenger:*

*A- Glucagon*

*B- ACTH*

*C- Insulin*

*Ans: C*

*Best definition of permissive :*

*A. one hormone is precursor to the other*

*B. one hormone antagonize the other*

*C. both hormones have the same action.*

*D. one hormone is needed to have a larger effect.*

*E. None of the following is correct.*

*Ans: D*

*The following hormones have permissive effects:*

- A. Oxytocin and vasopressin*
- B. Epinephrine and serotonin*
- C. Thyroxine and epinephrine*
- D. Insulin and glucagon*
- E. Testosterone and estrogen*

*Ans:C*

# *Lecture 3*

*All of the following are correct regarding Protein Kinase C except:*

- A- when activated, it phosphorylates specific tyrosine residues.*
- B- binds to membrane phospholipids when activated.*
- C- activated by DAG*
- D- activated by Ca +2*
- E- has a pseudo-substrate sequence.*

*“Threonine or Serine residues”*

**Ans: A**

*True about IP3 "inositol 1,4,5-triphosphate":*

*A- is generated by phosphorylating inositol diphosphate.*

*B- activates protein Kinase C*

*C- its activity can be augmented by phosphorylating it into inositol tetra-phosphate.*

*D- produced by G protein-activated enzyme*

*Ans: D*



*Which of the following is NOT true about cholera toxin*

*A. increases cAMP inside the cell*

*B. causes flow of NaCl outside the cell and can lead to dehydration.*

*C. Associated with Tyrosine Kinase*

*Ans: C*

*What must happen instantly in order to prevent overstimulation by a:*

*A. Hormones must be degraded and then resynthesizes.*

*B. G-proteins must be recycled and then degraded.*

*C. Receptors must dimerize.*

*D. Receptors must be blocked from continuing to activate G-proteins.*

*Ans: D*

*which one of the following is correct about the 7TM receptors:*

*A- dimer*

*B- can be phosphorylated on the intracellular domain.*

*C- linked to tyrosine kinase activity.*

*D- arrestin catalyzes the phosphorylation of the intracellular domain.*

**Ans: B**

*True about G proteins:*

*A- alpha 2 receptors usually are inhibitory.*

*B-  $\beta$ 1- or  $\beta$ 2-adrenergic receptors are inhibitory*

*C-  $\beta$ 1/ $\beta$ 2-adrenergic receptors increase IP3*

**Ans: A**

*Typically, what is the first reaction after most receptor protein tyrosine kinases bind their ligand:*

- A. Receptor denaturation*
- B. Receptor degradation*
- C. Receptor dimerization*
- D. Receptor dissociation*
- E. Receptor trimerization*

**Ans: C**

*All domains exist in PKC except:*

*A- G protein*

*B- calcium binding domain*

*C- DAG binding domain (C1)*

*D- catalytic domain*

***Ans: A***

*Where is the kinase catalytic domain of the receptor protein-tyrosine kinases found:*

- A. On the extracellular surface of the receptor, immediately adjacent to the ligand-binding domain.*
- B. On the DNA binding domain*
- C. On the cytoplasmic domain of the receptor.*
- D. Within the transmembrane spanning portion of the receptor.*
- E. On an independent protein that rapidly binds the receptor upon ligand binding.*

**Ans: C**

One of the following domain causes tyrosine phosphorylation:

A- SH2

B- SH3

C-Product of the Rous sarcoma viral gene

D- RAS

E-All of the above

*"The SH2 domain binds to phosphorylated tyrosines but does not induce phosphorylation itself.*

*The protein product of the Rous sarcoma virus, v-Src, is a tyrosine kinase capable of phosphorylating tyrosines on target proteins."*

**Ans: C**



*The EF domain is found in:*

*A. phosphoinositide*

*B. protein kinase c*

*C. Calmodulin*

*E. All answers are correct*

*Ans: C*

*The pseudosubstrate domain is found:*

*A. phosphoinositide*

*B. Calmodulin*

*C. RAC*

*D. protein kinase c*

*E. Non of the following*

*Ans: D*

*Which of the following activate GTP hydrolysis:*

*A) B- Subunit.*

*B) The  $\alpha\beta\gamma$  heterotrimer of G- protein.*

*C) RAS*

*"Normal RAS has GTPase activity; however, mutated RAS will lose the ability to hydrolyze GTP, resulting in continuous stimulation."*

**Ans: C**

*what must happen instantly in order to prevent overstimulation by a hormone:*

- A. Receptors must be blocked from continuing to activate G-proteins.*
- B. Receptors must dimerize.*
- C. Hormones must be degraded and then resynthesized.*
- D. New receptors must be synthesized to decrease the saturation effect of the hormone.*
- E. G-proteins must be recycled and then degraded.*

**Ans: A**

4) What happens to protein kinase A (PKA) following the binding of cAMP:

A. The inhibitory regulatory subunits dissociate from the catalytic subunits, completely

inactivating by the enzyme

B. PKA catalytic subunits then bind to two regulatory subunits, thereby activating the

catalytic subunits.

C. The stimulatory regulatory subunits dissociate from the catalytic subunits, inhibiting

the enzyme.

D. Phosphodiesterase binds to the catalytic subunits, which results in enzyme inactivation.

E. The regulatory subunits of PKA dissociate, thereby activating the catalytic subunits

Ans: E

*Which of the following is right about arrestin binding to a receptor:*

*A) activates the G -protein.*

*B) Arrestin is bounded to- phosphorylated receptor*

**Ans: B**

*Ras is a:*

*A- Extracellular receptor*

*B- Monomeric GTPase protein*

*C- Has 3 subunits*

***Ans: B***

*True about IP3:*

*A- It's Cooperative binding is sigmoidal curve.*

*B- The full opening of the calcium channels is achieved if the channel is bounded to 2 IP3.*

**Ans: A**

*"The channel should bind to 3 IP3 molecules rather than 2.*

*Cooperative binding means that the binding of one molecule of IP3 to the receptor increases the affinity of the receptor for additional IP3 molecules. This results in a sigmoidal (S-shaped) binding curve, which is characteristic of cooperative binding.*

*Therefore, Statement A is true."*



*A receptor that get dimerized after a hormone bound to it :*

*A- Jauns kinase 2*

*B- Calmodulin*

*Ans: A*

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