

Endocrinology

What is 2nd messenger cAMP? How it is formed and regulated. Name Hormone mediate thru cAMP

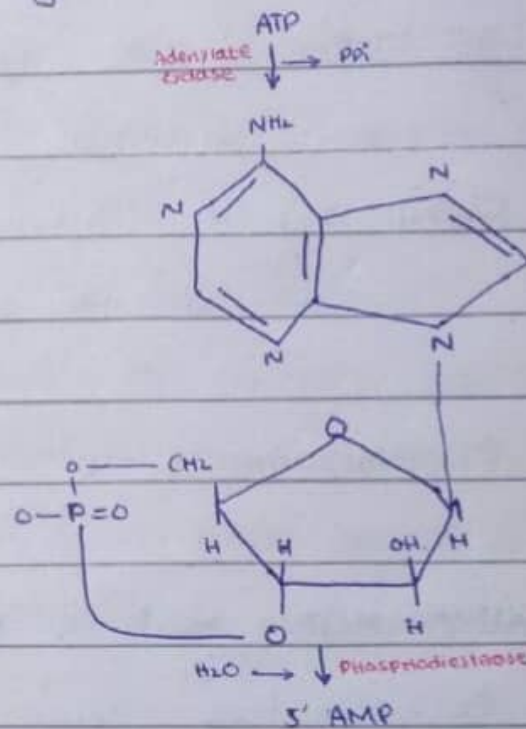
Second messenger system is Ubiquitous Nucleotides

It is composed of Adenine, ribose and Phosphate

linked by 3,5 linkages

Hormones:

- 1) TSH
- 2) ACTH
- 3) Glucagon
- 4) Adrenaline
- 5) LH
- 6) Parathormone
- 7) Adrenocorticotropin



3',5' cyclic adenosine monophosphate

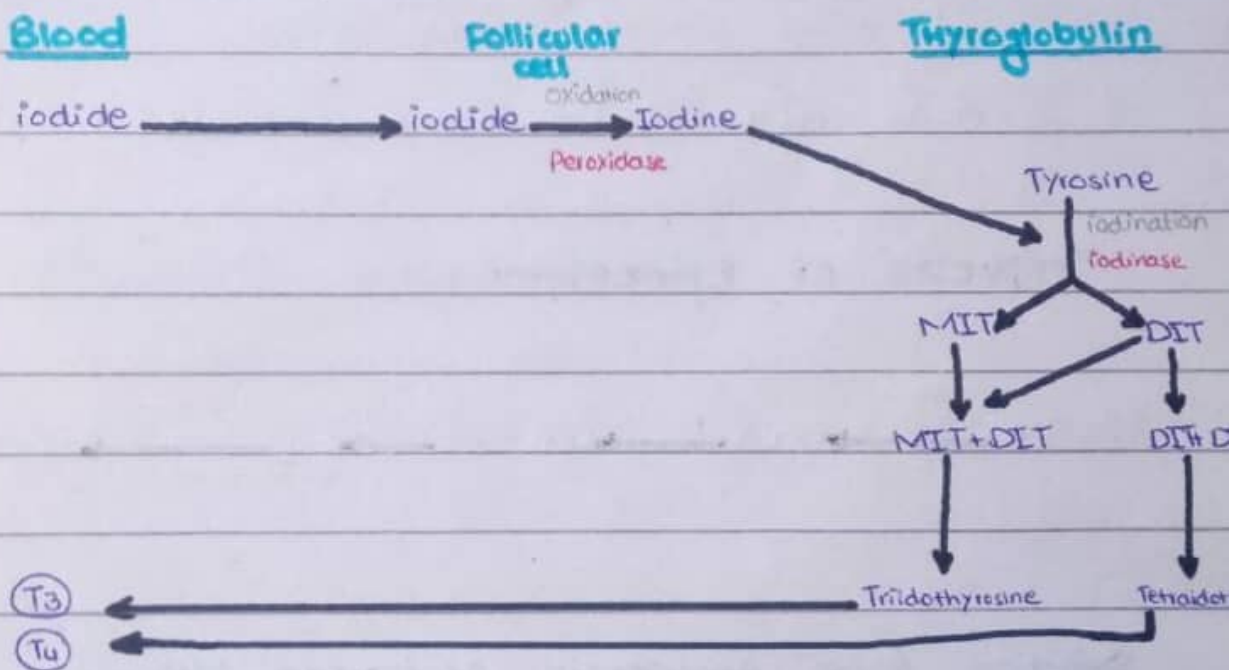
Briefly Explain secretion of insulin from B cell after CR:

- 1) Glucose enter into B-cell via Glut 2
- 2) Mobilize to form ATP
- 3) ATP binding cassette Protein stimulate
- 4) K⁺ Channel closes and Ca²⁺ channel open
- 5) ↑ intracellular Ca²⁺ level
- 6) secretion of insulin.

Mention Synthesis of T₃ & T₄ along its regulation:

Steps:

- 1) Iodide Trapping
- 2) Thyroglobulin Synthesis
- 3) Oxidation of iodine
- 4) Iodination of Tyrosine
- 5) Coupling reaction.



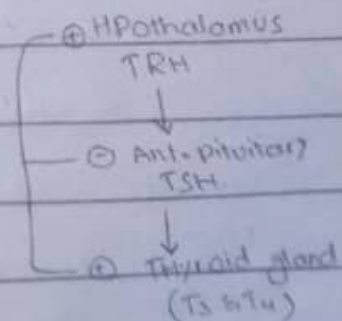
Regulation:

Stimulating factor :- ① TSH secreted by Ant. pituitary which release due to TRH by Hypothalamus.

- ② Cold ③ low BMR

Inhibitory factors:-

- ① Excitement & Anxiety
- ② Feedback inhibition by Excess T₃ & T₄
- ③ Lack of iodine



Effect of Growth Hormone:

- 1) ↓ uptake of Glucose by cell thus ↑ Blood glucose (DIBETOGENIC EFFECT) & also ↑ Glucose output from liver
- 2) Anabolic Effect of Protein metabolism. Causes the transcription of DNA for Protein Synthesis & have ⊕ Nitrogen & Phosphorus balance.
- 3) Mobilization of Fatty acid from Adipose tissue and ↑ Free Fatty acid level in circulation (ketogenic effect)
- 4) GH stimulate the Liver to secrete Somatomedins which acts on epiphyseal Cartilages of Large bones & ↑ Chondrocytes.

Somatomedin are GH polypeptide secreted by Liver under influence of GH.

Metabolic Effect of Glucagon:

Ⓐ Carbohydrates :
ⓐ Promote Gluconeogenesis
ⓑ Promote Glycogenolysis in liver by Phosphorylase Enzyme.

Ⓑ Protein :
ⓐ Mobilize amino acid from Extrahepatic tissues.
ⓑ Promote entry of amino acid in liver for Gluconeogenesis.

- © Lipids :
- ⊕ Promote Gluconeogenesis from Glycerol
 - ⊖ inhibit storage of Triglycerides in liver
 - ⊕ Promote utilization of Fatty acid

Other Effect

- ↑ strength of heart
- ↑ Bile acid synthesis
- Inhibit Gastric acid secretion

Effect of cortisol :

- 1) It increase blood Glucose by increasing Gluconeogenesis and decrease uptake of Glucose by cell.
It ↑ Blood amino acid conc. by ↑ Protein degradation
It ↑ circulating Fatty acid by ↑ Lipolysis.
- 2) It has ⊖ effect on ACTH
- 3) It inhibit leukotriens which is mediator for inflammation.
So it is anti-inflammatory agent
- 4) CVS : ↑ C.O & ↑ BP
- 5) immune system : Suppress by High doses of Cortisol
- 6) Bone : osteoporosis
- 7) secretory : ↑ production of HCl & Pepsinogen.
- 8) It is AntiAllergic by stimulating Histamine reaction.

Compare and Contrast Gigantism & Acromegaly:

Acromegaly: It is a condition characterized by Enlargement, thickening and broadening of bones especially at extremities of body.

It is due to Hyper secretion of GH after puberty edematous tumor of Ant. Pituitary acidophilic tumor

- 1) Lower jaws protruding outward
- 2) High Blood Glucose level
- 3) Enlargement of Hand & Feet.

Gigantism: Hypersecretion of GH before puberty resulting in talling height (8-9) feet.

- 1) B-cell burn out leading to diabetes mellitus
- 2) ↑ somatomedin formation
- 3) Tumor of Acidophilic Cells

Myxedema:

It is thyroid disorder characterized by edematous Appearance

Hypothyroidism

Features:

- 1) ↑ sleep
- 2) ↑ Body weight
- 3) Anemia
- 4) Mental Sluggishness
- 5) Facial Irritability
- 6) Fatigue
- 7) Cold intolerance

Cushing syndrome:

It is due to ↑ cortisol secretion by Adrenal cortex tumor

Sign & Symptoms:

- 1) Hypertension
- 2) Facial redness
- 3) Facial Hair growth
- 4) darkening of skin around neck
- 5) Moon like Face
- 6) Thinning of extremities
- 7) poor wound healing

Difference b/w Dwarfism & Cretinism :

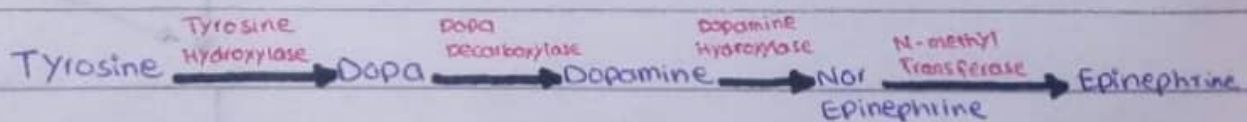
Dwarfism

- 1) Hypopituitarism
- 2) ↓ secretion of GH
- 3) Short stature, smart look, proportionate body parts
- 4) Mentally Normal, Normal IQ
- 5) Sexually infantilism
- 6) Symptoms appear earlier

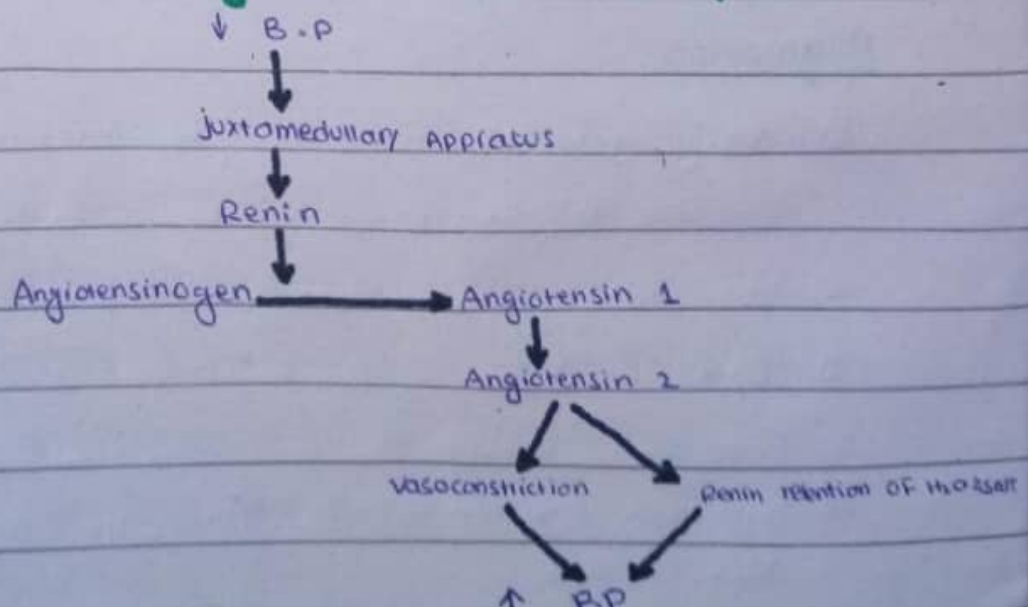
Cretinism

- 1) Hypothyroidism
- 2) ↓ secretion of T₃, T₄
- 3) Short stature, ugly look, disproportionate body parts
- 4) Mentally retarded, NO. IQ normal
- 5) Sexually infantilism, small gonads
- 6) Symptoms appear within 6 months.

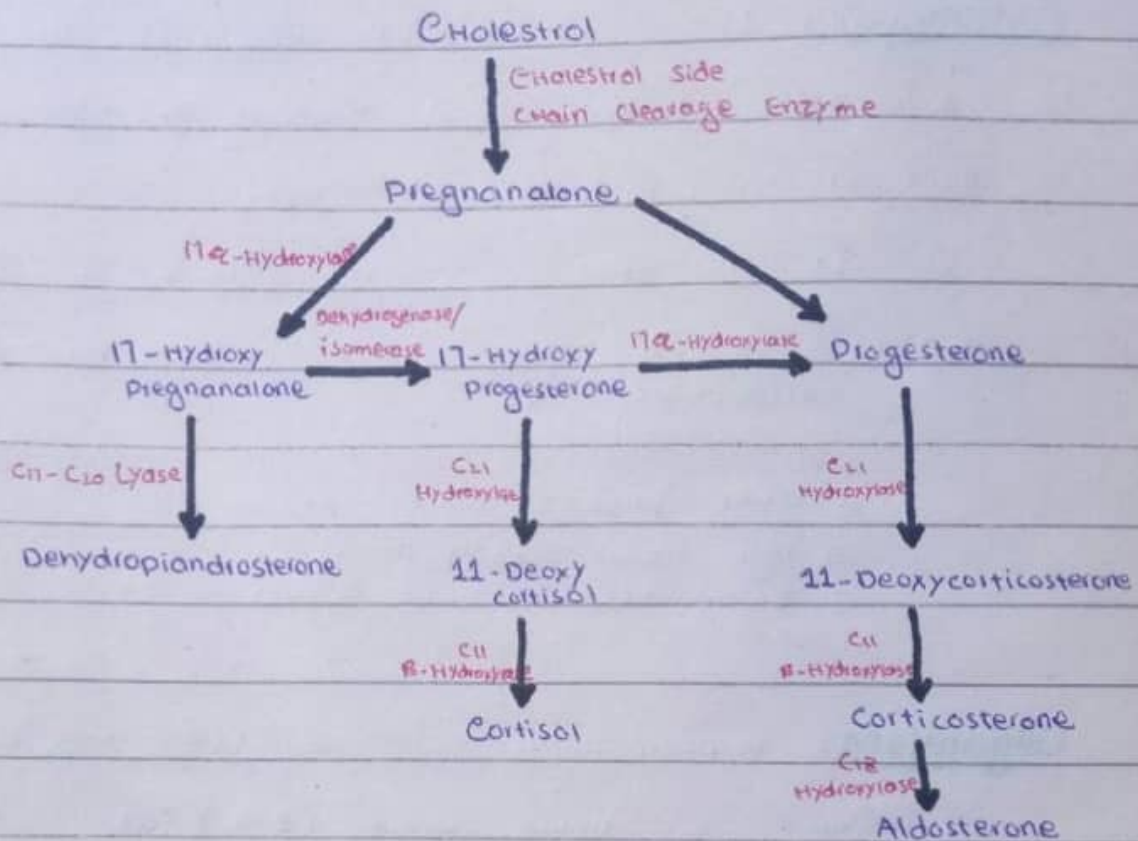
Synthesis of Epinephrine :



Describe Renin Angiotensin Adosterone System:

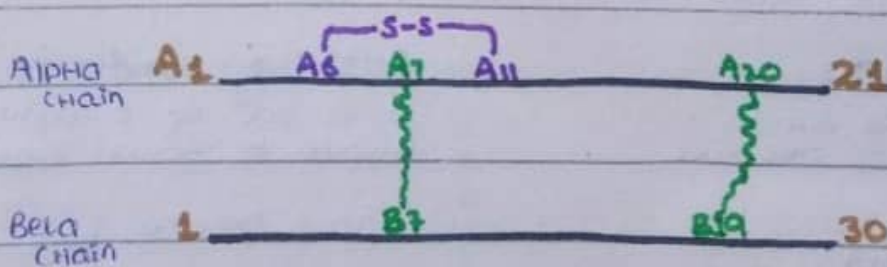


Synthesis of Adrenocorticosteroid :



Describe structure & function of insulin:

Structure :



2 chains :

Alpha chain — 21 amino acid

Beta chain — 30 amino acid

2 interchain disulphide bond

A7 — S — B7

A20 — S — B19

1 interchain disulphide bond in a chain



THE SUPERIOR COLLEGE, LAHORE

2nd PROFESSIONAL MBBS

ANNUAL EXAMINATION 2019

BIOCHEMISTRY

(SEQ's)

Roll No. 015

Time Allowed: 2 hours

Total Marks: 35

Instructions

1. The SEQ's part is to be submitted within 2 hours, Extra time will not be given.
2. Neat Hand Writing use of margin and marker for headlines will increase the presentation of your paper.
3. Do not write your name or disclose your identity in anyway.

Q No. 1.

- a. Write a short note on oxidative phosphorylation in human body (2)
- b. Which bile acids are synthesized in human body. Elaborate their physiological functions. (3)

Q No. 2

- a. Write down the steps of glycolysis with enzymes and factors. (3)
- b. Elaborate normal Blood Glucose Levels in human body. (2)

Q No. 3

- a. A boy was tested positive for phenylketonuria. Further laboratory investigations revealed elevated serum concentration of an essential aromatic amino acid.
 - i. Which enzyme is most likely to be absent in this patient? *phenylalanine hydroxylase* (0.5)
 - ii. Which amino acid is raised? *phenylalanine* (0.5)
 - iii. Name the alternative metabolites that are produced from the amino acid whose level is elevated in the disease. (1)
- b. Write down the steps of urea cycle along with enzymes & factors. What is significance of biosynthesis of urea? (3)

Q No. 4

- a. Elaborate the process of β -oxidation in human body? Name the regulatory enzymes of β -oxidation. (2)
- b. What are lipoproteins? Classify them on the basis of density. Mention the site of synthesis and metabolism of HDL. (3)

Q No. 5

- a. Mention reasons complications and remedy of gout. (3)
- b. Write a note on orotic aciduria. *OROTIDE OROTHIC ACIDURIA* (2)

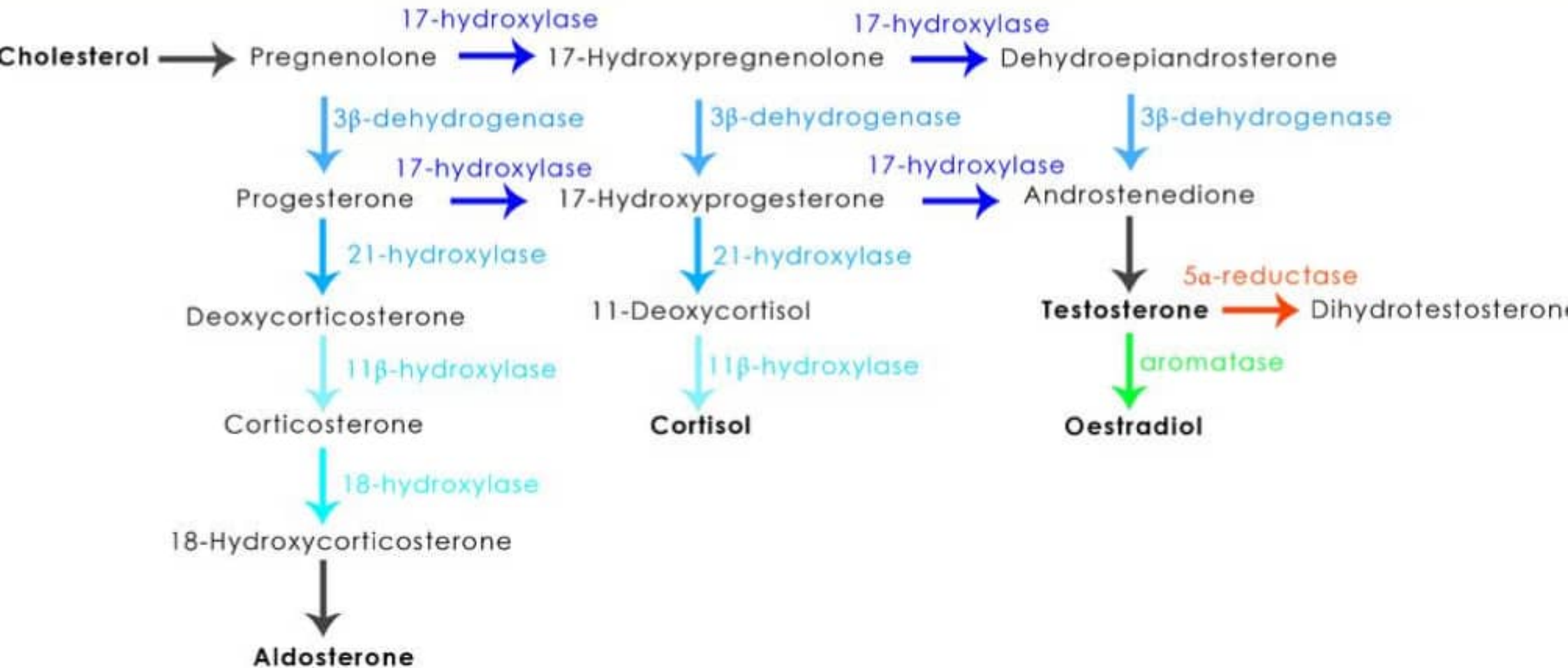
Q No. 6

- a. What is polymerase chain reaction (PCR)? What are its applications? (3)
- b. What is reverse transcription? Mention the role of retroviruses in Cancer. (2)

Q No. 7

- Name the site of synthesis of Insulin. Mention its metabolic effects on carbohydrate, protein and fat metabolism. (3)
- Write short note on
- i. Diabetes Mellitus (1)
 - ii. Diabetes Insipidus (1)

SYNTHESIS OF STEROID HORMONES



In black are hormones, in colour are enzymes.