

PITUITARY GLAND

I.Sc./Zoo/Gr. C

Pituitary gland is one of the most important endocrine gland situated in the depression of sphenoid bone of skull called Sella turcica.

The name pituitary was first proposed by Vesalius. Pituitary gland is also known as master gland because it also control the secretion of other endocrine gland. But today it is known that pituitary himself control by hypothalamus. So it will not better to say as master gland.

The Pituitary gland is pea shaped body measuring about 1cm and 1.5cm in length and breadth respectively. It is a compound gland as some of the portion develop from brain whereas some of its portion develop as Rathke's pouch from the roof of embryonic buccal cavity. Hence pituitary gland is ectodermal in origin.

Pituitary gland is composed of two portions, namely adenohypophysis and neurohypophysis.

Adenohypophysis is further divided into pars distalis, Pars tuberalis and pars intermedia. Where as Neurohypophysis is divided into pars nervosa, infundibulum and median eminence.

ADENOHYPOPHYSIS:- It forms major portion of pituitary gland which is compact and highly vascularized. Due to its anterior position it is also called anterior lobe. It consists of following portions

- a) Pars-distalis:- It represents the largest anteroverstral portion of adenohypophysis. This is composed of epithelial cells arranged in column or clusters. In between clusters of cells lies a number of sinusoids and large capillaries. These cells are kept together by a thin layer of fibrous connective tissue. The cells are of two types Chromophobe and Chromophil. The chromophil cells further of two type namely Acidophile cells and basophil cells. The cell synthesize and store hormones.

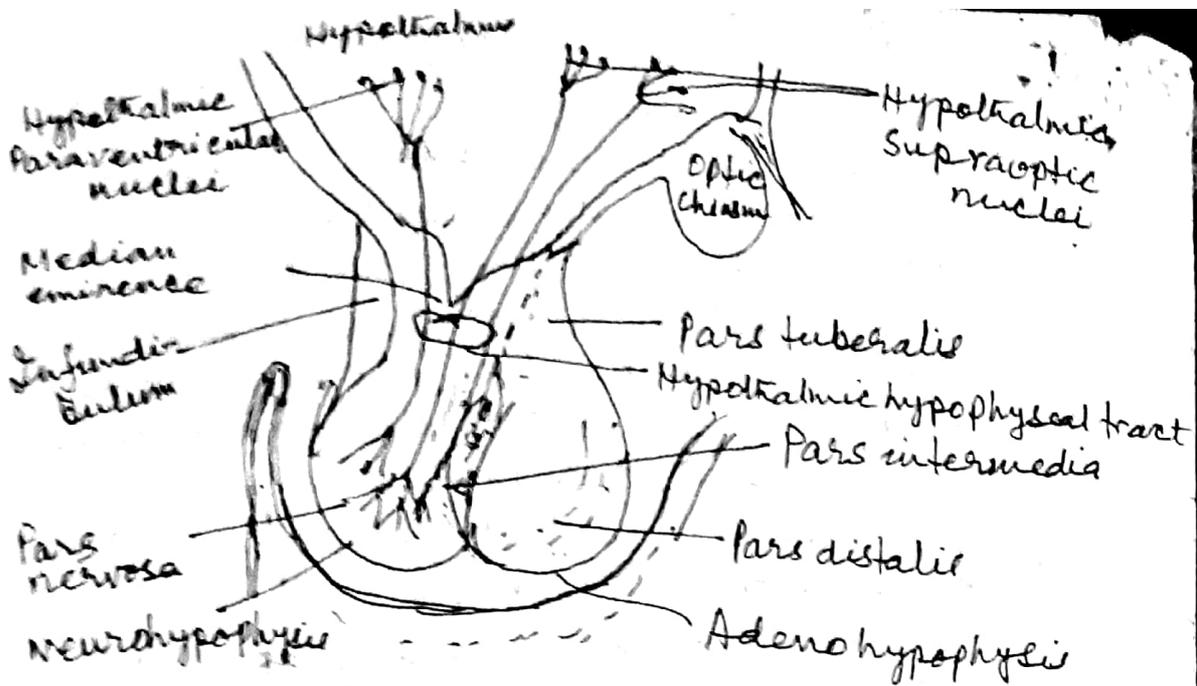
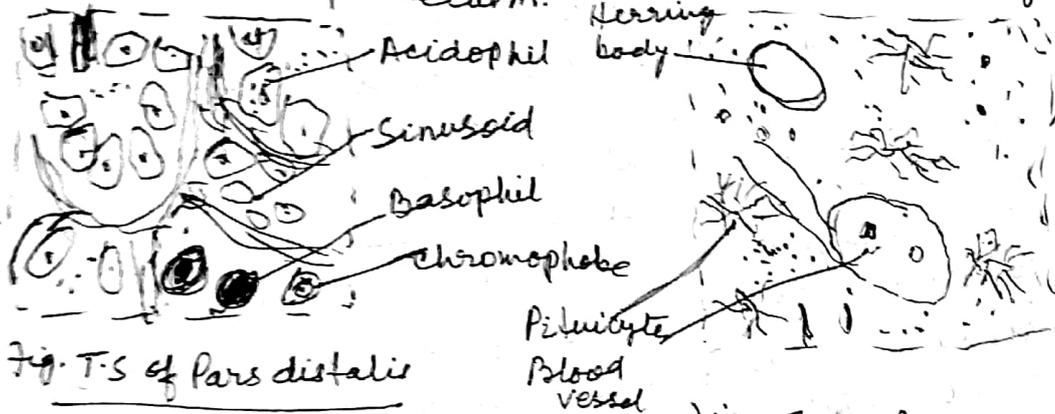


Fig: Pituitary gland (Various parts)

ii) Pars tuberalis :- These are composed of cuboidal vascular cells. It is upper most portion of the hypophysis. On the outer face it remains covered with squamous epithelium.



iii) Pars Intermedia neurohypophysis :- It lies between pars distalis and neurohypophysis. This is composed of few layers of epithelial cells.

B) NEUROHYPOPHYSIS :-

It is located behind adenohypophysis, so it is also called as posterior lobe. It contains following parts

i) Pars-nervosa :- It is made up of specialized non-medulated nerve fibres, neuroglia known as pituicytes and blood vessels. The nerve fibres arise from supra optic and paraventricular nuclei

(3)
of hypothalamus. These pass through the median eminence and reach to pars nervosa. Collectively it is called as ~~hypophyseal~~ hypothalamic-hypophyseal tract. In between nerve fibres there is found protein or colloidal substances known as Herring bodies.

ii) In fundibulum:- The dorsal prolongation of pars-nervosa reaching up to hypothalamus is known as infundibulum.

iii) Median eminence:- The mid central portion of hypothalamus which provide site of attachment for the infundibular stem is called median eminence.

Hormones of pituitary gland:-

Pituitary gland secretes several hormones which perform a large of important function.

Hormones secreted by pars-distalis:-

1) Somatotropic hormone (STH) or Growth hormone (GH)

It help in metabolism of protein, carbohydrate and lipids. It control the body growth by increasing protein synthesis in all the cells of the body. It brings about increase in number as well as in size of the cells. Hyposecretion in child cause dwarfism where as hypersecretion during the period cause gigantism. Hyposecretion during adult cause Simond disease where as its hypersecretion in this stage cause midget.

2) Thyroid Stimulating hormone (TSH) It stimulate the activity of thyroid gland. It promotes an increase in size and number of the follicular cells of thyroid gland. It stimulate thyroid gland to secrete thyroxin.

3) Adrenocorticotropic hormone (ACTH):- This hormone stimulate adrenal cortex of adrenal gland to secrete its hormones.

4) Luteotropic hormone (LTH) or prolactin or Lactogenic hormone :- It stimulates the production and secretion of milk along with ^{completion of} development of mammary gland during pregnancy. It helps in lactation after child birth. It also stimulates the development of corpus luteum and secretion of progesterone by the latter.

5) Follicle stimulating hormone (FSH) :- In female it stimulates the maturation of ovarian follicle and in male stimulates spermatogenesis. It is secreted in sexually matured individual.

6) Luteinizing hormone (LH) :- It promotes the production of testosterone by interstitial cells of testes of male. Hence in male it is also called interstitial cell stimulating hormone (ICSH). In female, it helps in ovulation.

Hormones of Pars-Intermedia

7) Melanocyte stimulating hormone :- It controls the synthesis and dispersion of colour pigments known as melanin in the chromatophores. In mammals including man, it regulates the movement of cells of black pigment layers of retina.

Hormones secreted by Pars-nervosa

8) Vasopressin or Antidiuretic hormone (ADH) :-

It promotes reabsorption of water from cells of distal convoluted tubules and collecting ducts of kidney. It also brings about contraction of smooth muscle fibres of blood vessels. Its hyposecretion causes diabetes insipidus.

9) Oxytocin or Pitocin :- It induces contraction of uterine wall at the time of child birth. It also helps in fertilization as the contraction of uterus causes upward movement of sperms.



12. Which of the following protects the body from dehydration
- Protoplasm
 - Mitochondria
 - Nucleoplasm
 - Centrosome
13. In plasma membrane the hydrophilic ends of phospholipid molecules
- Face each other
 - Face protein molecules
 - Are not found
 - Have not specific ends
14. In small intestine of Rabbit, the plasma membrane of cells transport glucose to blood by
- Active transport
 - Diffusion
 - Pinocytosis
 - Phagocytosis
15. According to fluid mosaic model, the plasma membrane
- Has intrinsic and extrinsic proteins
 - Is a semifluid structure
 - Is selectively permeable
 - All of the above are correct
16. The sperm bears a cap-like structure called acrosome. It is produced by
- A group of Golgi bodies
 - A Golgi body
 - Endoplasmic reticulum
 - Mitochondria
17. Vitellogenesis is associated with
- Lysosomes
 - Centrosome
 - Nucleosome
 - Mitochondria
18. The singer model of plasma membranes differs from the Robertson's model in the
- [AIIMS 1984]
- Number of lipid layers
 - Arrangement of lipid layers
 - Arrangement of proteins
 - Absence of proteins in singer model
19. Which of the following organelle is responsible for absorption of tail of tadpole.
- Nucleus
 - Centrosome
 - Peroxisome
 - Lysosome
20. The sub-units of 80S ribosome are
- 20 S and 60 S
 - 40 S and 60 S
 - 40 S and 40 S
 - 30 S and 50 S
21. Which of the following is correct about ribosome.
- Ribosomes are always associated with ER
 - Prokaryotic ribosomes have 23 S, 5 S and 16 S RNAs
 - Eukaryotic ribosomes have 23S, 5S and 16 S RNAs.
 - More than one is correct.
22. The protein factory of the cell is
- Present in nucleus
 - Present in cytoplasm
 - Present on ER.
 - Present in cytoplasm as well as ER.
23. Cancer cells are more easily damaged by radiation than normal-cells because they
- [PMT Delhi 1984]
- Are different in structure
 - Are non-living
 - Are starved
 - Are undergoing rapid division
24. Diagrammatic representation of chromosomes of an organism is called
- Chromograph
 - Idiogram
 - Cardiogram
 - Genotype
25. Chromatin is
- DNA
 - RNA
 - Nucleoprotein
 - Polynucleotide
26. Solenoid structure
- Is formed by chain of nucleosomes
 - Is maintained by histone proteins
 - Is formed by repeated folding of nucleosomes
 - All of the above
27. Histone octamer is associated with nucleosome. It is
- A group of 8 nucleosomes
 - A group of 8 chromosomes
 - A group of 8 polypeptide chains
 - Linker DNA

28. The high degree transcription preceding uncoiling is seen in
- Autosomes
 - Polyribosomes
 - Giant chromosomes
 - None of the above
29. Balbiani rings and puffs are site of
- Active replication
 - Active transcription
 - Active translation
 - Active separation
30. The differential staining to differentiate between euchromatin and heterochromatin is called
- Heteropycnosis
 - Heterosis
 - Hyperstaining
 - Hypostaining
31. Kinetochore can substitute
- Secondary constriction
 - Satellite
 - Telomere
 - Primary constriction
32. Replacement of secondary constriction from chromosome will hamper the formation of
- Nucleus
 - Nucleolus
 - Nuclear membrane
 - Nucleoplasm
33. Removal of telomere will induce
- Deletion of chromosomes
 - Addition of chromosomes
 - Separation of chromosomes
 - Uncoiling of chromosomes
34. Mitochondria are absent from [AFMC 1980]
- Mature WBC
 - Mature RBC
 - Nerve cells
 - Sperm
35. Middle piece of sperm is formed by
- Golgi body
 - Condensed Golgi body
 - Mitochondria
 - Condensed mitochondria
36. The intracellular transport is carried out by
- Plasma membrane
 - Endoplasmic reticulum
 - Nuclear membrane
 - Chromosome
37. A cell which is not engaged in protein synthesis lacks
- Mitochondria
 - Endoplasmic reticulum
 - Centrosome
 - Nucleolus
38. Which of the statement is correct
- DNA has two antiparallel polynucleotide chains
 - Phosphoric acid and pentose sugar form the back bone of DNA helix
 - The ratio between purines and pyrimidines is equal.
 - More than one is correct
 - All are correct statements
39. Which of the following is correct representation
- Nucleoside = Nucleotide + sugar
 - Nucleotide = Nucleoside
 - Nucleotide = Nucleoside + phosphorus
 - Nucleoside = Nucleotide + phosphorus
40. Nucleic acid are found in [BHU 1980]
- The nucleus only
 - The chromosome only
 - The cytoplasm only
 - Both nucleus and cytoplasm
41. The base sequence of nucleotide can be
- $P-S-A \equiv C-S-P$
 - $S-P-T = A-P-S$
 - $P-S-C \equiv G-S-P$
 - $P-S-C = G-S-P$
42. The formation of RNA from DNA is called
- Translation
 - Transcription
 - Replication
 - Duplication

43. The DNA and RNA molecules differ in respect of
- Molecular configuration
 - Purine and pyrimidine ratio
 - Nitrogenous base
 - b and c are correct
 - All are correct
44. Okazaki fragment is
- Parental chain of DNA helix
 - Parental chain of DNA helix that undergoes replication
 - Segment of DNA that undergoes replication
 - Special DNA fragment found in Japanese people
45. Which of the following statement is correct
- Polymerase III repairs DNA during replication
 - Primase adds deoxyribonucleotides to DNA chain
 - Polymerase I controls the formation of primer RNA.
 - None of the above is correct
46. Virioid is found in
- Prokaryotic cell
 - Eukaryotic cell
 - Both prokaryotic and eukaryotic cells
 - Neither prokaryotic nor eukaryotic cells
47. Genetic code is
- Universal having sets of three nucleotides
 - Different from individual to individual having sets of three nucleotides
 - A group of many nucleotides
 - A language for amino acids present in DNA
 - More than one is correct
48. Operon concept was developed by
- [NCERT 1978]
- Jacob and Monod
 - Watson and Crick
 - Schleiden and Schwann
 - Morgan and Beadle
49. Number of codons is
- | | |
|-------|--------|
| a) 32 | b) 64 |
| c) 96 | d) 128 |
50. The RNA involved in protein synthesis is
- | | |
|----------|---------------------|
| a) mRNA | b) t RNA |
| c) r RNA | d) All of the above |
51. Clover leaf model is represented by
- | | |
|----------|----------------------|
| a) m RNA | b) t RNA |
| c) r RNA | d) None of the above |
52. Christmas tree structure is represented by DNA during
- | | |
|------------------|----------------------|
| a) Replication | b) Translation |
| c) Transcription | d) None of the above |
53. Which of the statement is correct
- mRNA is greatest in amount and t RNA is smallest in size
 - t RNA is greatest in amount and r RNA is smallest in size.
 - r RNA is greatest in amount and t RNA is smallest in size
 - r RNA is greatest in amount and m RNA is smallest in size.
54. The puffs of lampbrush chromosome are result of
- | | |
|-----------------------|-----------------------|
| a) Gene mutation | b) Gene amplification |
| c) Gene transcription | d) Decoding of gene |
55. The puffing pattern of polytene chromosome will remain
- Always constant during metamorphosis of tadpole
 - Differ during metamorphosis of tadpole
 - Depend upon chance of metamorphosis of tadpole
 - Puffing pattern does not indicate any thing regarding metamorphosis of tadpole.
56. Central dogma can be represented as
- DNA \rightarrow RNA \rightarrow Enzyme
 - DNA \rightleftharpoons RNA \rightarrow Protein
 - DNA \rightleftharpoons RNA \rightleftharpoons Protein
 - None of the above
57. Dr. Hargobind Khorana synthesized
- | | |
|-----------|-----------------|
| a) Genes | b) Proteins |
| c) Lipids | d) Amino acids. |

58. Genetic code was discovered by
 a) Khorana
 b) Holley and Nirenberg
 c) Nirenberg and Mathai
 d) Jacob and Monad
59. Gene acts through
 a) Gene
 b) RNA
 c) Enzyme
 d) Hormone
60. Meiosis occurs in germinal cells because it helps to maintain the number of chromosome in an organism
 a) The statement is true but reason is false
 b) The statement is false but reason is true
 c) Both statement and reason are false
 d) Both statement and reason are true
61. The externally resting but internally most active stage of cell division is
 a) Interphase
 b) Prophase
 c) Telophase
 d) None of the above
62. The spindle fibres are made up of
 a) Tubulin
 b) Prolamin
 c) Glutalin
 d) Scleroprotein
63. Chromosomes form a bouquet during
 a) Leptotene of meiosis
 b) Pachytene of meiosis
 c) Anaphase of mitosis
 d) Telophase of mitosis
64. S-phase of interphase involves
 a) Synthesis of protein
 b) Synthesis of nucleic acid
 c) Increase in number of cells
 d) Decrease in Genetic material
65. If one cell has twice as much DNA as another similar cell, it may be [CPMT 1971]
 a) Respiring
 b) Secreting
 c) Dividing
 d) Moving
66. Which of the following two stages are opposite to each other
 a) Prophase and anaphase
 b) Anaphase and Metaphase
 c) Metaphase and Telophase
 d) Prophase and Telophase
67. Which of these is the chronological sequence of stages in prophase of meiosis I. [CPMT, 1974]
 a) Interphase, Leptotene, Zygotene, Pachytene
 b) Leptotene, Zygotene, Pachytene, Diakinesis
 c) Leptotene, Zygotene, Pachytene, Diplotene
 d) Zygotene, Leptotene, Pachytene, Diplotene
68. The raw material for evolution is produced during
 a) Leptotene
 b) Zygotene
 c) Pachytene
 d) None of the above
69. The correct statement about anaphase is
 a) In mitosis chromosomes separate
 b) In meiosis chromosomes separate
 c) In mitosis chromatids separate
 d) a and b are correct
 e) b and c are correct
70. Daughter cells of meiotic division have haploid number of chromosomes. It shows that [CPMT 1974]
 a) Chromosomes are located upon genes
 b) Genes are located upon spindle fibres
 c) Genes are located upon chromosomes
 d) Chromosomes have no genes
71. DNA replication is [BHU 1983]
 a) Conservative
 b) Semiconservative
 c) Complete
 d) Incomplete
72. Polytene chromosomes are found only in certain tissues like
 a) Muscle and liver
 b) Liver and heart
 c) Endo and exocrine glands
 d) Salivary glands, Malpighian tubules
73. The giant chromosomes of the dipteran larvae were discovered by
 a) Darlington
 b) Brown
 c) Balbiani
 d) Robertson
74. Template refers to
 a) The physical basis of heredity
 b) Unit of DNA having coded information for mRNA
 c) A genetic element on chromosome
 d) A complete set of chromosome

75. *Pleiotrophy refers to*
- A condition in which single gene influences more than one trait
 - A cytoplasmic body found in bacteria
 - Self replicating cytoplasmic particles
 - A chemical bond holding amino acid sub unit
76. *The Krebs cycle enzymes are located at* [BHU 71]
- Outer mitochondrial membrane
 - Inner mitochondrial membrane
 - Mitochondrial matrix
 - None of the above
77. *Which of the following does not participate in protein synthesis*
- Rough surface endoplasmic reticulum
 - Smooth surface endoplasmic reticulum
 - RNA
 - DNA
78. *Golgi body is produced by*
- Cisternae
 - Vacuoles
 - Vesicle
 - Nuclear membrane
79. *Juxta-nuclear means*
- Inside the nucleus
 - Outside the nucleus
 - Near the nucleus
 - Away from the nucleus
80. *The suicide bag of the cell is*
- Acrosome
 - Lysosome
 - Nucleosome
 - Polyribosome
81. *In the mitochondrial electron transport system the final electron acceptor is* [AIIMS 1985]
- Cytochrome
 - Cytochrome oxidase
 - Water
 - Oxygen
82. *The nucleoplasm*
- Can communicate with cytoplasm
 - Can not communicate with cytoplasm
 - Can change into cytoplasm
 - Can not change into cytoplasm
83. *Replication of DNA occurs during*
- Mitosis and first meiotic division
 - Mitosis and prior to first meiotic division
 - Mitosis and prior to second meiotic division
 - Mitosis and meiosis
84. *The RNA which carries amino acid to ribosome is*
- r RNA
 - t RNA
 - m RNA
 - All of the above
85. *The base sequence in a strand of DNA helix is ATCG. what will be the base sequence in m RNA ?*
- ATGC
 - UACG
 - TCGA
 - UAGC
86. *Virus that attacks bacteria is*
- Virophage
 - Parasitic virus
 - Bacteriophage
 - TMV
87. *Synaptonemal complex is formed during*
- Diplojene
 - Pachytene
 - Leptotene
 - Zygotene
88. *Synaptonemal complex is associated with* [BHU 1983]
- Polytene chromosome
 - Lampbrush chromosome
 - Mitotic chromosome
 - Paired meiotic chromosome
89. *The function of the nonsense codon is*
- Initiation of protein synthesis
 - Stoppage of protein synthesis
 - Co-ordination between DNA and RNA
 - Co-ordination between various RNAs
90. *Which will probably occur when a diploid cell undergoes normal meiotic division.* [AIIMS 1984]
- All dominant genes will segregate together into daughter cell.
 - All homologous chromosomes pair will separate
 - All daughter cells have different homologous chromosome pairs
 - All linkage groups will be disrupted

91. During mitotic anaphase

- a) Homologous chromosomes separate
- b) Heterologous chromosomes separate
- c) Chromatids of chromosome separate
- d) Chromosomes partially separate.

92. The period between two nuclear divisions between two mitosis is characterized by [AIIMS 1985]

- a) Important metabolic reactions in cytoplasm
- b) DNA replication
- c) Presence of more mitochondria
- d) Suspension of metabolic activity

93. The number of tRNA in a cell is

- a) 5
- b) 10
- c) 20
- d) 25

94. Large quantity of gene can be obtained by

- a) Gene duplication
- b) Gene replication
- c) Gene cloning
- d) Gene transcription

95. Genetic counselling is done to

- a) Improve human race by genetic engineering
- b) Increase human population
- c) Avoid genetic defect in a family
- d) Cure genetic disease

96. UAG is

- a) Opal and stop codon
- b) Amber and stop codon
- c) Ochre and stop codon
- d) Initiation codon

97. Plasmid is

- a) Straight bacterial DNA
- b) Single chained bacterial DNA
- c) Ringed bacterial DNA
- d) Viral DNA

98. The cytoplasmic skeleton is

- a) Cytoplasm
- b) Cisternae
- c) Plasma membrane
- d) Endoplasmic reticulum

99. Split proteins are found in ribosomes. They

- a) Are integral part of ribosome
- b) Can be separated from ribosome
- c) Are found in the gap of components of ribosome
- d) Are found between two ribosomes

100. Splicing occurs in

- a) DNA
- b) tRNA
- c) mRNA
- d) rRNA

101. Crossing over occurs

- a) At chiasmata between sister chromatids
- b) At chiasmata between non-sister chromatids
- c) At any where between non-sister chromatids
- d) At any where between sister chromatids