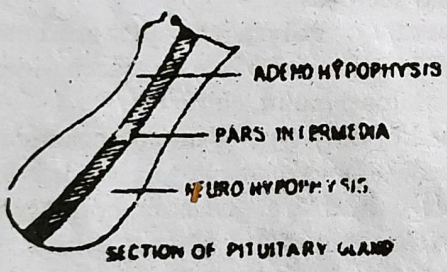
Prof ANIL KUMAR (Zoology)
B.Sc HONS. Part III Paper - V

TOPIC - Give an account of structure and function of Pituitary gland.

Prof ANIL KUMAR
Associate Professor Zoology
R.R.S College MOKAMA (P.P.U)

**Ans. Structure :** The pituitary gland or hypophysis is commonly master gland of the endocrine system. It is attached to the brain by a stalk called pituitary stalk. The gland consists of three lobes, namely adenohypophysis (anterior lobe), neurohypophysis (posterior lobe) and an intermedia to lobe.

In development the pituitary gland is formed by the fusion of two structures namely infundibulum and Rathke's pocket. Rathke's pocket in the dorsal evagination of the buccal cavity. It develops into the adenohypophysis and the intermediate lobe the infundibulum develops as a ventral evagination of the diencephalon. It develops into the neurohypophysis.



SECTION OF PITUITARY GLAND


ACIDOPHIL

The neurohypophysis encloses a cavaity called influndibular recess. This cavity is the continuation of the cavity of the diencephalon. Similarly, the adenohypophysis encloses a cavity called hypophyseal recess. This cavity is the remnant of the lumen of the Rathke's pocket.

**Adenohypophyses**

Pituitary → Rathke's pocket → intermediate lobe
Pituitary → Infundibulum → Neurohypophyses

**Pituitary gland in different chordates :**

**(1) Prochordates :** In prochordates the preoral pit of young amphioxus is homologus to the pituitary gland. In the adult it develops into the Mullller's organ. The Muller's organ has no endocrine function. In tunicates, the sub-neural gland functions as the pituitary gland.

**(2) Cyclostomes :** In cyclostomes the pituitary gland remains in the primitive condition. The cavity of the Rathke's pocket remains large and it opens into the mouth cavity. The infundibular cavity is also wide.

**(3) Higher vertebrates :** In higher vertebrates the hypophysical cleft and the infundibular cavity are narrowed or disappeared. In clasmobranches the anterior lobe is located posterior to the others. In birds, sea cows and whales the intermediate lobe is absent.

**Hormones of the pituitary gland :**

Pituitary gland secrets the following hormones :

1. Growth hormone (STH)
2. Adernocorticatrophic hormone (ACTH)
3. Thyroid stimulating hormone (TSH)
4. Follicle stimulating hormone (FSH)
5. Luteinizing hormone (LH)
6. Luteotrophic hormone (LTH)
7. Melanocyte stimulating hormone (M.S.H.)
8. Vasopressin and
9. Oxytocin.

**Functions :**

**1. Growth Hormone or Somatotrophin :** It is essential for the normal growth of the organism. It is an anabotic hormone and it promotes protein synthesis. If the secretion of this hormone is decreased (hyposecretion) during early life. It leads to dwarfism. But hyper secretion during early life reunites in gigantism. Hyper secretion in adult produces protruding jaw bones. This abnormality is called acromegali.

**2. Adrene corticatrophic Hormone or ACTH :** It stimulates the activity of the adrenal cortex, inducing the secretion of glucocorticoids deficiency causes Rheumatoid fever, Addison's disease etc.

**3. Thyretrophin or Thyroid stimulating hormone or TSP :** It stimulates thyroid gland thereby increasing the thyroxine secretion.

**4. Follicile stimulating Hormone or FSH :** In females it increases the number and size of Grawfian follicles. In males it stimulates the testis for spermatogenesis.

**5. Luteinizing Hormone or LH :** In females it stimulates the secretion of progesterone and regulates the growth and appearance of corpus luteum. In males it controls the activity of the interstitial cells of testis and this is also describe as the interstitial cell stimulating hormone of ICSH.

**6. Prolactin or Luteotrophic Hormone or LTH :** Prolactin is responsible for the initiation of milk secretion in females. It also stimulates proliferation of the glanular elements of the mammary gland during pregnancy. Thus it completes the development of breast. In the brids, it promotes nesting behaviour and also stimulates the crop gland of pigeon.

**7. Melanocyte stimulating Hormone or MSH :** Formerly it was known as intermedian, because it is secrete by parts intermedia. It has many biological actions. It affects the pigment dispersion in the melanophores of lower vertebrates but its role in birds and mammals is not clear. When adenohypophysis or pituitary is removed from frog it results in the permanent bleaching of the skin. In fishes an amphibians MSH stimulates the production of new pigment.

**8. Vasopressin or Anidiuretic Hormone or ADH :** Vasopressin is also called pitressin. It has an important role in regulating water reabsorption by

the renal tubules. An under secretion of vasopressin results in the disease diabetes inspidus in which a huge amount of urine is excreted. Hence it is commonly called ADH Vasopressin raises blood pressure by its vasopressor effect on peripheral blood vessels.

**9. Oxytocin or Pitocin :** It produces vasodilation and a decrease in blood pressure by an opposite effect to that of ADH. It also helps in the contraction of the smooth muscles of uterus. It is also essential for contraction of the mouth muscles of the mammary glands resulting in milk secretion.

**Disorders of pituitary**–Hyperpituiterism, owing to over secretion, leads to gigantism in young ones. This leads to acromogaly in the adult. Hypopituitarism leads to dwarfism in the young ones and acromicria in