MED439
KING SAUD UNIVERSITY

Revised & Approved

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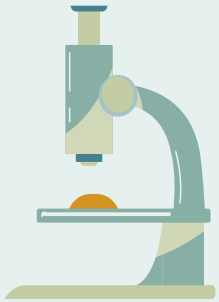


Histology Team
439

Pituitary Gland

Color index:

Slides

Important

Doctors notes

Extra

Editing file

Objectives:

By the end of this lecture, the student should be able to describe:

1. The microscopic structure of the different parts of the pituitary gland in correlation with their functions.
2. The hypophyseal portal circulation; components and significance.

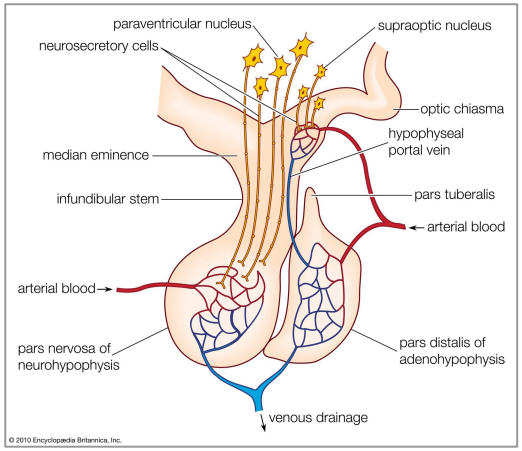
Pituitary Gland

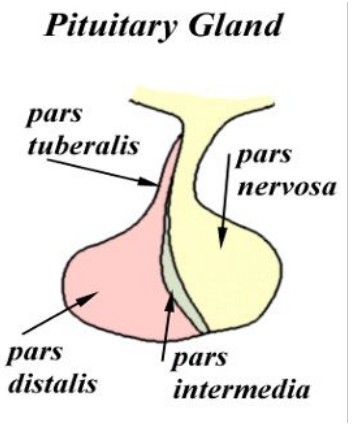
Adenohypophysis Cerebri
Glandular part

- **Pars Distalis (pars anterior)**
- Pars Tuberalis
- Pars Intermedia

Neurohypophysis Cerebri
Nervous part

- Median Eminence
- Infundibulum: Neural (Infundibular) Stalk (stem)
- **Pars Nervosa**





Adenohypophysis: Pars Distalis

Types of parenchymal cells:

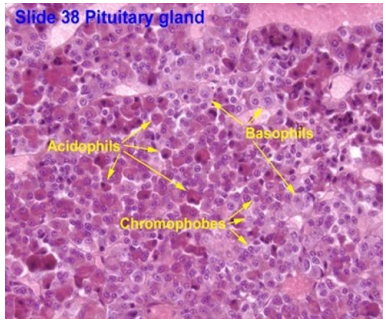
Chromophils

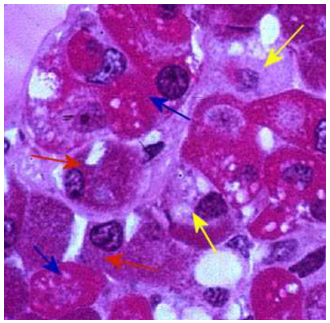
1- Acidophils:
- Somatotrophs (GH cells).
- Mammotrophs (Prolactin cells): Increase during lactation

2- Basophils:
- Thyrotrophs (TSH Cells)
- Gonadotrophs (Gonadotropic cells (FSH, LH)
- Corticotrophs (ACTH cells)

Chromophobes

may represent:
- stem cells.
- degranulated chromophils.
- degenerated cells.





Blue arrow: acidophils
Red arrow: basophils
Yellow arrow: chromophobes

Neurohypophysis: Pars Nervosa

Contents:

Unmyelinated axons

- Unmyelinated axons of secretory neurons situated in supraoptic & paraventricular nuclei (i.e. Axons of hypothalamohypophyseal tract).
- Function: Storage & release of:
  - Vasopressin (ADH); by supraoptic nuclei
  - Oxytocin; by paraventricular nuclei

Pituicytes

- Are glial-like cells in p. nervosa.
- Structure: Have numerous cytoplasmic Processes.
- Functions: Support the axons of the p. nervosa.

N.B. No secretory or neuronal cells in pars nervosa

Herring bodies

- Are distentions of the axons in p. nervosa.
- Representing accumulation of neurosecretory granules at axon termini and along the length of the axons in p. nervosa.

Fenestrated blood capillaries

N.B. The anterior lobe (Adenohypophysis) secretes prolactin which leads to milk production
While the posterior lobe (Neurohypophysis) secretes oxytocin which causes milk secretion

M.Doctor's notes

Slide 3

- Pars distalis: originating from the roof of the primitive mouth.
- Pars nervosa: downward growth from the base of the brain (hypothalamus).

Slide 4

- Acidophils have high affinity to acidic dies.
- Basophils have high affinity to basic dies.
- Somatotrophs (GH cells) represent 50% of all total number of cells in pars distalis.
- Mammotrophs (Prolactin cells) represents 10% of all total number of cells in pars distalis for both male & female. In male, it will potentiate indirectly the action of LH hormone to increase testosterone.

F.Doctor's notes

Slide 3 :

Pituitary gland is very small structure formed of 2 main components according to the embryological development totally different from each other .

Anterior part of the gland :

- is manly epithelium not connected to the brain only attached .
- Called Adenohypophysis cerebri = Adeno : gland , hypophysis : pituitary , cerebri : related to the brain but not neurally (لانه مافيها nerve cells or axons)
- Formed of 3 parts : pars(part) distalis large dilated like tube and pars intermedia contain remnants of collagen during the forming of adenohypophysis cerebri
- Related to hypothalamus hormonally where the hormones from the hypothalamus control the secretion .

Never to find cell in both parts of gland only axons in the posterior lobe.

Posterior part of the gland :

connected to brain through nerve fibers and formed of 3 main parts :

- Median eminence (plexus) like هضبة :
- Infundibulum: Neural (Infundibular) Stalk (stem) : like the neck
- Pars nervosa

F.Doctor's notes

Slide 5 :

Pars Nervosa formed of :

- unmyelinated axons of hypothalamic nuclei (supraoptic - paraventricular) pass through Infundibulum to pars nervosa (form the hypothalamohypophyseal tract anatomically)
- Cell with nucleus: neural like glial cells called pitutocyes support the axons
- لانها endocrine gland : must have fenestrated blood capillaries
- Hearing bodies : Dilated terminal structure of the axons so the hormones(ADH - Oxytocin) produced by the hypothalamic nuclei stored here

ADH = to maintain fluid within the body

Oxytocin = Female (يحتاجه جسمنا during menstruation) = we fell constricts (مغص) it increased during menstruation to constrict the uterus to produce excessive blood and during the labor increase the uterine contraction for delivery .

Slide 4:

Anterior part of the gland - pars distalis :

لما جو العلماء يصبغو باستخدام (basal stain E and H) اكتشفو مجموعه من cells :

52 % of cells not stained called chromophobes (كارهة للون) تبص فيهم تشوف كانه فيه vacuoles ; not takin acidic color of E or basic color of H (قال بعض البس اعلم الله = ؟ طيب ايه طبيعتهم) theories : stem cells of chromophils or degranulted chromophils (يعني هي كانت اكتف احتجناها وطلعت كل السكريشن اللي فيها حتى صار السايتوبلازم اللي فيها مو كثير فخلصت القرانيولز) or degenerated cells (functionless)

48% take color called chromophils (محب للون) بعضهم اخذ احمر والاخر ازرق :

Acidophilic cells : (اكتشفو انهم نوعين من الخلايا باكتشاف انه فيه انتجن ع الخلية غير عن الثانيه) by Certain Ab to cobe with this Ag

- Somatotrophs : somato , related to body and they secrete hormones affect the body growth (GH) if decreased in childhood will cause dwarfism and if increased causes gigantism .
- Mammotrophs : mammo related to mammary gland which increases during lactation and pregnancy to increase Prolactin hormone to form and secrete milk (who's stimulate the release of Prolactin = Oxytocin)

F.Doctor’s notes

Slides 4 :

Basophilic cells (blue cytoplasm)

- thyrotrophs secrete TSH that stimulates Thyroid to release TH. (that’s why the pituitary glands called master of endocrine because it’s secretion of H affect other glands)
- Gonadotrophs release FSH , LH affecting ovaries and testes . (some says there’s one gonadotrophs release both Hormones and some says there are 2 one for releasing FSH and other for LH.
- Corticotrophs (ACTH cells) cortisone and corticoids secreted from adrenal gland which is controlled through pituitary gland .

All the cells controlled by pituitary gland and hypothalamus .

MCQs

Q1) Which of the following cells belong to the basophils of pars distalis?
A- Chromophobes
B- Gonadotropins
C- Somatotrophs
D- Mammotrophs

Q2) Corticotrophs contains which cells ?
A- ACTH cells.
B- TSH cells
C- GH cells
D- Prolactin cells

Q3) Which of the following cells Representing accumulation of neurosecretory granules at axon?
A- Herring bodies
B- Pituicytes
C- Mammotrophs
D- Thyrotrophs

Q4) Which of the following is true about Pituicytes?
A- Not found in pars nervosa
B- Support the axons
C- Have few cytoplasmic Processes.
D- Epithelial-like cells

Q1: B
Q2: A
Q3: A
Q4: B

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