**Summary**

**Pituitary Development**:

**• Posterior pituitary ( neurohypophysis):**

* from neural cells as an outpouching from the floor of 3rd ventricle
* Pituitary stalk joins the pituitary gland with hypothalamus

**• Anterior pituitary ( adenohypophysis ) :**

* From Rathke’s pouch, Ectodermal evagination of oropharynx .
* Migrate to join neurohypophysis

**Function of pituitary gland:**

**• Posterior pituitary:**

* **Oxytocin**
* **VASOPRESSION (ADH) = ↑secretionàSIADH , ↓secretion àDiabetes insipidus**

**• Anterior pituitary:**

* **Growth Hormone (GH)**
* **prolactin (PRL)**
* **Thyroid Stimulating Hormone (TSH)**
* **Luteinizing hormone (LH) and Follicle Stimulating Hormone (FSH).**
* **adrenocorticotrophic hormone (ACTH)**

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| Cell | Corticotroph | Gonadotroph | Thyrotroph | Lactotroph | Somatotroph |
| Hormone | POMC,ACTH | FSH, LH | TSH | Prolactin | GH |
| Stimulators | CRH, AVP, gp-130 cytokines | GnRH, Estrogen | TRH | Estrogen, TRH | GHRH, GHS |
| Inhibitors | Glucocorticoids | Sex steroids,  inhibin | T3, T4, Dopamine, Somatostatin, GH | Dopamine  D2 receptor | Somatostatin, IGF1, Activins |
| Target Gland | Adrenals | Ovary, Testes | Thyroid | Breast and other tissues | Liver, bone and other tissues |
| Trophic Effects | Steroid production =cortisol | Sex steroid, Follicular growth, Germ cell maturation | T4 synthesis and secretion | Milk production | IGF-1 production, Growth induction, Insulin antagonism |

**DISORDERS OF PITUITARY FUNCTION**

* **Hypopituitarism**
* Central hypoadrenalism, hypogonadism, hypothyroidism or GH deficiency.
* Panhypopituitarism
* **Hypersecretion of Pituitary Hormones**
* Hyperprolactinemia
* Acromegaly
* Cushing’s Disease

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| Non-functional pituitary adenoma:   * Absence of signs and symptoms of hormonal hypersecretion * 25 % of pituitary tumor * Needs evaluation either micro or macroadenoma (micro = less than 1cm , macro =more than 1 cm) * Average age 50 – 55 yrs old, more in male | |
| Presentation of NFPA | * As incidentaloma by imaging * Symptoms of mass effect. * Hypopituitarism * Gonadal hypersecretion |
| Treatment | * Surgery if indicated * Observation , in Slow growing tumour * Adjunctive therapy |

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| Functional Pituitary Adenoma | | |
| 1)Prolactin" | **Function:** stimulates breast development and milk production  **Causes of Hyperprolactinemia:**   * Hypothalamic Dopamine Deficiency * Defective Transport Mechanisms * Lactotroph Insensitivity to Dopamine * Stimulation of Lactotrophs   **Prolactinomas :**  Most common type of functional pituitary adenomas   * Of women with prolactinomas- 90% present with microprolactinomas * Of men with prolactinomas- up to 60% present with macroprolactinomas   **Clinical Features of Hyperprolactinemia/Prolactinoma:**  Women: Secondary amenorrhea, infertility Glactorrhea  Men: Loss of libido, Headache, Gynecomastia  **So Not all hyperprolactinemia is due to a prolactinoma …**  **Management:**   * Medical Medical Medical Medical therapy (the Dopamine agonist) * Surgical resection * Radiation therapy | |
| 2)GH | * Pituitary tumor as mass effect →→ Growth hormone deficiency * Hyperfunctioning mass →→ Acromegaly * **Clinical presentation of GH deficiency:**   Children - growth delay  Adult - hypoglycemia  **Diagnosis**:   * GH, IGF-I level * Dynamic testing: clonidine stimulation test, glucagon stimulation, exercise testing, arginine-GHRH, insulin tolerance testing * X-ray of hands: delayed bone age * In Adult: Insulin tolerance testing, MRI pituitary to rule out pituitary adenoma   **Management**:  GH replacement   * **Clinical picture and presentation of Acromegaly:** * GH level ( not-reliable, pulsatile) * IGF-I * 75 g OGTT tolerance test for GH suppression * Fasting and random blood sugar, HbA1c * Lipid profile * Cardiac disease is a major cause of morbidity and mortality * 50 % died before age of 50 * HTN in 40% * LVH in 50% * Diastolic dysfunction as an early sign of cardiomyopathy   **Medical treatment:**   * Somatostatin analogue * Surgical resection of the tumor | |
| 3) ACTH | Function :regulate the steroid hormone cortisol. Cortisol is released by the adrenal gland.  **HPA-axis**   * 2nd adrenal insufficiency * glucgocorticoid replacement * Circadian rhythm of cortisol secretion * Early morning cortisol between 8-9 am   **Hypoadrenalism:**   * Nausea * Vomiting * Abdominal pain * Diarrhoea * Muscle ache * Dizziness and weakness * Tiredness * Weight loss * Hypotension   **Management of hypoadrenalism:**   * **Cortisol replacement** * **ACTH-Adenoma :**   **HPA-axis ( excessive cortisol)-** Cushing syndrome   * 80 % HTN & LVH * Diastolic dysfunction, intraventricular septal hypertrophy * ECG needed: high QRS voltage, inverted T-wave * Echocardiogram preop * OSA: 33% mild, 18% severe. Needs respiratory assessment and careful use of sedative during surgery * Glucose intolerance * Osteoporosis with vertebral fracture * thin skin→ difficult IV cannulation, poor wound healing   **Cushing’s-Management**   * Surgical resection of pituitary * Medical Treatment | |
| 4)TSH | FUNCTION: It tells the thyroid gland to make and release thyroid hormones. | |
| * **Central Hypothyroidism** * Low TSH * Low free T4 and T3   **Management** :   * Thyroxine replacement * Surgical removal of pituitary adenoma if large | * **TSH-Producing adenoma** * Very rare * Signs of hyperthyroidism * High TSH, FT4, FT3   **Treatment**   * with anti-thyroid meds * Surgical resection of adenoma * Medical therapy: Somatostatin Analogue |
| 5)LH &FSH | * **Gonadotroph Adenoma**   • High FSH and Low LH  • High serum free alpha subunit  • High estradiol , thickened endometrium and polycystic ovaries  **Treatment**:   * Surgical resection if large * Radiation therapy | |