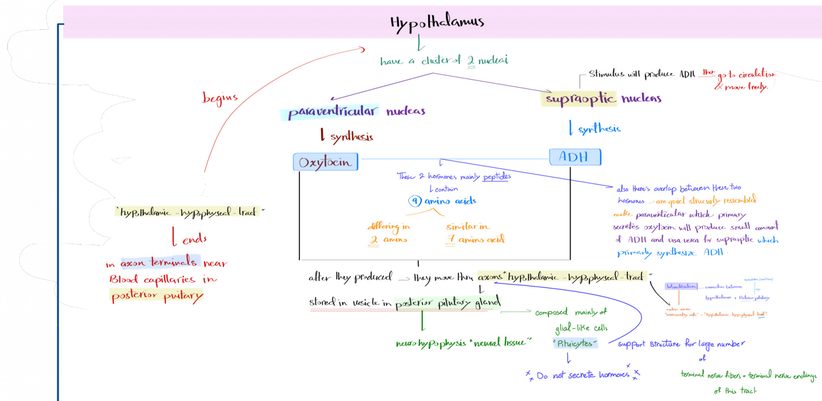
Pituitary Hormones and Their Control by the Hypothalamus

Pituitary Gland (Hypophysis)

is a small **endocrine gland** situated in a bony cavity at the brain's base, just below the hypothalamus. It is connected to the hypothalamus by a thin stalk.

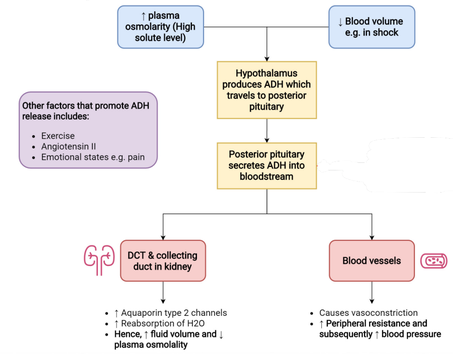
Pituitary Gland Structure:

- **Anterior Pituitary (Adenohypophysis):**
  - Composed of glandular epithelial tissue.
  - Secretes various hormones:
    - Gonadotropins (FSH and LH):* Regulate sex hormone secretion by the gonads.
    - Growth Hormone (GH):* Influences growth and metabolism.
    - Thyroid-Stimulating Hormone (TSH):* Controls thyroid hormone production.
    - Adrenocorticotropic Hormone (ACTH): Regulates adrenal hormone secretion.
    - Prolactin (PRL): Acts on non-endocrine tissues.
  - **Regulation:** Controlled by hypothalamic hormones via the hypophyseal portal system.
- **Posterior Pituitary (Neurohypophysis):**
  - Comprised of nervous tissue.
  - Stores and releases hormones synthesized in the hypothalamus
    - Oxytocin: Involved in uterine contractions and lactation.
    - Vasopressin (ADH): Regulates water reabsorption in the kidneys.



Hormones Secreted:

- The anterior pituitary secretes various hormones. For instance, FSH and LH (gonadotropins) regulate sex hormone secretion by the gonads.
- Hormones like GH, TSH, ACTH, FSH, and LH are tropic hormones, influencing other endocrine glands' secretions.
- PRL, among anterior pituitary hormones, acts directly on non-endocrine tissues, unlike others that stimulate hormone secretion.
- FSH, LH, and GH, besides regulating hormone secretion, impact non-endocrine target cells directly.



Regulation of Pituitary Hormones:

- The anterior pituitary is functionally linked to the hypothalamus through a portal system named the *hypophyseal portal system*.
- Releasing and inhibitory hormones from the hypothalamus influence anterior pituitary secretions.
- Feedback mechanisms involving hypothalamic hormones and target-gland hormones regulate anterior pituitary secretions.
  - Example Scenario: Gonadotropin-Releasing Hormone (GnRH)
- In pre-puberty, GnRH levels are undetectable in young children but increase before puberty.
- Upon secretion, GnRH stimulates gonadotropes in the pituitary to release FSH and LH, initiating hormonal cascades for puberty.

Oxytocin Impact:

- Oxytocin influences uterine contractions during childbirth and milk ejection during breastfeeding.
- It plays a pivotal role in bonding and attachment, exemplifying its diverse functions in reproductive physiology.