

## # NEURAL CONTROL OF ADENOHYPOPHYSIS

- Control of adnohypophysis by neural mechanism.
- Master gland (1905-1925) as it controls secretion of hormones which are vital for life.

### Evidences -

1. Electrical stimulation of hypothalamus.
2. Pituitary stalk sectioning. — Harris (1945-50)
3. Transplantation of pituitary. —
4. In vitro culture of pituitary.

**HT** → TRH, GnRH, CRH -- released from hypothalamus.  
 ↓ Axonal ends  
**ME i plexus**  
 ↓ HPV  
**P.D-region**  
 Superior hypophyseal artery goes to region of median eminence and form a primary capillary plexus. Via hypophyseal portal blood vessels pre-capillary plexus get with sec. capillary plexus. From median eminence hypophyseal portal system passes.

— **Flow of blood**: from hypothalamus to pituitary proved by exp. of Green and Harris — studied >100 vertebrate species.

① Houssery et al (1935) in food — flow of blood is downward from **HT** to **Pituitary**.  
 Physiology and medicine.

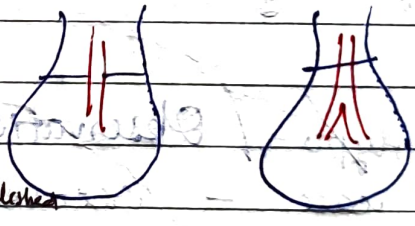
**NOTE** — **Schally and Guillemin** — got nobel prize for discovery of releasing hormone (TRH and GnRH). Base for exp. was prepared by Green and Harris.

\* Until structure of hormone is unknown, then it is c/a ~~is~~ factor but after ~~is~~ knowing str. it is c/a hormone.

② — Wislocki & King (1936)

Hypophyseal portal system <sup>(vein) ≠ HPV</sup> is a functional link b/w hypothalamus and hypophysis and pars distalis.

③ — Scientist R.O. Greep (1936)



HPV ~~est~~ not established

HPV established.

They performed hypophysectomy and left in situ.

① experiment —

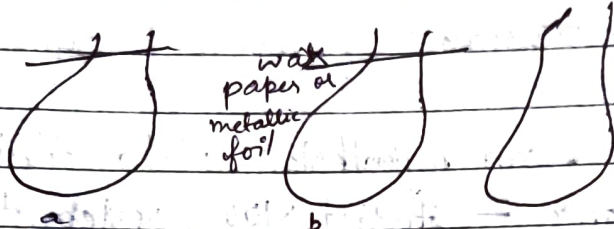
♂ rat  $\xrightarrow{\text{Hypo}}$  Suppression of spermatogenesis  
 ♀ rat  $\xrightarrow{\text{Hypo}}$  " " " " estrous cycle

After some times (some days) this suppression of gametogenesis or estrous cycle is recovered. This is recovery shows that HPV has great regeneration power.

### ② experiment -

Harris in (1945-50)

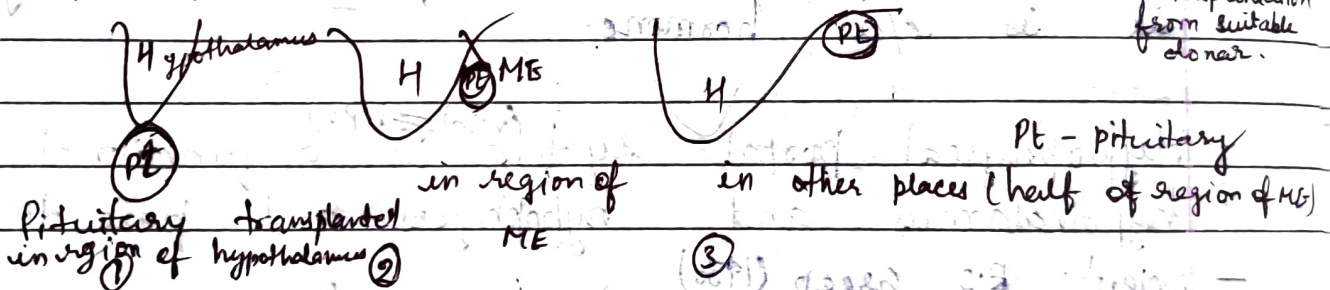
- a • <sup>simple</sup> stalk sectioning in ♀ rat
- b • Permanent stalk sectioning
- c • Control



- Recovery after sometime is observed. - No recovery

CONCLUSION: Hypophysial portal vessel has great capacity of regeneration until permanent sep<sup>n</sup> is completed. HPV connect pituitary and hypothalamus.

### ③ exp. by Harris and Jacobson (1950-52) = Pituitary transplantation from suitable donor.



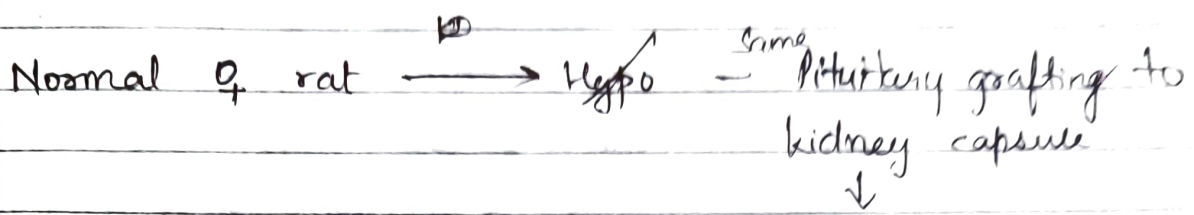
♀ rat - Hypo / Observation

- In first case - recovery of oestrous cycle.
- second case - recovery of oestrous cycle.
- third case - no recovery.

### Conclusion-

HPV works as function link b/w hypothalamus and hypophysis, as in second cond. releasing hormone of hypothalamus is released in region of ME and herefrom it is delivered to hypophysis via HPV.

⊙ exp - by Nikitoritch, Winer, Everett (1957-59)



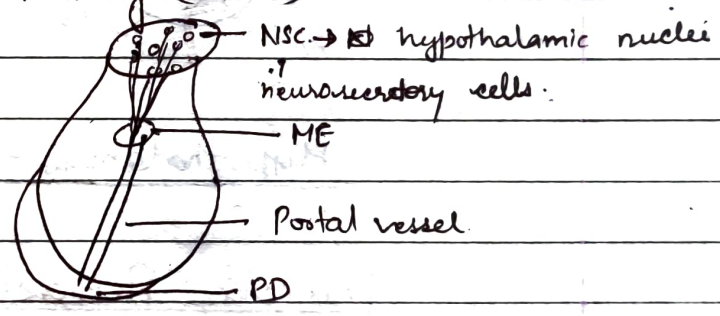
Suppression of hormone activity

After 2-3 months this pituitary (grafted in kidney capsule region) is taken and grafted at original pos<sup>n</sup> of same rat, then recovery of function is observed.

Conclusion - HPV connects hypothalamus to pituitary by great regenerating power and result in normal recovery of function.

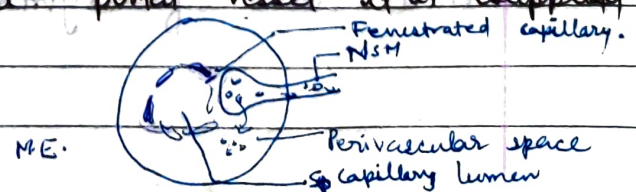
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Hypophyseal - portal vessel - Makes the vascular link b/w hypothalamus and pituitary (anterior).



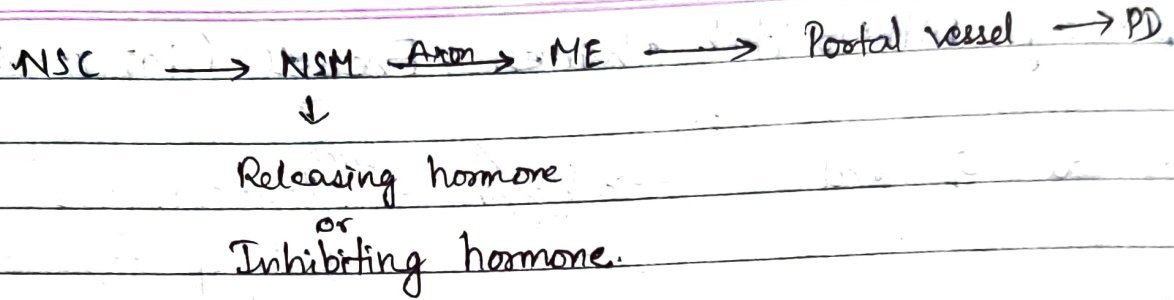
→ Green and Harris: proposed neurovascular theory

Neurovascular theory - In hypothalamus we have NSC (hypothalamic nuclei) which produces NSM (neurosecretory material). These NSM via axon come to median eminence and via portal vessel it is supplied to anterior pituitary.



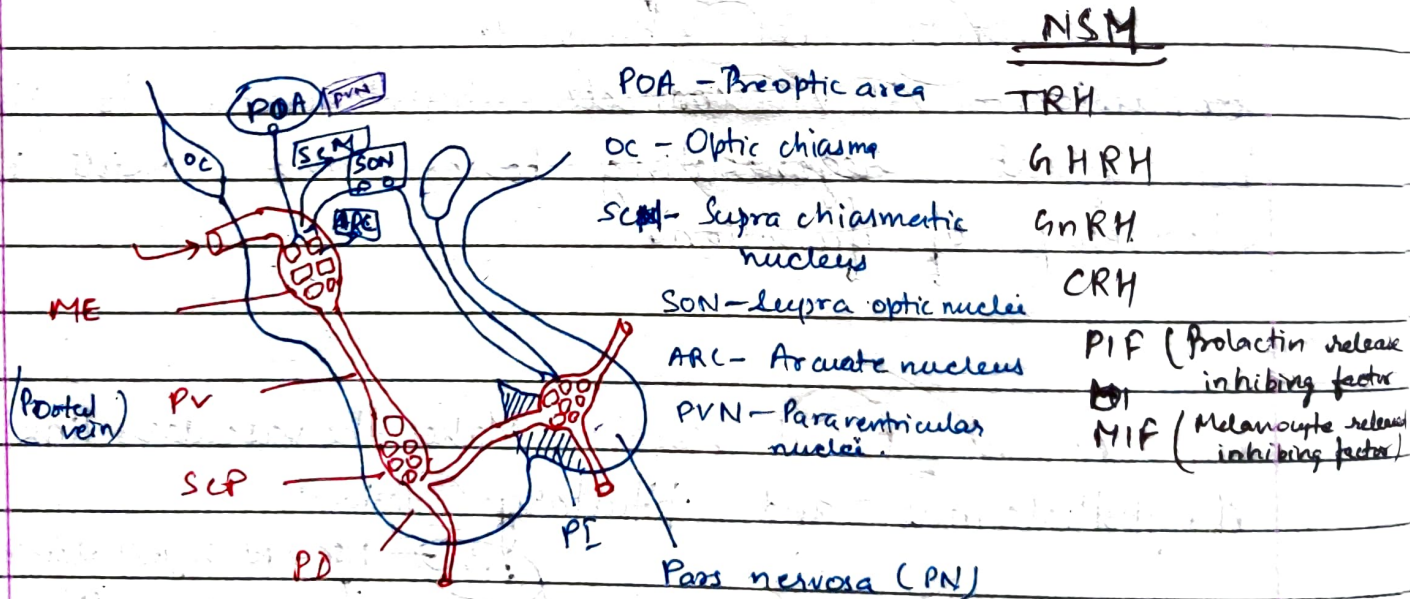
PD produces - 6 hormones  
 RN " - 2 "  
 PI " - 1 (MSH) x in humans

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From NSC to ME link is - neural } Complete system is neurovascular  
 From ME to PD " " - vascular }

→ Area in hypothalamus - hypophysiotropic area (HTA) where NSC are located.



Hypothalamus - Pituitary Axis