

Sem IV (PG)

Paper ZOO-402

Group B : Neuro-Immuno Endocrinology

Prepared by Anindita Das

Neuro-immuno endocrine pathways (2)

Neural control of different endocrine glands

- NEURAL CONTROL OF HYPOTHALAMIC NEUROSECRETORY CELLS

Figure 5 indicates how different neurotransmitters (serotonin, dopamine and noradrenaline) from nerve cell axons might regulate the secretion of hypothalamic releasing and inhibiting hormones through their action on the synaptic receptors of the neurosecretory cells. Neurosecretory cells occur in different neurotransmitter pathways and the neurotransmitters in these pathways may stimulate or inhibit hormone release.

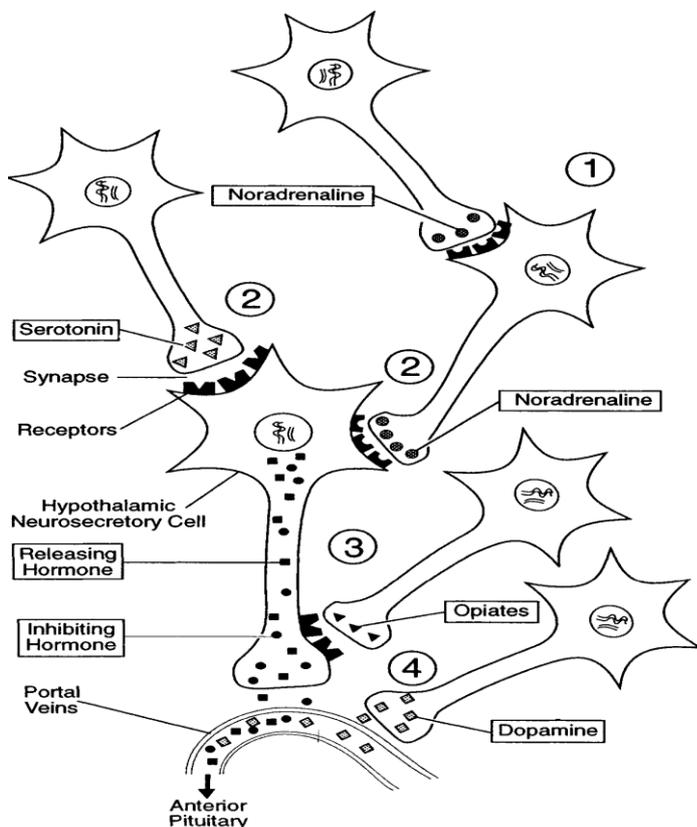


Fig 5: Four possible mechanisms through which neurotransmitters can regulate the release of hypothalamic and pituitary hormones. (1) Indirect stimulation of the neurosecretory cell through sensory or other nerve pathways which synapse on an interneuron which then synapses onto the neurosecretory cell. (2) Direct axo-dendritic or axo-somatic synapses on the neurosecretory cell. (3) Axo-axonal synapses on the neurosecretory cell. (4) Release of transmitters into the hypophyseal portal veins to act directly on the endocrine cells of the pituitary. Upon stimulation, the neurosecretory cell releases its releasing or inhibiting hormones into the portal veins.

• **NEUROTRANSMITTER REGULATION OF ADENOHYPHYSAL HORMONES**

❖ **ACTH and CRH:**

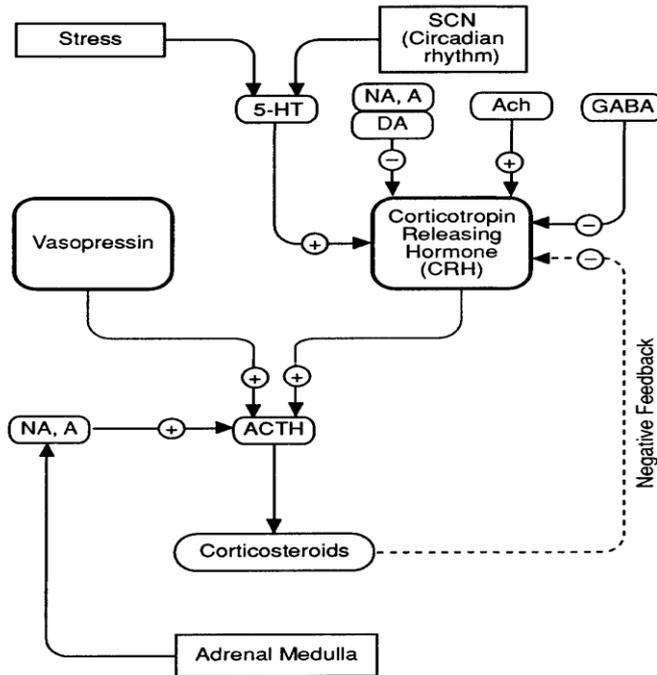


Fig 6: Summary of the neurotransmitter control of CRH and ACTH secretion.

A = adrenaline;
 Ach = acetylcholine;
 DA = dopamine;
 NA = noradrenaline;
 SCN = suprachiasmatic nucleus;

❖ **TRH and TSH:**

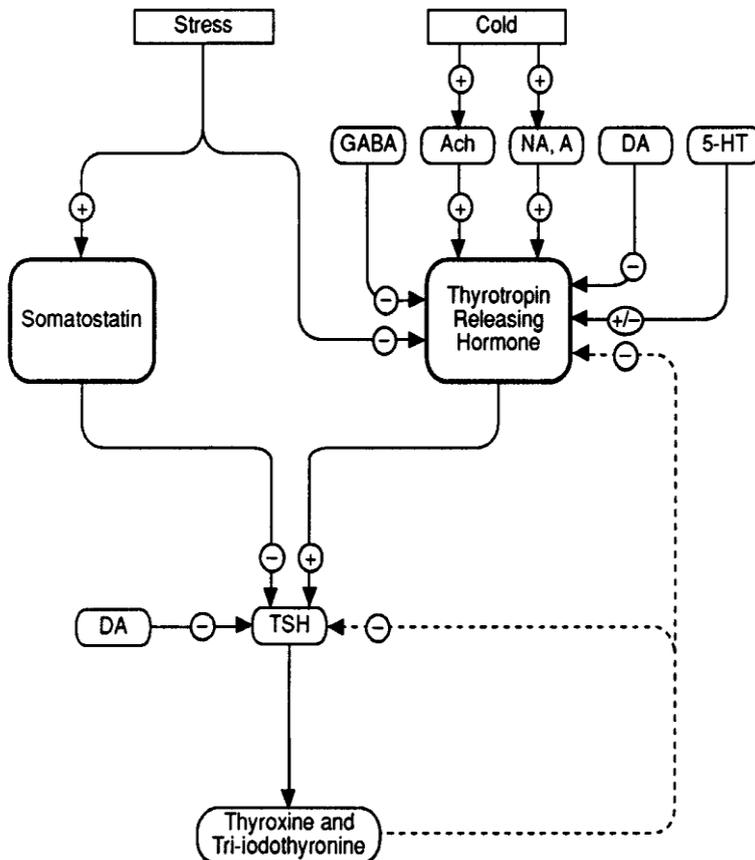


Fig 7: Summary of the neurotransmitter control of thyrotropin releasing hormone (TRH) and thyroid stimulating hormone (TSH) secretion. Abbreviations as in Figure 6.

❖ **GnRH and Gonadotropins:**

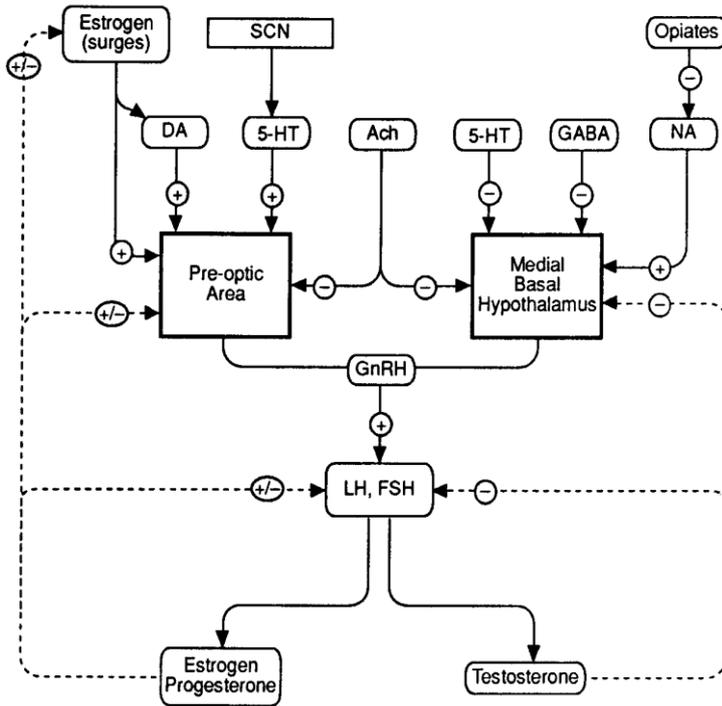


Fig 8: Summary of the neurotransmitter control of gonadotropin releasing hormone (GnRH) and gonadotropin secretion. Abbreviations as in Figure 6.

❖ **Prolactin:**

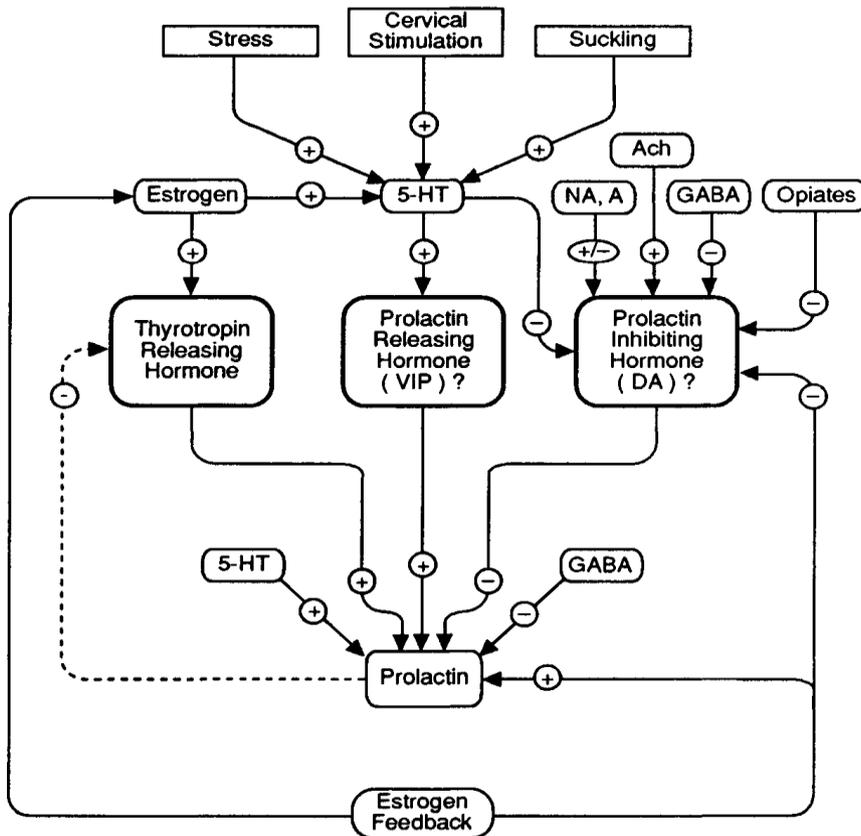


Fig 9: Summary of the neurotransmitter control of prolactin secretion. Abbreviations as in Figure 6.

❖ Growth hormone:

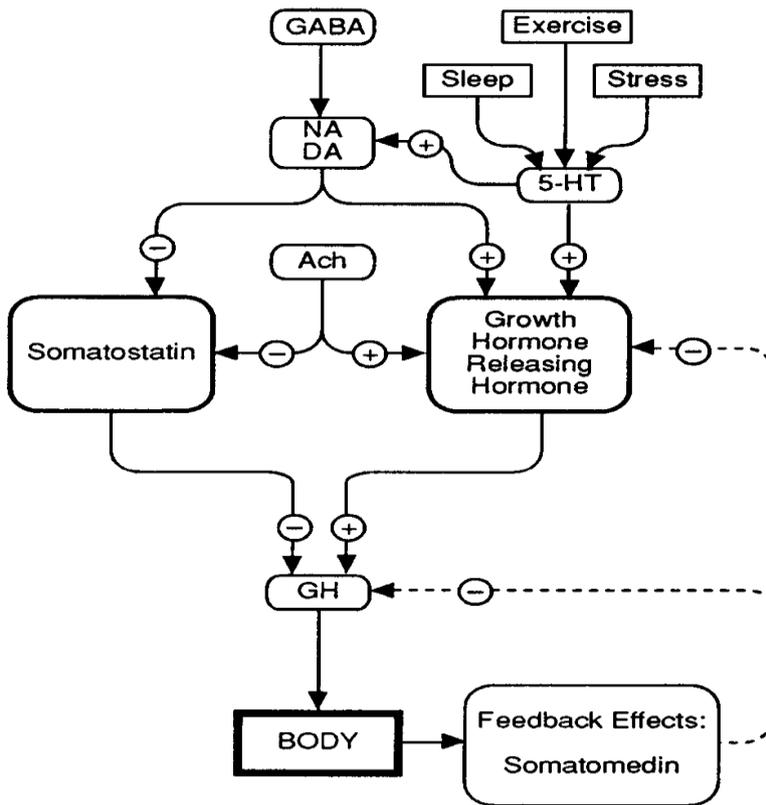


Fig 10: Summary of the neurotransmitter control of growth hormone secretion. Abbreviations as in Figure 6.

❖ MSH:

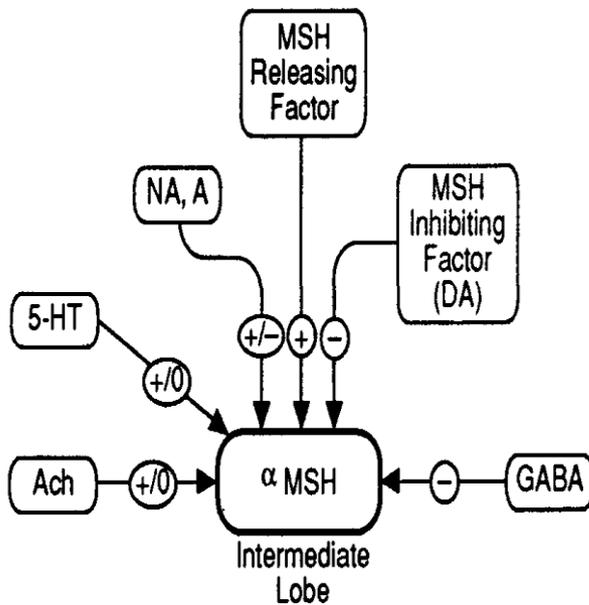


Fig 11: Summary of the neurotransmitter control of α-melanocyte-stimulating hormone (α-MSH) secretion. Abbreviations as in Figure 6.

- **NEUROTRANSMITTER REGULATION OF NEUROHYPOPHYSEAL HORMONES**

- ❖ **Oxytocin:**

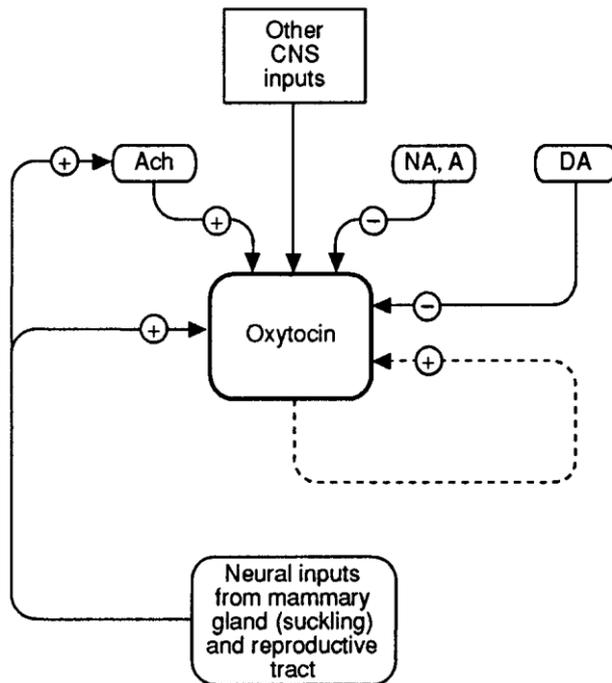


Fig 12: Summary of the neurotransmitter control of oxytocin secretion. Abbreviations as in Figure 6.

- ❖ **Vasopressin:**

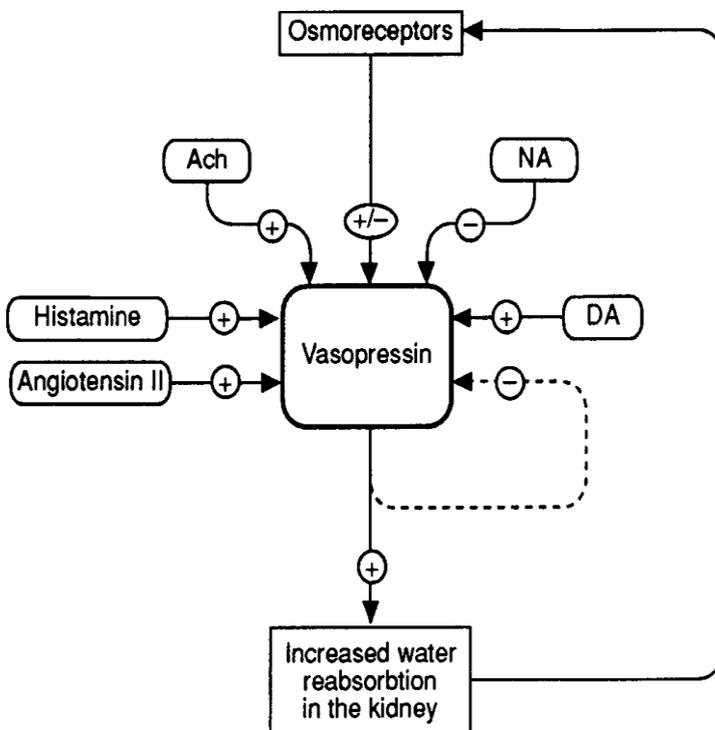


Fig 13: Summary of the neurotransmitter control of vasopressin secretion. Abbreviations as in Figure 6.