

STRESS



NEUROTRANSMITTER



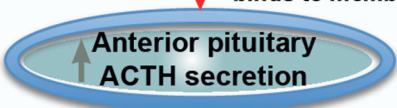
binds to membrane receptors



↑ CRH
(in hypothalamic-pituitary portal vessels)



binds to membrane receptors



↑ PLASMA ACTH



binds to membrane receptors

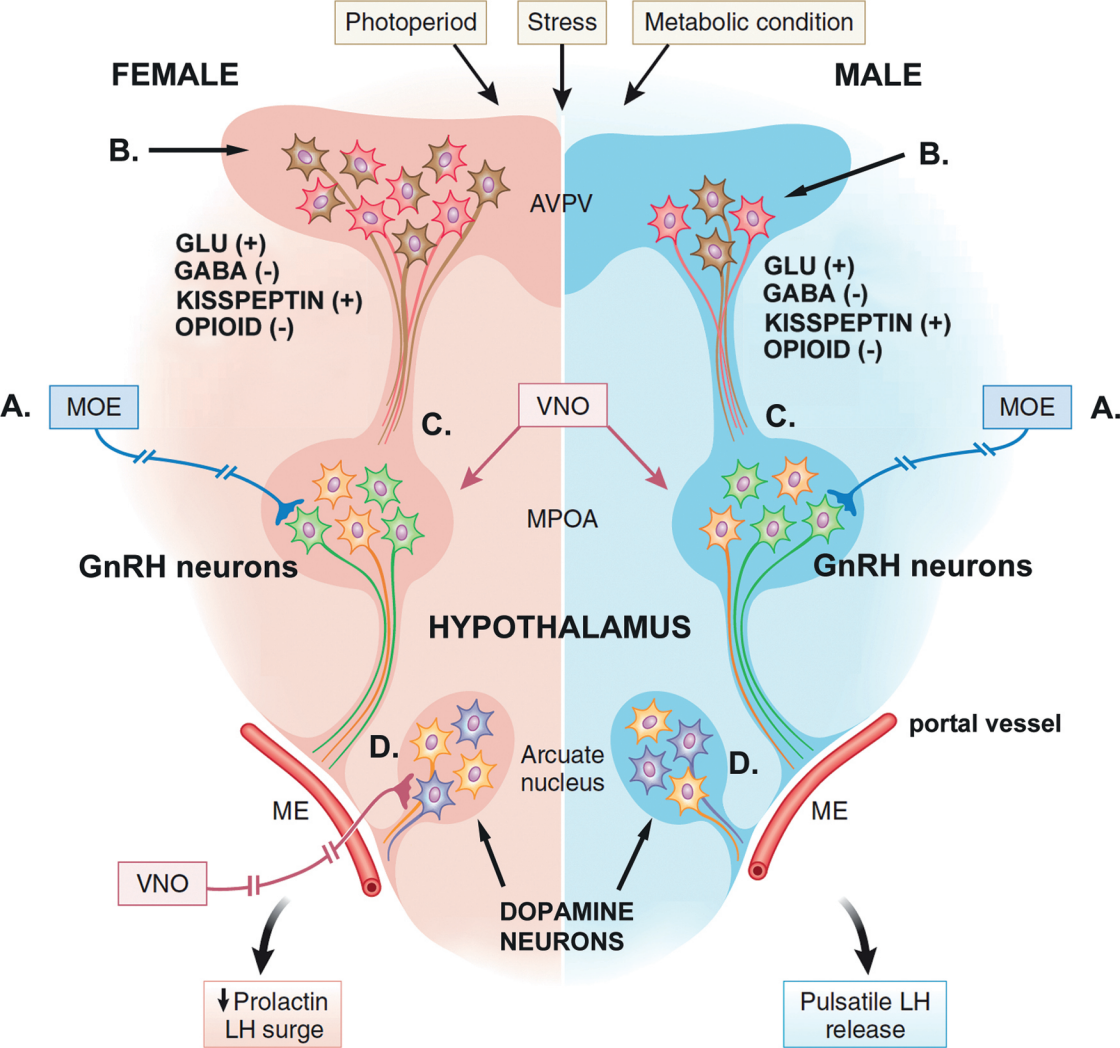


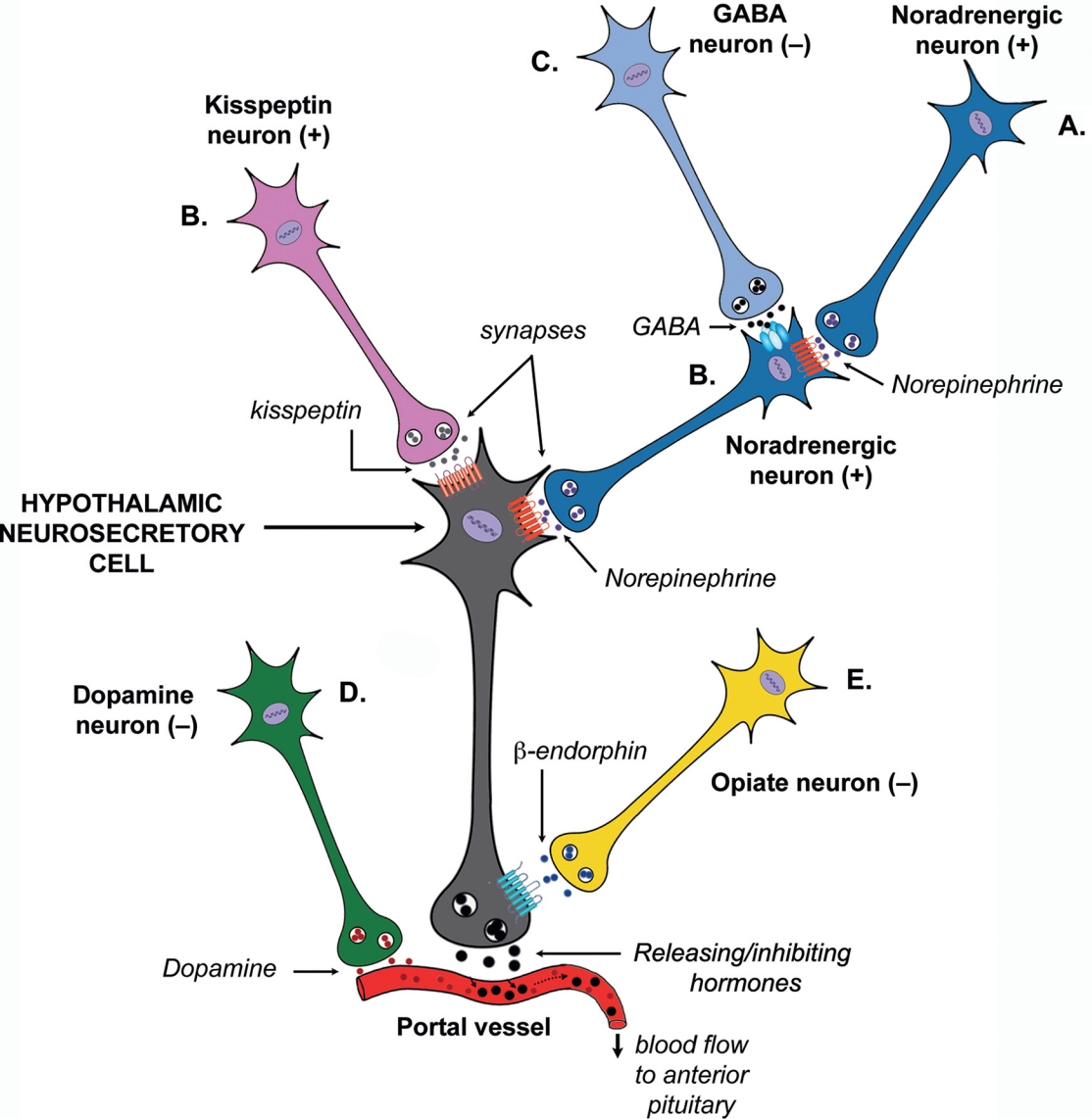
↑ PLASMA CORTISOL



binds to intracellular receptors

TARGET CELLS for cortisol
Respond to increased cortisol



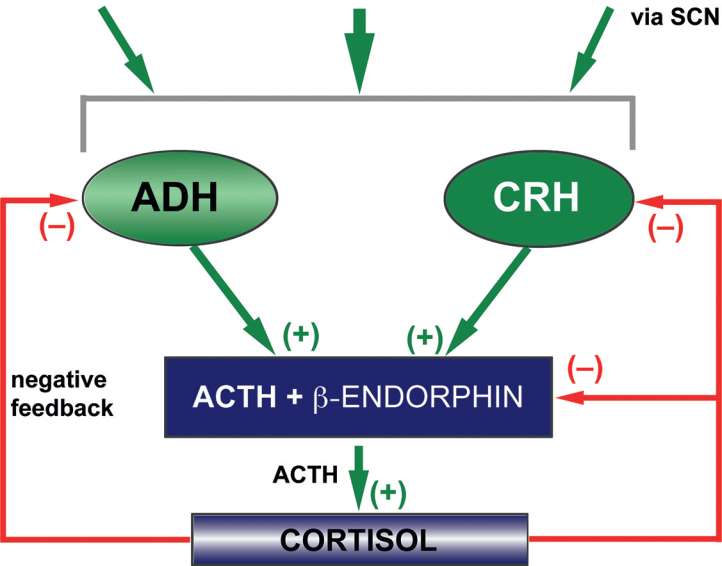


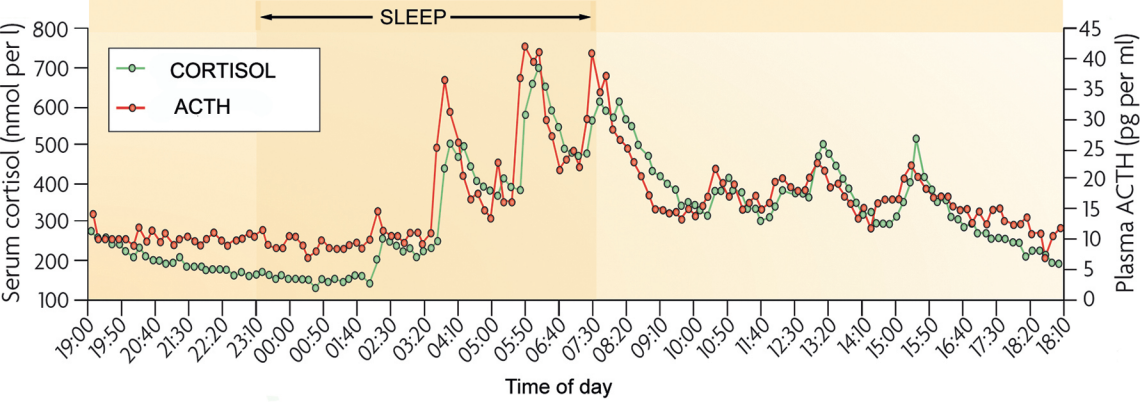
REGULATION

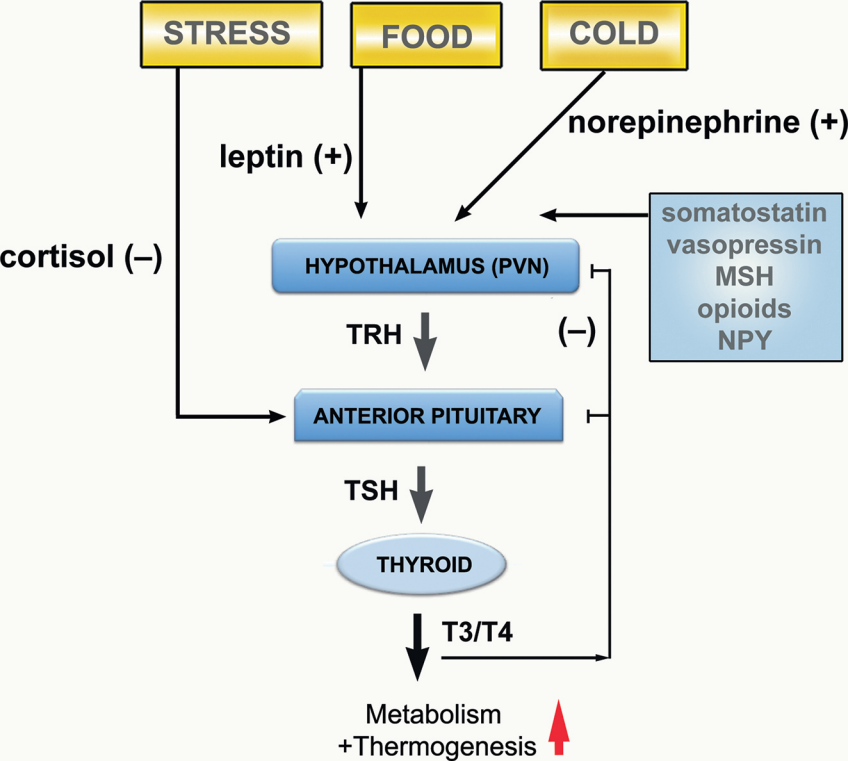
OPIOIDS (-)
ENDOCANNABINOIDS (-)
GHRELIN (+)
INTERLEUKINS (+)

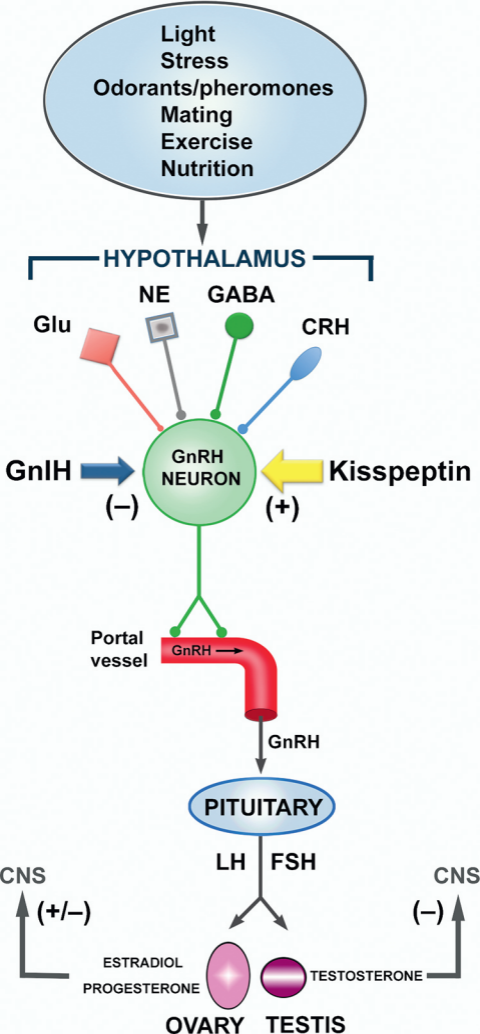
STRESS

CIRCADIAN
via SCN



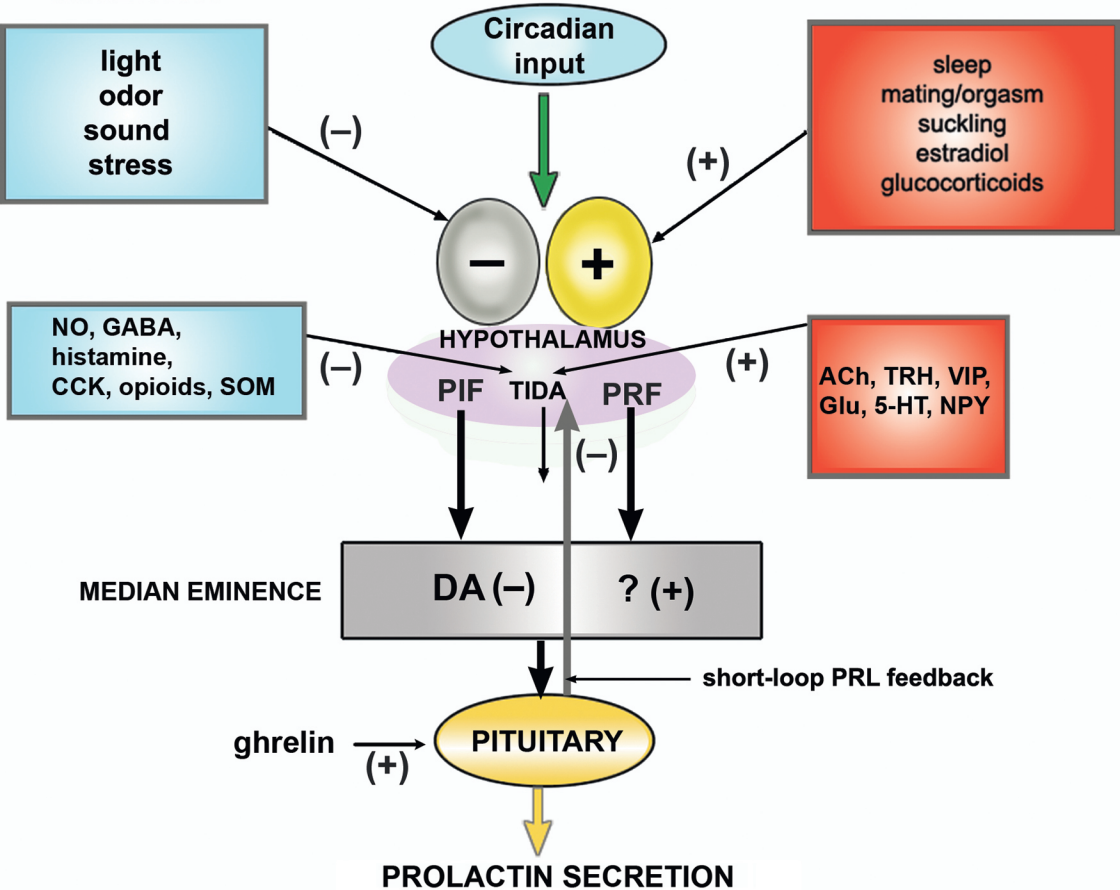






INHIBITION

STIMULATION



NEURAL CONTROL

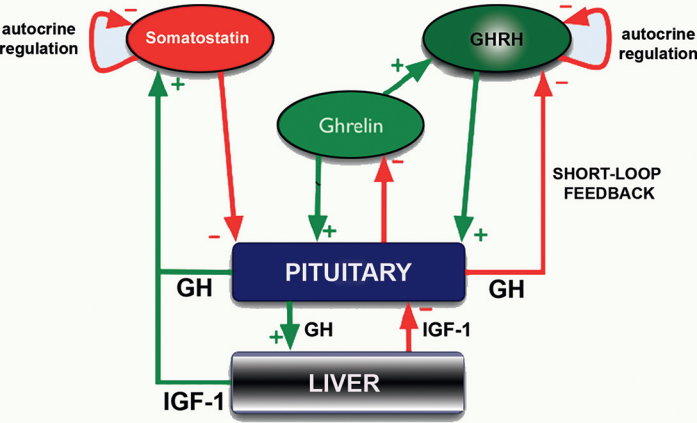
muscarinic ACh
alpha adrenergic
opioids
nitric oxide
glutamate
GABA

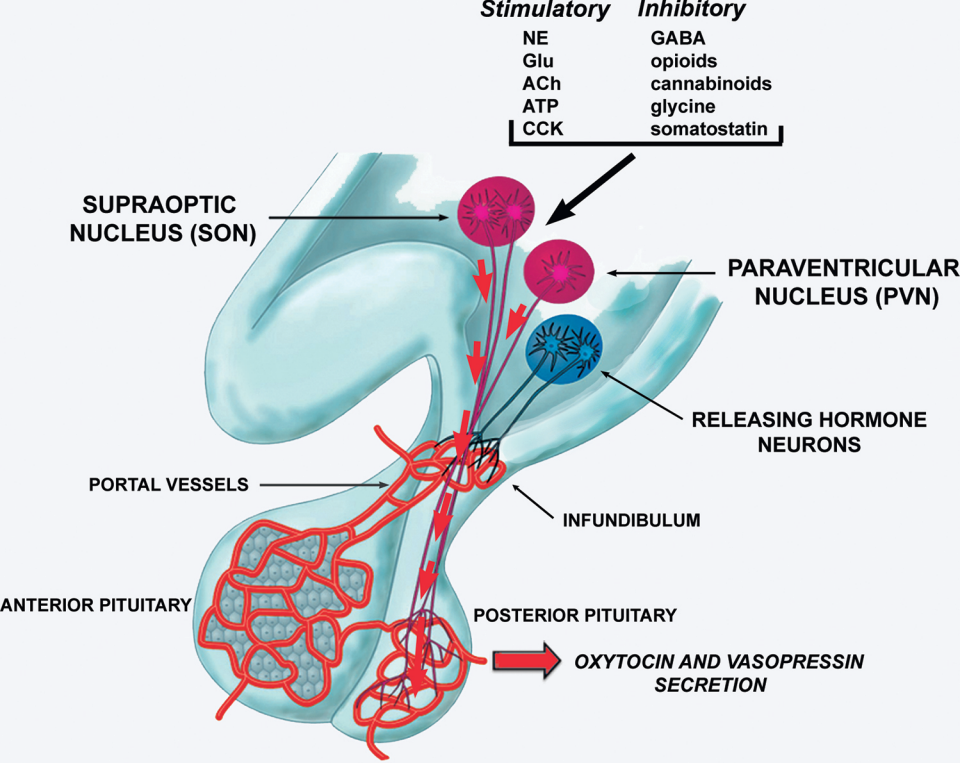
(+)

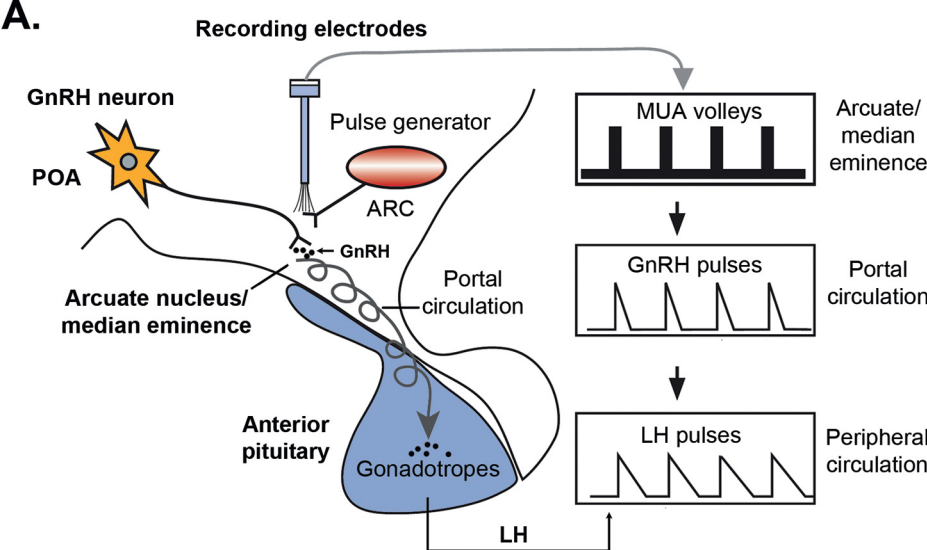
beta adrenergic
stress
obesity

(-)

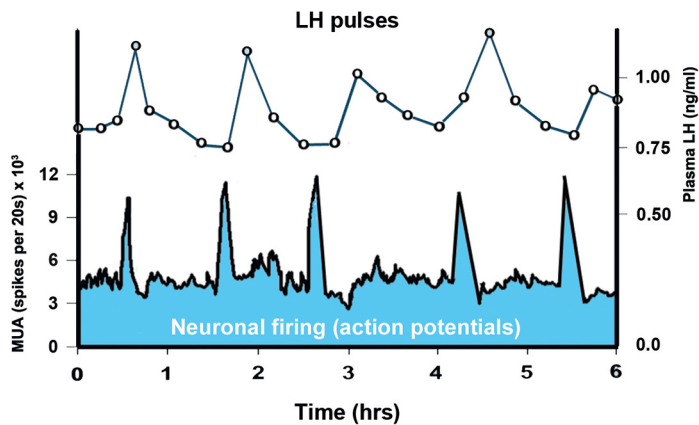
HYPOTHALAMUS

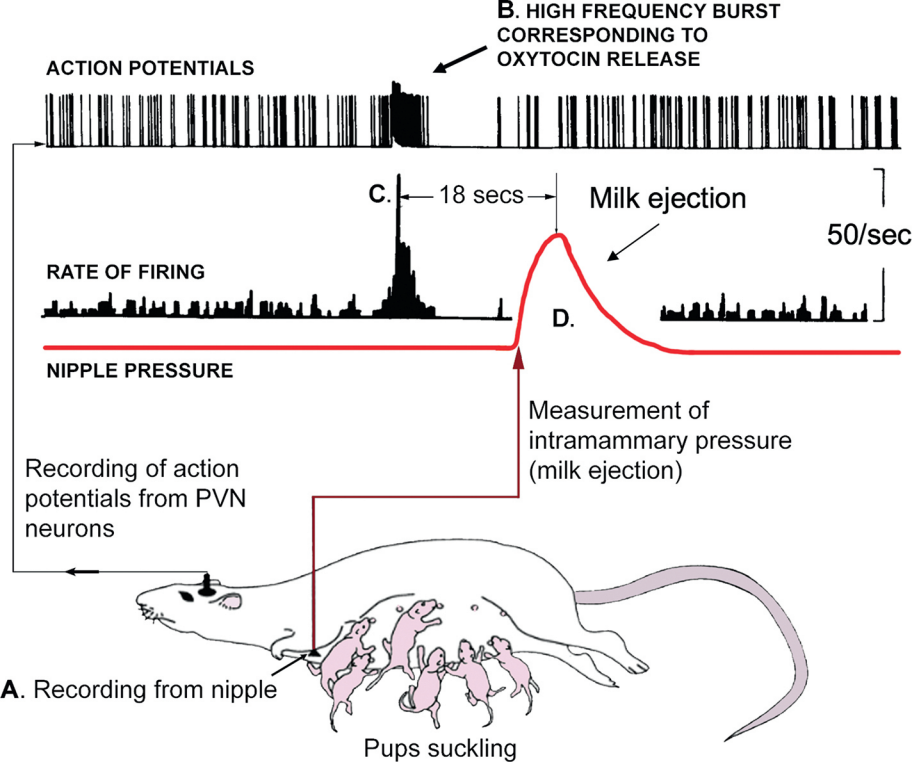






B.





Astrocyte



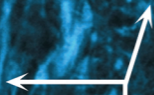
Astrocyte



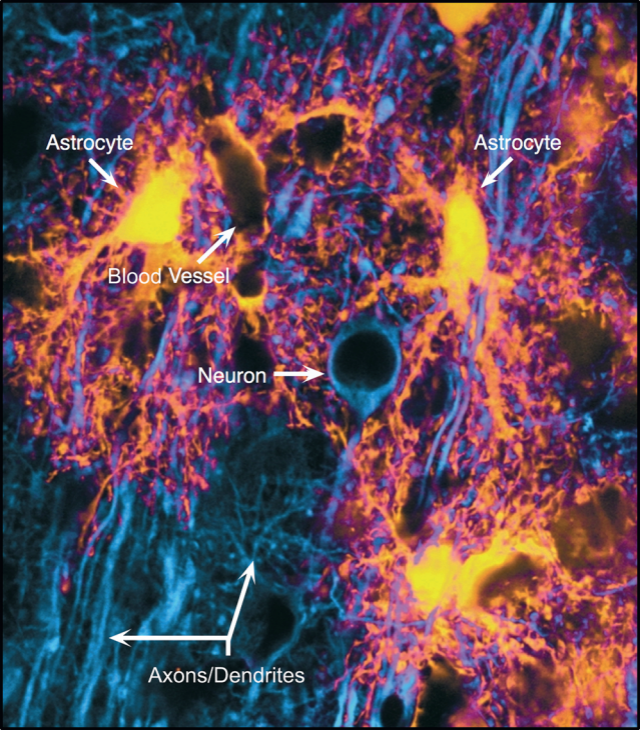
Blood Vessel

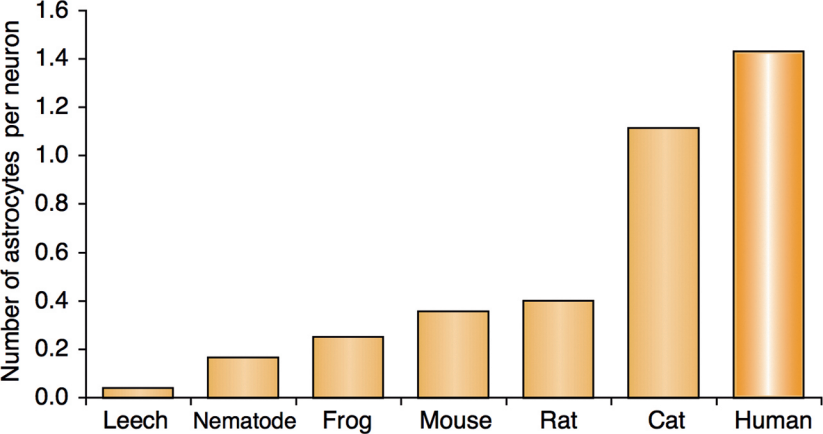


Neuron



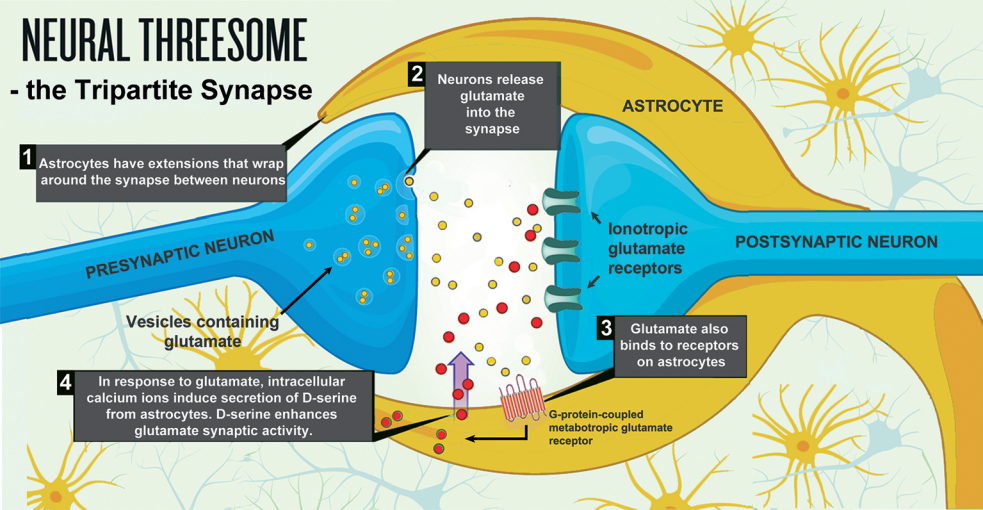
Axons/Dendrites





NEURAL THREESOME

- the Tripartite Synapse



1 Astrocytes have extensions that wrap around the synapse between neurons

2 Neurons release glutamate into the synapse

3 Glutamate also binds to receptors on astrocytes

4 In response to glutamate, intracellular calcium ions induce secretion of D-serine from astrocytes. D-serine enhances glutamate synaptic activity.

