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9.01 Introduction to Neuroscience
Fall 2007

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Chemical Control of the Brain

(1) Point-to-point systems

(2) Hormones

Secretory hypothalamus:

Magnocellular neurosecretory pathway:

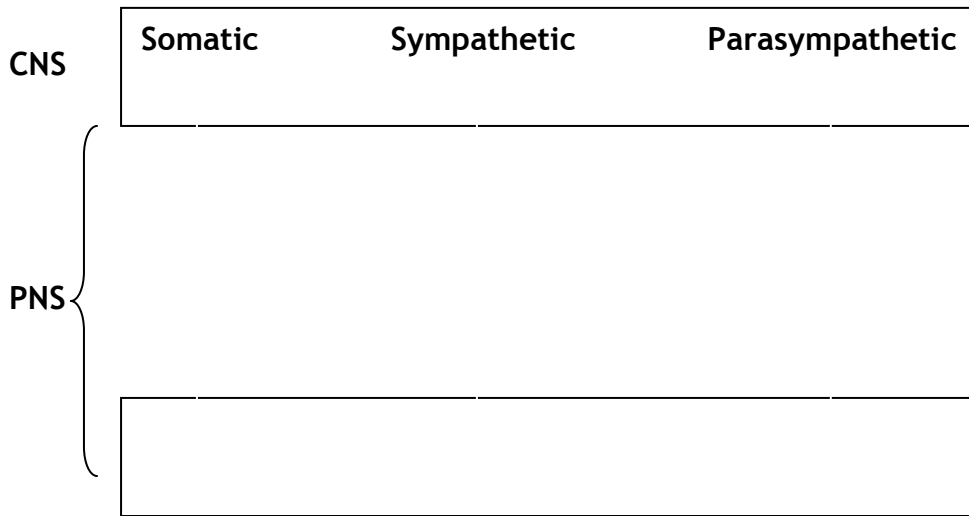
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Parvocellular neurosecretory pathway:

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(3) Autonomic Nervous System

	Sympathetic	Parasympathetic
General effect		
Point of origin		
Ganglion location		
NT		



(4) Diffuse Modulatory Systems

NT	Pathway	Function	Disorder	Treatment	Drugs
NE	Locus coeruleus → all over brain	Wakefulness	Depression	MAOI, tricyclic antidepressants	
DA	Ventral tegmental area → nucleus accumbens	Motivation	Schizophrenia	Haloperidol, chlorpromazine	Amphetamine, heroin, nicotine
	Substantia nigra → striatum	Movement	Parkinson's	L-dopa	
5-HT	Raphe nuclei → all over brain	Mood, pain, wakefulness	Depression	MAOI, SSRI, tricyclics	LSD
ACh	Basal nucleus of Meynert → cortex	Learning, memory	Alzheimer's		
	Medial septal nuclei → hippocampus				
	Pons/tegmentum → thalamus	Modulates sensory stimuli			

Eating and Motivation

Anorectic peptides

Leptin

α MSH (arcuate nucleus)

CART (arcuate nucleus)

Satiety signals

Ghrelin

CCK

Insulin

Orexigenic peptides

NPY (arcuate nucleus)

AgRP (arcuate nucleus)

MCH (lateral hypothalamic area)

Orexin (lateral hypothalamic area)

Experiments to know: ob/ob knockout mice, parabiotic mice, electrical self-stimulation