Control and Co-ordination

a nerve net without a brain, then a brain with sixty regions, then a second, slower system running on hormones

From diffuse net to centralized brain

- sponges show division of labour among cells but no true nervous system
- Hydra : the first true nervous system, a nerve net with no polarity, impulse spreads any direction
- Planaria : first animal with a true CNS, a cerebral ganglion plus ventral cords
- cords joined ladder-fashion by transverse commissures, the ladder-type system

Nerve vs tract, myelination

- an axon bundle OUTSIDE the CNS is a nerve , the same INSIDE is a tract
- medullated nerves: medullary sheath plus neurilemma. non-medullated: neurilemma only
- medullated conduction is ~50x faster than non-medullated
- nerve wrapping, inner to outer: endoneurium (per fibre), perineurium (per bundle), epineurium (whole nerve)

Neuron, structure

- structural and functional unit of the nervous system: cyton, dendron, axon
- cyton: nucleus, Nissl's granules (riboprotein, make transmitter enzymes), neurofibrils (impulse transmission)
- dendrons: many branched processes, carry signals TOWARD the cyton
- axon: single, unbranched, carries signals AWAY from the cyton, arising at the axon hillock
- axon ends in telodendrons and holds no Nissl's granules

the whole story of nervous evolution is one trend: net with no direction, to cords with a ladder, to a brain with named regions

Neuroglia, by location

Cell type	Location	Function
Oligodendrocytes	CNS	form the myelin sheath (white matter)
Microglia	CNS	brain macrophages, from monocytes, clear debris
Astrocytes	CNS	star shaped, most abundant, maintain blood-brain barrier
Ependymal cells	CNS	line ventricles/central canal, make and circulate CSF
Schwann cells	PNS	form the myelin sheath of PNS nerves
Satellite cells	PNS	support neuron cell bodies

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