

for a primary research article related to study of the cytoskeleton in a cell type of your choosing

- 1) The cell type you chose,
- 2) The name of the primary research publication you found interesting,
- 3) The research question being asked in the publication,
- 4) The cellular model that was used to try to answer the research question, and
- 5) How many review articles resulted from a search of this specific topic? Be sure to include citations.

- 1- Myelin sheath is an insulating layer that forms around nerves, allowing electrical signal to transmit quickly along the axon (saltatory conduction). In the central nervous system (CNS), the myelin is formed by oligodendroglia cells and in the peripheral nervous system (PNS) by Schwann cells.
  - Oligodendrocytes originate from oligodendrocyte progenitor cells (OPCs) after distinct developmental stages. Then they extend to provide insulation to many axons.
  - Schwann cells, have diverse functions, including clustering of ion channels at the nodes of Ranvier, promotion of neuronal survival, and regulation of axonal diameter and typically myelinate only a single axon.
- 2- The actin cytoskeleton in myelinating cells
- 3- In myelinating cells, the cytoskeleton acts as a scaffold to mediate cell-to-cell interactions and exhibits specific activity patterns. The paper describes cytoskeletal molecules which regulate these patterns during cell differentiation and myelination.
- 4- In-vitro experiments and various animal models (rats, mice, knockout mice) have been used for research, to identify:
  - Actin polymerizing proteins (WAVE1, WAVE2), and signal transduction molecular switches, Rho GTPases, which regulate cell proliferation and myelination.
  - Major actin depolymerizing molecules: *cofilin*, *gelsolin*
  - PAK molecules which regulate oligodendrocyte development.
  - In the PNS, *in vitro* inhibition of the Rho/ROCK pathway in Schwann cells lead to shorter and sometimes thicker myelin internodes, while *in vivo* deletion of N-SWAP in the same cells has similar effect in damaged sciatic fiber.
  - Experiments with various animal models (Trembler J mouse, Shiverer mouse, hereditary neuropathy with liability to pressure palsy (HNPP) mouse) show that diseases could cause cytoskeletal changes in CNS and PNS and changes in cytoskeletal regulators can lead to disease states.

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