**A vitamin supplement for remyelination**

De la Fuente et al. reveal how the vitamin D receptor (VDR) promotes the differentiation of oligodendrocyte progenitor cells (OPCs), thereby boosting myelin sheath regeneration.

When central nervous system axons lose their insulating myelin sheath—due, for example, to demyelinating diseases such as multiple sclerosis (MS)—OPCs migrate toward the damage and differentiate into mature, myelin-producing oligodendrocytes. The nuclear receptor retinoid X receptor γ (RXR-γ) promotes OPC differentiation and remyelination, but nuclear receptors generally function as heterodimers, so de la Fuente et al. set out to identify RXR-γ’s binding partners.

**Splicing limits the spread of Crumbs**

Vichas et al. reveal that an RNA helicase controls epithelial cell polarity by regulating alternative splicing of the apical membrane protein Crumbs.

In a genetic screen, Vichas et al. found that mutations in a gene called obelus (obe) perturbed epithelial cell polarity and intercellular junctions in early Drosophila embryos. Obe mutant cells displayed an expanded apical membrane domain, and their intercellular adherens junctions clustered into single large aggregates instead of becoming evenly distributed across cell–cell interfaces. In addition, centrosomes were aberrantly close proximity to the clustered junctions.

**Ephrin-A3 typecasts muscle fibers**

Stark et al. describe how an ephrin ligand repels fast-firing motor axons so that slow muscle fibers can maintain their identity.

Individual skeletal muscles are composed of a characteristic ratio of fast and slow myofibers that express different myosin isoforms and are innervated by fast- or slow-firing motor neurons, respectively. Fiber type is specified cell autonomously during development but is maintained in adult tissue by the fiber’s connection to the correct type of motor neuron. How myofibers and motor neurons get appropriately matched up with each other remains unclear.

Stark et al. found that the repulsive guidance cue ephrin-A3 was specifically expressed on slow muscle fibers. Mice lacking ephrin-A3 were born with the same number of slow myofibers as wild-type animals, but, over time, many of these fibers converted to fast myofibers innervated by fast motor axons. On the other hand, misexpressing ephrin-A3 in fast myofibers promoted their conversion to the slow type after their neuronal connections were removed and then allowed to reform.

Ephrin-A3 may therefore help slow myofibers maintain their identity by preventing fast motor neurons from innervating them incorrectly. Accordingly, ephrin-A3’s receptor, EphA8, was present near the synaptic terminals of fast motor axons. Surprisingly, however, EphA8 wasn’t expressed in the motor neurons themselves but in the terminal Schwann cells that regulate neuromuscular junctions. The researchers now want to investigate how EphA8-expressing Schwann cells specifically recognize fast motor neurons and how ephrin-A3 expression is influenced by factors, such as exercise or aging, that can alter the ratio of slow and fast muscle fibers.

Stark, D.A., et al. 2015. J. Cell Biol. http://dx.doi.org/10.1083/jcb.201502036