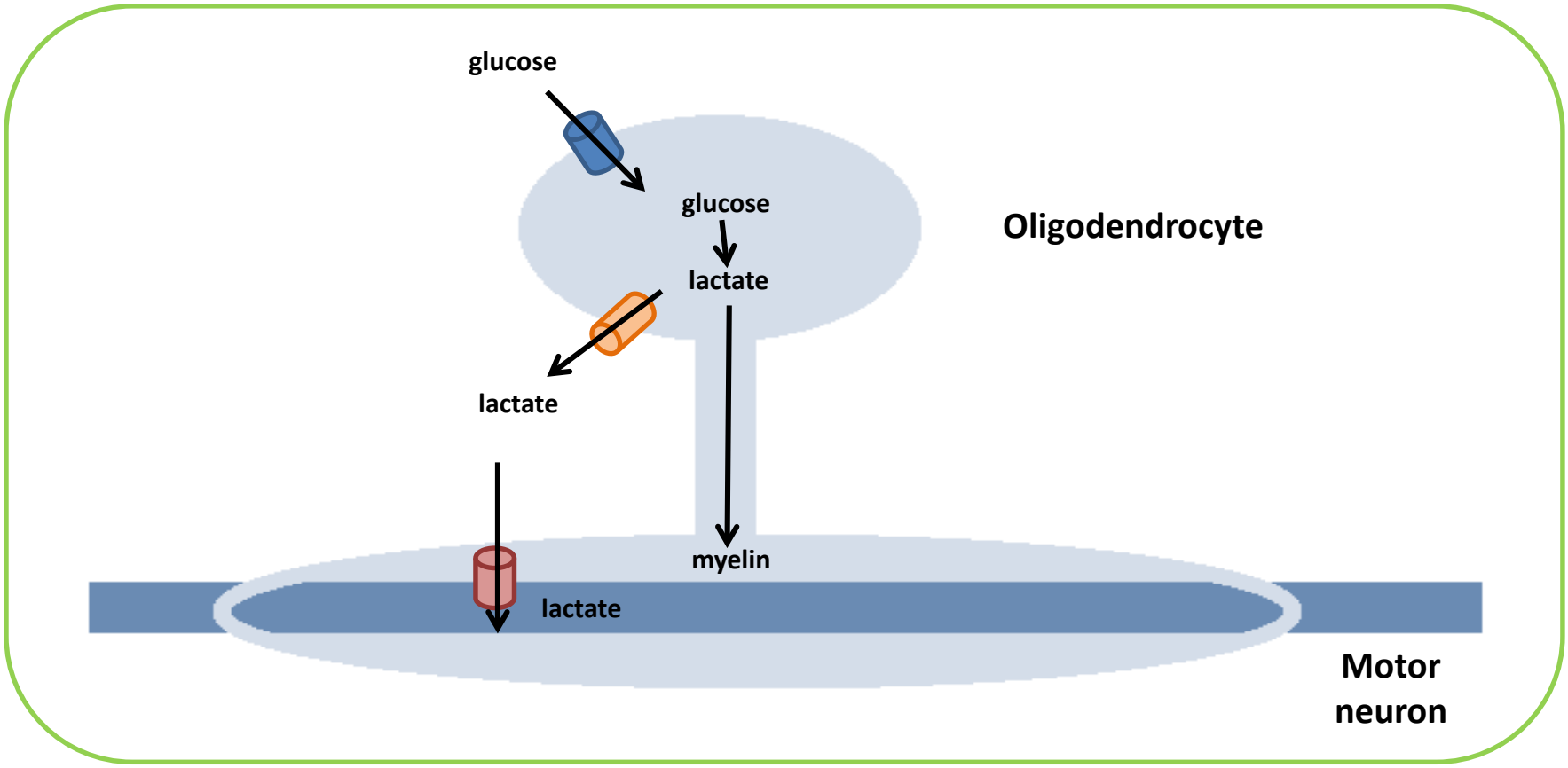
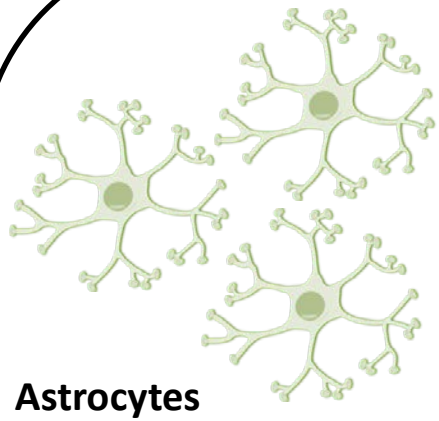
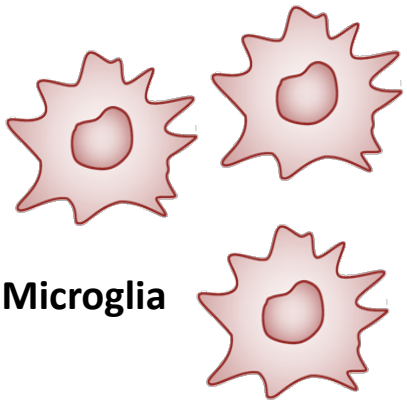


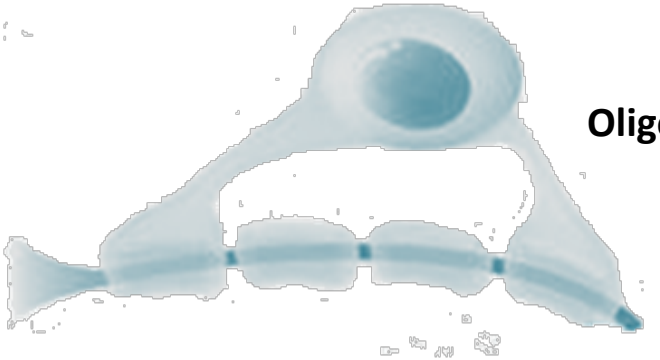
In the CNS, oligodendrocytes myelinate motor neurons and provide nutrients (lactate) for neurons as an important energy source



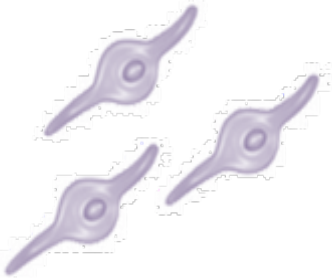
Astrocytes



Microglia

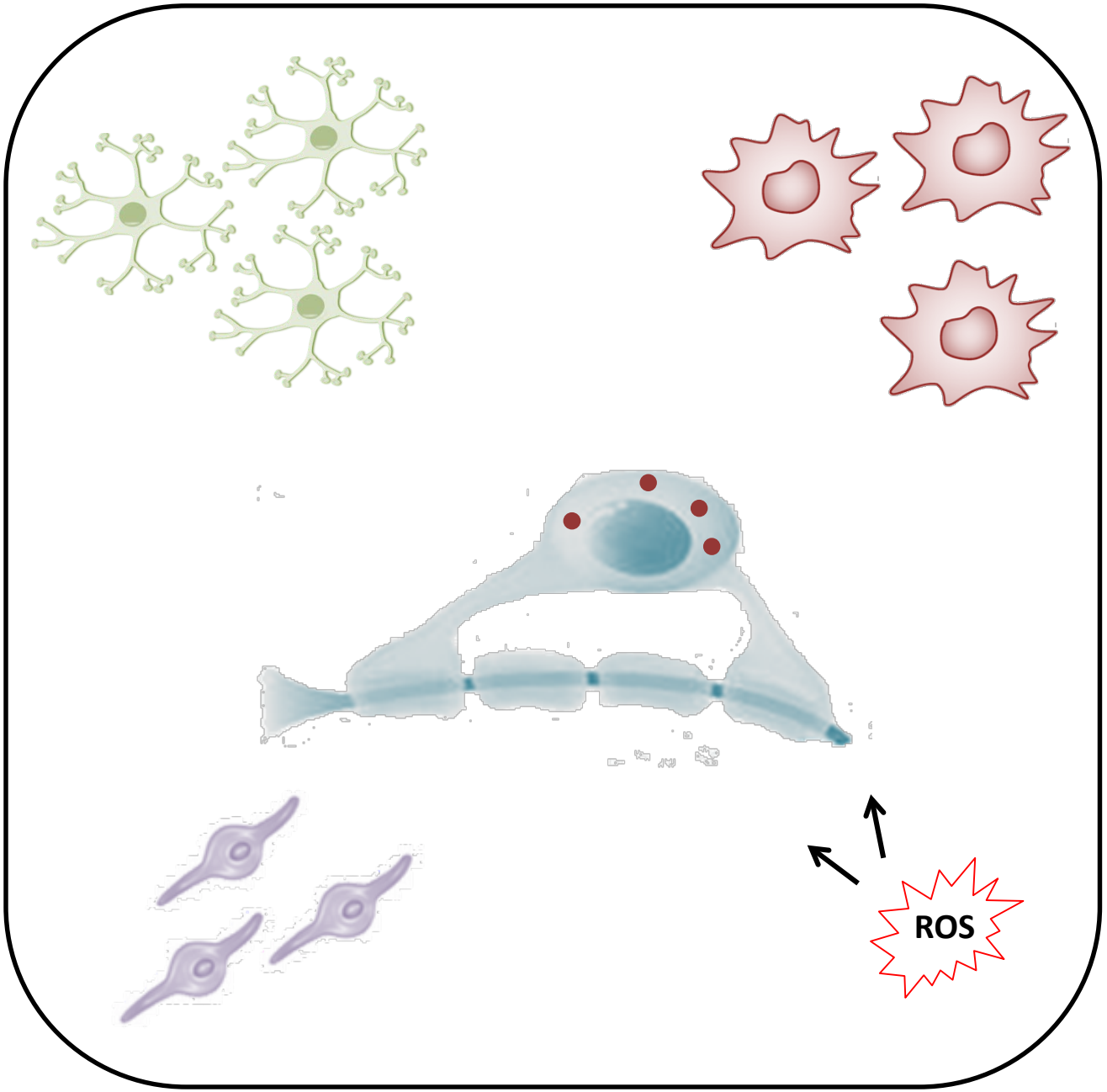


Oligodendrocyte

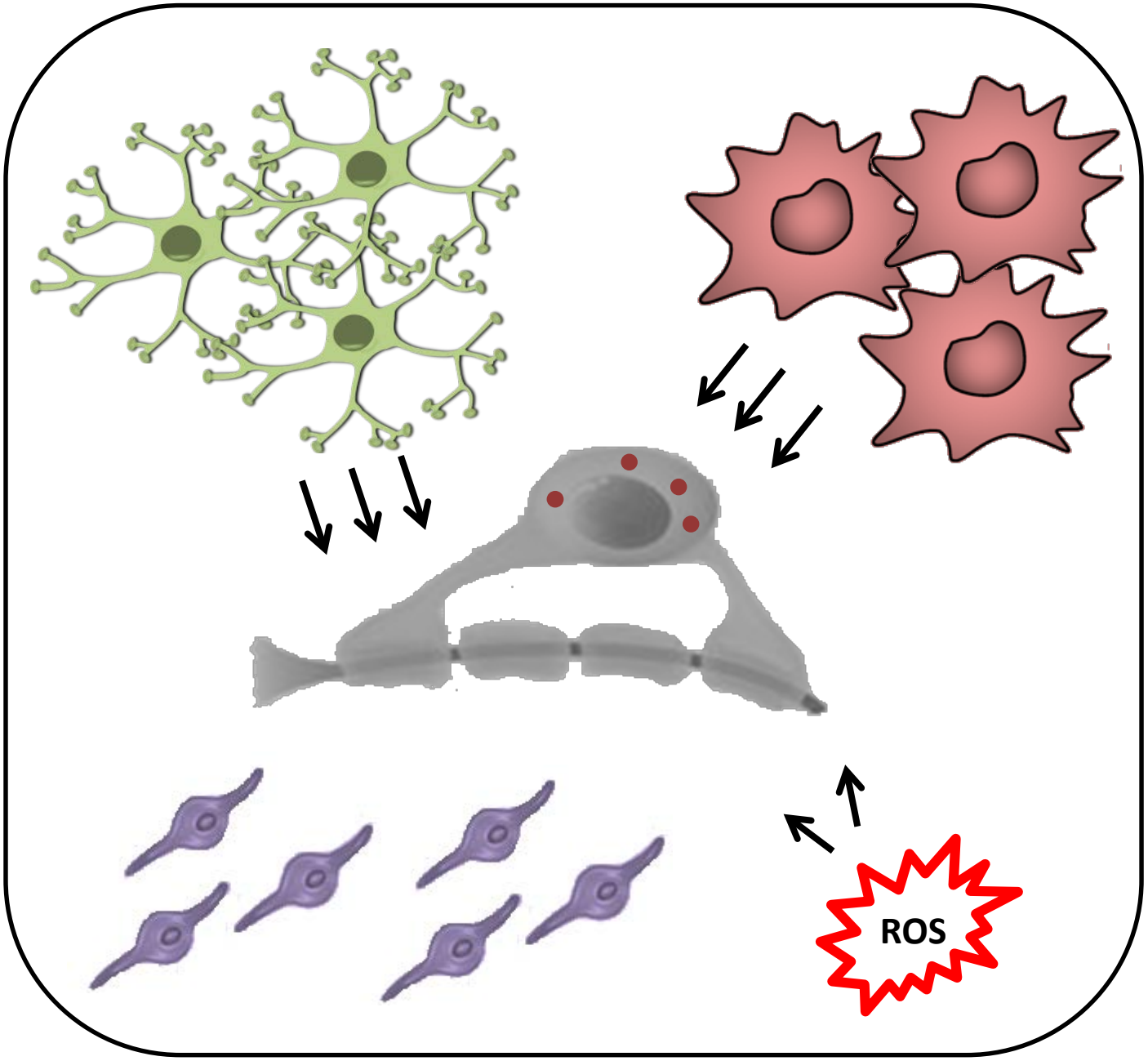


Oligodendroglial precursor cells

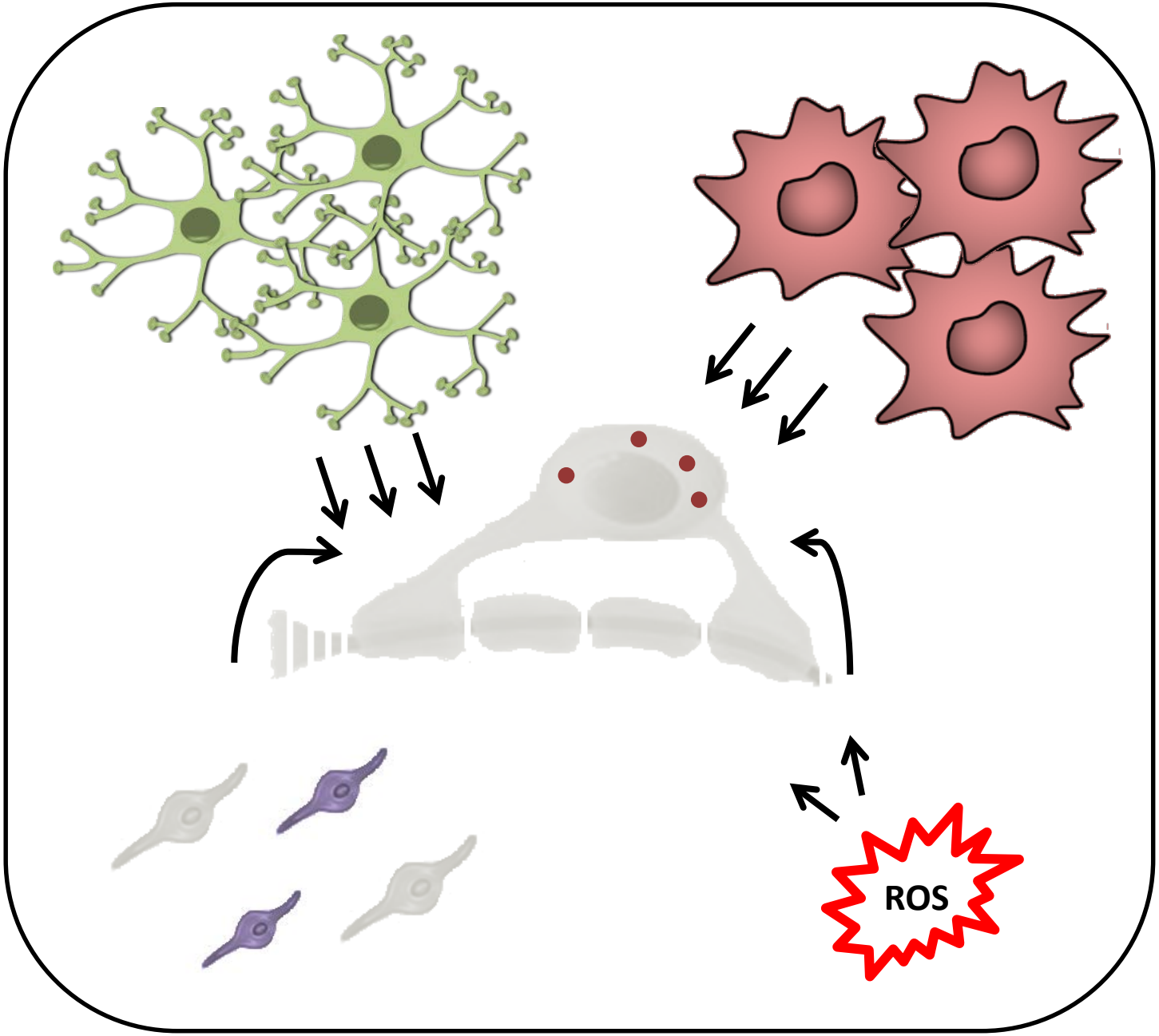
Oligodendrocytes are cells in the central nervous system responsible for (1) ensheathing neurons with myelin and insulating the neurons; and (2) providing neurons with nutrients (such as glutamate) for energy production



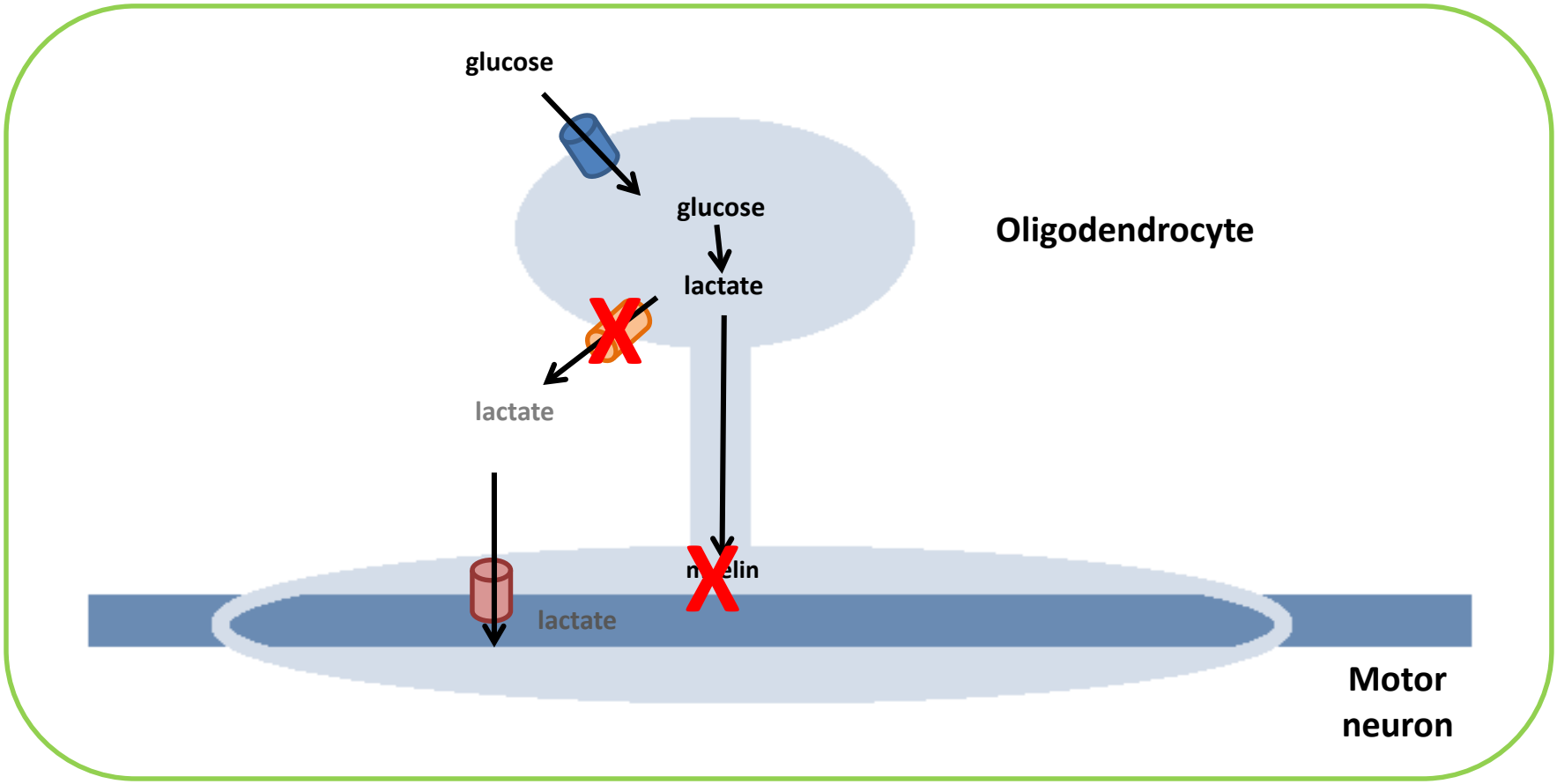
Gene mutations that cause ALS are also present in oligodendrocytes (red dots), and make the cells vulnerable to stress, such as reactive oxygen species (ROS) causing loss of function.



Stressed oligodendrocyte start dying which is further enhanced by cells surrounding them, including activated microglia and astrocytes. As a consequence, precursors of oligodendrocytes start to proliferate at a fast pace to compensate for the loss of oligodendrocytes.



In addition, damaged oligodendrocytes no longer support neurons leading to neural death. This further stresses and kills oligodendrocytes hereby creating a viscous cycle of oligodendrocyte - neuron death.



Ultimately, loss of oligodendrocytes cause neuronal dysfunction (as they are not myelinated properly) and death (as they do no longer receive nutrients), causing muscle paralysis.