Novel functions for integrins in neural development

Talk by Charles ffrench-Constant (MRC Centre for Regenerative Medicine, Edinburgh) on 23/02/10 Hosted by Professor Sue Wonnacott

Multiple sclerosis is the most common progressive degenerative disease in young adults. It is caused by inflammation associated with demyelination of axons in the central nervous system. Normally, demyelination is countered by production of new oligodendrocytes from precursors in the neural stem cell niche. NSCs require a transient increase in β1 integrin to enable differentiation, and this was manipulated in a mouse model where β1 integrin was knocked out selectively in the NSC niche. This caused the basal NSC processes to detach from the surrounding lamina and resulted in a total loss of differentiation. A more accurate model used antibodies to create a transient two hour down regulation in β1 integrin. This caused detachment of NSC apical processes from the ventricle wall of the niche, and led to cell differentiation. However, cell cleavage occurred only in the vertical plane; both cleavage planes are required to produce an asymmetric division which will lead to neuronal and glial cell differentiation. This work has identified β1 integrin as a molecule which is required for formation of both neurons and glia from precursors. Interuptions in β1-integrin function could be responsible for the onset of multiple sclerosis.

Words: 192