Vascular endothelial growth factor (VEGF) is a potent stimulator of angiogenesis. It is released from ischemic cells and detected on local endothelial cells through VEGF receptors on the endothelial cell surface. Activation of VEGF receptors triggers a host of cellular changes, including proliferation, morphological change and migration. These co-ordinated responses lead to the outgrowth on new capillaries and ultimately to increased perfusion of the ischemic area.

VEGF receptors are members of the receptor tyrosine kinase (RTK) family. In the canonical model of RTK function, binding of growth factor at the cell surface triggers activation of the receptor, but also stimulates removal of the receptor from the cell surface by endocytosis. Subsequent intracellular sorting leads to recycling of the internalised receptor to the cell surface, or delivery to the lysosome and degradation. This regulated receptor trafficking plays an important part in the response to growth factor. VEGF receptor is unusual in that it constantly cycles between the plasma membrane and the endosomal compartment in the absence of growth factor. Intracellular sorting of the internalised receptor also shows differences to the canonical model, and impacts on signalling from the receptor.

The atypical trafficking of the VEGF receptor suggests adaptation to serve the angiogenic process. Here, we discuss ways in which the distinct features of VEGF receptor trafficking may contribute to the processing of angiogenic signals.