



The angiogenic process itself is by sprouting and intussusception both during intrauterine life and in adulthood. Regions devoid of blood supply are vascularized by sprouting of endothelial cells. Intussusception involves splitting, expansion of transvascular tissue pillars, and invasion of interstitial components into places of existing vascularity.

12.2 ANGIOGENESIS BY SPROUTING

In regions of less oxygen, the parenchymal cells respond by secreting proangiogenic growth factor-VEGF-A (vascular endothelial growth factor). This stimulus triggers the development of new blood vessels.

A capillary sprout develops from the tip of the endothelial cell toward VEGF-A in the extracellular matrix. The sprout elongates by the capillary proliferation of stalk cells. When one or more tip cells join at the source of the growth factor, it forms a lumen, paving the way for blood flow (Gerhardt, 2008; Ruhrberg et al., 2002; Carmeliet et al., 2009; Horowitz and Simons, 2008).

Once the oxygen capacity of the region is restored, the VEGF-A levels reduce and capillary development stabilizes. So the vascularity depends on the concentration of VEGF-A.

12.3 ANGIOGENESIS BY INTUSSUSCEPTION

As the other name, splitting Angiogenesis suggests that the cells of the endothelium protrude into the lumen of the capillary, join together, forms connectivity, and splits into two. Migration and proliferation of endothelial cells are not required. This process is continuous through one's lifetime, more during embryo development, happens where vascularity already exists. The presence of transcapillary tissue pillars proves the existence of splitting angiogenesis, which can be proved by SEM and serial micrograph reconstruction. It occurs in vascularity next to the epithelial surfaces such as the choroid of the eye, vascularity abetting glands, kidneys, skeletal muscle, ovary, and the brain. The signaling system is not understood completely. But VEGF-A and the mechanical stress associated to high blood flow stimulates intussusception (Kurz et al., 2003; Djonov et al., 2002).