

Angiogenesis
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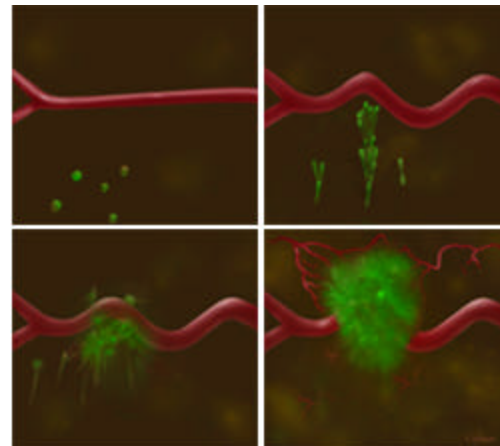
Angiogenesis:

Angiogenesis is the process in which the body creates new or regenerates old blood cells. This occurs naturally in the body as maintenance or as a potentially harmful effect of some diseases. Angiogenesis occurs when tissue releases angiogenic growth factor (proteins) that diffuses into the nearby tissues. The angiogenic growth factors bind to specific receptors located on the endothelial cells of nearby preexisting blood vessels. Once growth factors bind to their receptors, the endothelial cells become activated. Signals are sent from the cell's surface to the nucleus. The endothelial cell's machinery begins to produce new molecules including enzymes. Enzymes dissolve tiny holes in the sheath-like covering (basement membrane) surrounding all existing blood vessels. The endothelial cells begin to divide, and they migrate out through the dissolved holes of the existing vessel towards the diseased tissue. Specialized molecules called adhesion molecules, or integrins serve as grappling hooks to help pull the sprouting new blood vessel sprout forward. Additional enzymes (matrix metalloproteinases, or MMP) are produced to dissolve the tissue in front of the sprouting vessel tip in order to accommodate it. As the vessel extends, the tissue is remolded around the vessel. Sprouting endothelial cells roll up to form a blood vessel tube. Individual blood vessel tubes connect to form blood vessel loops that can circulate blood. Finally, newly formed blood vessel tubes are stabilized by specialized muscle cells (smooth muscle cells, pericytes) that

provide structural support. Blood flow can now begin.

Angiogenesis and Cancer:

Angiogenesis therapy is being used to treat several diseases, but none have as much attention as the success they are having with cancer research. Cancerous tumors support themselves and their growth through growing new blood cells to help expand. Without additional blood vessels a tumor couldn't exceed the size of two millimeters. Use of supplement growth inhibitors prevent the tumor from creating new blood vessels and being able to nourished new growth.



Angiogenesis has no side effects only slight complications w/ slowing down the healing process and in pregnant women. Hopefully in the future this harmless procedure will replace more harmful treatments like chemotherapy. As promising as these drugs may seem they have not been testing in humans yet, only in mice and rabbits. Researchers are hoping that this method of fighting cancer will be available for use in the next three years.