

Angiogenesis: Basic and clinical aspects *

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SUMMARY

The cardiovascular system is the first functional organ system to develop in the vertebrate embryo. A widely accepted view is that blood vessels arise through two mechanisms during development, vasculogenesis and angiogenesis. New vessels in the adult arise mainly through angiogenesis, although vasculogenesis also may occur. The existence of a postnatal vasculogenesis is also supported by the evidence that both endothelial cells and endothelial precursor cells co-exist in the circulation.

Angiogenesis is a biological process by which new capillaries are formed and it occurs in many physiological and pathological conditions. It is controlled by the net balance between molecules that have positive and negative regulatory activity and this concept had led to the notion of the “angiogenic switch”, depending on an increased production of one or more of the positive regulators of angiogenesis.

Considerable benefit can be derived in the clinical setting from manipulating angiogenesis, either positively or negatively. There is a variety of important clinical situations in which it would be desirable to promote angiogenic processes, such as situations in which it would be desirable to promote angiogenic processes, such as for the induction of collateral vascularization in an ischemic heart or limb. Conversely, there are pathologic conditions in which preventing angiogenic processes could be useful in the treatment of a growing tumor or a chronic inflammatory process.