

**Cover illustration**

Developing mouse retinal blood vessels grow towards areas of low oxygen concentration. (Courtesy of M. Fruttiger, Kings College London/*Development*.)

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ANGIOGENESIS

Blood vessels are a complex network of tubes that carry oxygenated blood and nutrients throughout our bodies. If laid end to end, the vessels from a typical adult would circle the Earth twice. It comes as no surprise, then, that the process of growing new blood vessels — angiogenesis — is a fundamental biological mechanism that results in serious disease when it goes awry. Indeed, more than US\$4 billion has been invested in the research and development of medicines to promote or reduce angiogenesis, making it one of the most heavily funded areas of medical research today.

Angiogenesis is an essential process during development — growth of a vascular system is one of the earliest events in organogenesis. Nonetheless it also occurs in adulthood, during wound healing and restoration of blood flow to injured tissues.

Angiogenesis is regulated by a very sensitive interplay of growth factors and inhibitors, and their imbalance can lead to disease. In cancer, diabetic eye disease and rheumatoid arthritis, excessive angiogenesis feeds diseased tissue and destroys normal tissue. Conversely, insufficient angiogenesis underlies conditions such as coronary heart disease, stroke and delayed wound healing, where inadequate blood-vessel growth leads to poor circulation and tissue death.

This Insight describes many of these physiological and pathophysiological processes of angiogenesis and lymphangiogenesis (the development of new lymph vessels) from development through to the immune response and nervous system function. In addition, it introduces some exciting therapeutic applications that have recently been made available. We are indebted to all our authors.

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Natalie DeWitt, Senior Editor

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