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Commentary

Role of Angiogenesis in Tumor Progression

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DESCRIPTION

The formation of new blood vessels to facilitate tissue growth is known as angiogenesis. It is required in the development of a body and good in the context of tissue healing, but it is harmful in the context of cancer. Angiogenesis is a hallmark of cancer, as it is required for both cancer growth (progression) and dissemination (metastasis). New blood vessels are required to ensure an adequate supply of oxygen and nutrients to the cells before a tumor can develop greater than a few millimeters in size. Because tumors cannot grow in the absence of angiogenesis, angiogenesis medicines are currently employed to treat a variety of cancers.

Angiogenesis is the physiological process by which new blood vessels form from pre-existing vessels created during the vasculogenesis stage. Angiogenesis is the process through which the vasculature continues to expand by sprouting and dividing. Vasculogenesis is the embryonic production of endothelial cells from mesoderm cell progenitors and neo-vascularization. Vasculogenesis forms the initial vessels in the developing embryo, while angiogenesis is responsible for the majority, if not all, blood vessel growth during development and disease.

Angiogenesis is a normal and necessary process in growth and development, as well as wound healing and granulation tissue creation. However, it is also a critical phase in the progression of tumors from benign to malignant, leading to the use of angiogenesis inhibitors in cancer treatment.

ROLE OF ANGIOGENESIS IN CANCER GROWTH

Angiogenesis is important in cancer research because tumors require the development of new blood vessels in order to grow and spread. Angiogenesis is required for tumors to grow to a size greater than 1mm. Cancers accomplish this by secreting chemicals that promote angiogenesis and thus cancer growth. Angiogenesis is commonly assumed to be turned off. When new blood vessels are required for wound repair or menstruation, the process may be reactivated, but only for a short time. Even when angiogenesis is turned on, it is tightly controlled by signals from the surrounding environment.

A shortage of oxygen (hypoxia) in a tumor is thought to accelerate angiogenesis. This happens when a tumor's surface area to volume ratio is too low for diffusion alone to feed the tumor. In reaction to hypoxia, cancer cells transmit messages or signals to neighboring blood vessels, causing the vessels to sprout additional extensions that will nourish the tumor.

Angiogenesis inhibitors

Angiogenesis inhibitors (anti-angiogenesis drugs) are medications that prevent tumors from forming new blood vessels and thereby growing and spreading. These drugs can disrupt the process of angiogenesis at numerous locations. Some of these drugs prevent angiogenesis by attaching directly to Vascular Endothelial Growth Factor (VEGF), preventing it from sending signals that stimulate the process. Other drugs work at various stages of the process. They are referred to as targeted therapies because they precisely target pathways involved in cancer growth.

Cancer treatments

Angiogenesis inhibitors are most successful when used in conjunction with other treatments such as chemotherapy. The explanation for this is easier to comprehend if you look at how angiogenesis inhibitors work. Angiogenesis inhibitors do not kill cancer cells; rather, they block them from multiplying and spreading (metastasizing). As a result, other therapies must be combined with these drugs in order to eradicate a tumor. Addressing angiogenesis can help with treatment by using angiogenesis inhibitors, but it's crucial to remember that angiogenesis can also impair other treatments. For example, the creation of new blood vessels (which differ from normal blood vessels) can impair chemotherapy medications' ability to reach a tumor.

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