The Effect of the Plant Hormone Abscisic Acid on the Sprouting of Blood Vessels in vitro

Chaqour, Julienne

Blood vessels are the principal means of adequate oxygen and nutrient delivery to every organ in the body. However, numerous proliferative diseases, associated with diabetes or chronic inflammation, are characterized by the abnormal and/or excessive growth of blood vessels that adversely interfere with the proper healing of diseased organs. Similarly, the formation of new blood vessels around small tumors enhances their growth and spreading to healthy organs. Current medical treatments are based on the use of synthetic drugs that negatively affect healthy tissues. The objective of this study is to explore the inhibitory effects of abscisic acid (ABA), a natural plant hormone that inhibits germination, on blood vessel growth and sprouting, a process known as angiogenesis. For this purpose, endothelial cells which form the walls of blood vessels, were cultured in vitro. Using a fibrin beads-based sprouting assay, the sprouting of these cells was tested in the absence or presence of increasing concentrations of ABA (1μM, 10μM, and 100μM). Results showed that ABA effectively inhibited the growth and sprouting of vascular tubes from the beads, in a dose dependent manner. ABA blocked the proliferation and spreading of endothelial cells without altering their survival. Further testing of the effects of ABA on the aberrant growth of blood vessels would confirm its therapeutic utility in the treatment of proliferative diseases and potentially cancer.

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