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## 4 - 56 Combination Effects of Curcumin and Radiation on the Angiogenesis of Tumor*

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Tumor angiogenesis is the formation of new blood vessels from the existing vascular bed to provide tumor cells with sufficient oxygen, nutrients, *etc.*, and consequently contributes to tumorigenesis, invasion and metastasis of solid tumor. Hence, Anti-angiogenesis is a desirable strategy for tumor therapy. Chinese herbal medicine (CHM) and their extracts are emerging as the noticeable choice for its multi-level, multi-target and coordinated intervention effects against tumor such as Danshen, Angelica, Chuan xiong, Apigenin, Silibinin, Wogonin[1−2]. Curcumin derived from the spice plant Curcuma longa, a powerful anti-cancer agent, has a strong anti-inflammatory and antioxidant functions. The aim of the current study was to explore the combinated application of curcumin and radiation in inhibition of angiogenesis of tumor. Our findings revealed that after combinated treatment with curcumin and radiation, the proliferation was suppressed ($P < 0.01$), and the apoptotic rate increased from 3.21% to 17.87% in human microvascular endothelial cells. Furthermore, endothelial cell motility was obviously reduced in the cells administrated with curcumin and radiation than in those treated with curcumin or radiation alone. Importantly, our data showed that endothelial growth factor (VEGF) secretion level was notably blocked when cells were treated with curcumin and radiation, which are important for the degradation of extracellular matrix as well as promotion of endothelial cell proliferation, migration and survival. To understand the underlying mechanisms for the reduced VEGF levels, hypoxia-inducible factor 1 (HIF-1), the major transcriptional regulator of hypoxia-induced angiogenesis through transactivation of genes that encode VEGF, was determined. HIF-1 protein level decreased in line with VEGF alteration. In summary, our data demonstrated that the combination effect of curcumin and radiation on retarding tumor angiogenesis is possibly related to the HIF-1/VEGF pathway.

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