Thy-1, a novel marker for angiogenesis upregulated by inflammatory cytokines.

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Abstract

We identified the cell surface glycoprotein Thy-1 on the endothelium of newly formed blood vessels in four models of angiogenesis in adult rats. Anti-Thy-1 staining showed that Thy-1 was upregulated in adventitial blood vessels after balloon injury to the carotid artery. Preabsorption with a rat Thy-1-Ig fusion construct eliminated all immunoreactivity and thus confirmed the specificity of the Thy-1 staining. Thy-1 was also expressed in the endothelium of small blood vessels formed after tumor implantation in the cornea, in periureteral vessels formed after ligation of the renal artery, and in small blood vessels of the uterus formed during pregnancy. In contrast with its expression during adult angiogenesis, Thy-1 was not expressed in the endothelium of blood vessels during embryonic angiogenesis. In vitro, the inflammatory cytokines interleukin-1beta and tumor necrosis factor-alpha upregulated Thy-1 mRNA by 8- and 14-fold, respectively. Vascular endothelial growth factor, basic fibroblast growth factor, transforming growth factor-beta, and platelet-derived growth factor-BB had no effect on Thy-1 mRNA. Thus, Thy-1 appears to be a marker of adult but not embryonic angiogenesis. The upregulation of Thy-1 by cytokines but not growth factors indicates the importance of inflammation in the pathogenesis of adult angiogenesis.