The peroxisome proliferator-activated receptor (PPAR) family consists of three ligand-activated nuclear receptors: PPARalpha, PPARbeta/delta and PPARgamma. These PPARs have important roles in the regulation of glucose and fatty acid metabolism, cell differentiation and immune function, but were also found to be expressed in endothelial cells in the late 1990’s. The early focus of endothelial PPARs was PPARgamma. Activation of PPARgamma was shown to inhibit angiogenesis \textit{in vitro} and in models of retinopathy and cancer, while more recent data points to a critical role in the development of the vasculature in the placenta. Over the last 5 years with increasing availability of selective ligands there has been a far greater interest in PPARbeta/delta. Unlike PPARgamma, activation of PPARbeta/delta induces angiogenesis, \textit{in vitro}, \textit{in vivo} and has been suggested to be a critical component of the angiogenic switch in pancreatic cancer. Moreover PPARbeta/delta is an exercise mimetic and appears to contribute to the angiogenic remodeling of cardiac and skeletal muscle induced by exercise. This evidence and the emerging mechanisms by which PPARs act in endothelial cells will be discussed in more detail.