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Cellular and Molecular Life Sciences

Announcement of the Editor-in-Chief

As previously decided, we publish the names of the authors and the titles of the two most read (by internet) reviews published in Cell. Mol. Life Sci. the previous year (2006).

1) The role of VEGF receptors in angiogenesis; complex partnerships

S. Cébe-Suarez, A. Zehnder-Fjällman and K. Ballmer-Hofer*

Paul Scherrer Institut, Biomolecular Research, Molecular Cell Biology, 5232 Villigen (Switzerland)
e-mail: kurt.ballmer@psi.ch

Abstract. Vascular endothelial growth factors (VEGFs) regulate blood and lymphatic vessel development and homeostasis but also have profound effects on neural cells. VEGFs are predominantly produced by endothelial, hematopoietic and stromal cells in response to hypoxia and upon stimulation with growth factors such as transforming growth factors, interleukins or platelet-derived growth factor. VEGFs bind to three variants of type III receptor tyrosine kinases, VEGF receptor 1, 2 and 3. Each VEGF isoform binds to a particular subset of these receptors giving rise to the formation of receptor homo- and heterodimers that activate discrete signaling pathways. Signal specificity of VEGF receptors is further modulated upon recruitment of coreceptors, such as neuropilins, heparan sulfate, integrins or cadherins. Here we summarize the knowledge accumulated since the discovery of these proteins more than 20 years ago with the emphasis on the signaling pathways activated by VEGF receptors in endothelial cells during cell migration, growth and differentiation.

March 2006, Volume 63, Number 5, pp. 601 – 615

2) Metastasis: cell-autonomous mechanisms versus contributions by the tumor microenvironment

L. Kopfstein and G. Christofori*

Institute of Biochemistry and Genetics, Department of Clinical-Biological Sciences, University of Basel, Mattenstrasse 28, 4058 Basel (Switzerland), Fax: +41 61 267 3566, e-mail: gerhard.christofori@unibas.ch

Abstract. The fatality of cancer predominantly results from the dissemination of primary tumor cells to distant sites and the subsequent formation of metastases. During tumor progression, some of the primary tumor cells as well as the tumor microenvironment undergo characteristic molecular changes, which are essential for the metastatic dissemination of tumor cells. In this review, we will discuss recent insights into pro-metastatic events occurring in tumor cells themselves and in the tumor stroma. Tumor cell-intrinsic alterations include the loss of cell polarity and alterations in cell-cell and cell-matrix adhesion as well as deregulated receptor kinase signaling, which together support detachment, migration and invasion of tumor cells. On the other hand, the tumor stroma, including endothelial cells, fibroblasts and cells of the immune system, is engaged in an active molecular crosstalk within the tumor microenvironment. Subsequent activation of blood vessel and lymph vessel angiogenesis together with inflammatory and immune-suppressive responses further promotes cancer cell migration and invasion, as well as initiation of the metastatic process.

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