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Cellular and Molecular Life Sciences

Announcement

Here we publish the names of the authors and the titles of the two most cited reviews and research articles published in Cell. Mol. Life Sci. the previous year (2007).

Reviews

1) Purine and pyrimidine receptors

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Abstract. Adenosine 5'-triphosphate (ATP), in addition to its intracellular roles, acts as an extracellular signalling molecule via a rich array of receptors, which have been cloned and characterised. P1 receptors are selective for adenosine, a breakdown product of ATP, produced after degradation by ectonucleotidases. Four subtypes have been identified, A1, A2A, A2B and A3 receptors. P2 receptors are activated by purines and some subtypes also by pyrimidines. P2X receptors are ligand-gated ion channel receptors and seven subunits have been identified, which form both homomultimers and heteromultimers. P2Y receptors are G protein-coupled receptors, and eight subtypes have been cloned and characterised to date.

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2) Molecular basis for chemoprevention by sulforaphane: a comprehensive review

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Abstract. The consumption of cruciferous vegetables has long been associated with a reduced risk in the occurrence of cancer at various sites, including the prostate, lung, breast and colon. This protective effect is attributed to isothiocyanates present in these vegetables, and sulforaphane (SF), present in broccoli, is by far the most extensively studied to uncover the mechanisms behind this chemoprotection. The major mechanism by which SF protects cells was traditionally thought to be through Nrf2-mediated induction of phase 2 detoxification enzymes that elevate cell defense against oxidative damage and promote the removal of carcinogens. However, it is becoming clear that there are multiple mechanisms activated in response to SF, including suppression of cytochrome P450 enzymes, induction of apoptotic pathways, suppression of cell cycle progression, inhibition of angiogenesis and anti-inflammatory activity. Moreover, these mechanisms seem to have some degree of interaction to synergistically afford chemoprevention.

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Research Articles

1) Endocannabinoids in adipocytes during differentiation and their role in glucose uptake

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Abstract. The molecular basis for the control of energy balance by the endocannabinoid anandamide (AEA) is still unclear. Here, we show that murine 3T3-L1 fibroblasts have the machinery to bind, synthesize and degrade AEA, and that their differentiation into adipocytes increases by approximately twofold the binding efficiency of cannabinoid receptors (CBR), and by approximately twofold and approximately threefold, respectively, the catalytic efficiency of the AEA transporter and AEA hydrolase. In contrast, the activity of the AEA synthetase and the binding efficiency of vanilloid receptor were not affected by the differentiation process. In addition, we demonstrate that AEA increases by approximately twofold insulin-stimulated glucose uptake in differentiated adipocytes, according to a CB1R-dependent mechanism that involves nitric oxide synthase, but not lipoxygenase or cyclooxygenase. We also show that AEA binding to peroxisome proliferator-activated receptor-γ, known to induce differentiation of 3T3-L1 fibroblasts into adipocytes, is not involved in the stimulation of glucose uptake.

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2) Nitric oxide synthase reduces nitrite to NO under anoxia

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Abstract. Cultured bEND.3 endothelial cells show a marked increase in NO production when subjected to anoxia, even though the normal arginine pathway of NO formation is blocked due to absence of oxygen. The rate of anoxic NO production exceeds basal unstimulated NO synthesis in normoxic cells. The anoxic release of NO is mediated by endothelial nitric oxide synthase (eNOS), can be abolished by inhibitors of NOS and is accompanied by consumption of intracellular nitrite. The anoxic NO release is unaffected by the xanthine oxidase inhibitor oxypurinol. The phenomenon is attributed to anoxic reduction of intracellular nitrite by eNOS, and its magnitude and duration suggests that the nitrite reductase activity of eNOS is relevant for fast NO delivery in hypoxic vascular tissues.

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