# Non conventional activity of the endocannabinoid system at glutamate release in rat cortical astrocytes

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**Abstract**

Endogenous cannabinoids rapresent an important family of substances that play a critical role in different fisiological processes, expecially in the central nervous system (CNS).
The endocannabinoid system through its endocannabinoids mediators can modulate neuronal excitability by interacting with two types of cannabinoid receptors termed CB1Rs and CB2Rs. AEA, an endogenous ligand for CB1 receptors, can also acts as a full agonist on the transient receptor potential vanilloid 1 (TRPV1) expressed both in the periphery and in the CNS. Scientific evidences support a specific role of endocannabinoids in neurons, although several data have lately proved the expression of CB receptors also in astrocytes in different brain areas. In this context, recent studies have demonstrated a bidirectional communication between neurons and astrocytes, based on the expression by astrocytes of different cannabinoid receptors that can be activated by neuron-released mediators; despite these evidence the presence of cannabonoid receptors in astrocytes and their involvement in the neuron-astrocyte communication remain largely unknown and controversial.
In the present study we attemped to characterize the effects of cannabinoid receptors activation in sub-cellular astroglial particles prepared from rat cerebral cortex named gliosomes.

Our astroglial purified preparation expressed both CBRs and TRPV1 subtype receptors. Metanandamide, a non-selective CBRs or TRPV1 agonist, exibited in gliosomes biphasic modulating activity: at low concentrations [0.1μM] was actually able to increase depolarization-evoked glutamate release through CB1-mediated effect, while higher concentrations [3 μM] switched the activation of TRPV1 receptors, reducing glutamate-evoked release.
These findings were confirmed by using selective CB1/TRPV1 agonists (ACEA / capsaicin ) or metanandamide in presence of different selective antagonists (SR141716 / 5-IRTX).
Selective CB1 and vanilloid receptors activation both evokes IP3 intracytoplasmatic augmentation, on the contrary, cAMP levels are unchanged suggesting PLC involvement as the main signalling transduction mechanism in gliosomes.