Glucagon Like Peptide-1 increases glutamate release in the mouse cerebral cortex and hippocampus by activacting presynaptic GLP-1R

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The GLP1 is an incretine hormone that it's mainly known for its insulinotrophic effect, but it has been amply demonstrated that the activation of its specific receptor GLP1R has neuroprotective and neurotrophic actions in CSN. In the CNS the action of hormones, neuromodulators is expressed throught neurotransmitter release at presynaptic level.
I investigate the effects of the activation of presynaptic receptors GLP-1 on the release of glutamate, the major excitatory neurotransmitter, in different brain areas.
It's been used the model system of synaptosomes from cortical and hippocampal tissues. They are analyzed by western blotting, confocal microscopy and functional studies for the neurotransmitter release.
The WB analysis demonstrates the presence of glp1r on nerve endings obtained from cortex and hippocampus of mice.
The exposure of purified synaptosomes to increasing concentrations of Exendin-4, 1 and 10 nM, were able to enhance the glutamate release induced by depolarization with an effect of 35 and 55% respectively. The effect of Exendin-4 was due to the specific activation of the glp1r, because it was entirely blocked by equimolar concentrations of selective antagonist Exendin-3. Similar results we have obtained by treating in the same conditions purified synaptosomes of hippocampus.
Finally the confocal microscopy analisys demonstrates that the 36% of glutamatergic nerve ending possess GLP1R.
Our data show that the isolated glutamatergic nerve endings from the cortex and hippocampus of adult mice possess the presynaptic receptor for GLP1, whose activation causes an increase of neurotransmitter release induced by depolarization.