## Altered synaptic plasticity in intersectin-1 null mice

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Intersectin-1 (Itsn1) is upregulated in individuals with Down syndrome (DS) and this has been suggested to contribute to the pathogenesis of both Down syndrome and Alzheimer's disease. Itsn1 interacts with proteins involved in endocytosis, regulating synaptic vesicle recycling presynaptically, and receptor and ion channel turnover postsynaptically, and in modulating second messenger coupling. Our aim was to determine in more detail the role of Itsn1 by examining the effects of Itsn1 knock-out (KO) on synaptic function in mouse hippocampus.

**Methods:** Wild type (WT) and Itsn1 KO mice were anaesthetized and their brains rapidly removed to an ice slurry. Hippocampal slices, 300 μm thick, were prepared, mounted in a recording chamber, and continuously superfused with artificial cerebral spinal fluid (aCSF) at 35°C. Field excitatory post synaptic potentials (fEPSPs) were recorded with extracellular electrodes from the stratum radiatum of the CA1 region in response to stimulating the Schaffer collaterals.

**Results:** Paired pulses were applied with interstimulus intervals of 25–500 ms and resulted in facilitation. The degree of facilitation was not changed in slices from 5 KO mice compared with 10 WT animals ($P = 0.09$). Bursts of tetanic stimulation resulted in potentiation of the fEPSPs that persisted for at least 3 h. The potentiation was $2.1 \pm 0.5$ fold greater ($P = 0.02$) in slices from KO ($n = 5$) compared with WT ($n = 10$).

**Conclusions:** These results demonstrate altered postsynaptic plasticity in slices from Itsn1 KO mice, with a marked increase in fEPSP amplitude. This could be explained in terms of enhanced postsynaptic receptor density involving reduced endocytosis, or altered second messenger coupling.