

**P002** Coupling of GABA<sub>A</sub> receptors and L-type voltage-gated calcium channels in rat cerebellar granule neurons

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In developing cerebellar granule neurones (CGN) GABA<sub>A</sub>-receptor activation causes excitation, via efflux of Cl<sup>-</sup>, with a resultant increase in intracellular calcium ([Ca<sup>2+</sup>]<sub>i</sub>). In CGN from 6-8 day old rat pups, [Ca<sup>2+</sup>]<sub>i</sub> was measured by imaging with Fura-PE3 and membrane potentials examined with gramicidin perforated patch recordings. Muscimol produced a rapid transient increase in [Ca<sup>2+</sup>]<sub>i</sub> primarily through L-type voltage gated calcium channels (VGCCs) with no N or P/Q type involvement. Interestingly, a second muscimol-induced response could not be elicited within 3 minutes of the first. Perforated patch recordings showed that muscimol produced a transient depolarisation, changing the membrane potential by 30-40mV, which was also seen upon a second administration of muscimol. The inability of a second muscimol application to increase [Ca<sup>2+</sup>]<sub>i</sub> was not due to inactivation of L-type VGCCs because (i) application of a high [K<sup>+</sup>] bath solution after the first muscimol application was able to increase [Ca<sup>2+</sup>]<sub>i</sub> and (ii) applying a high [K<sup>+</sup>] bath solution first did not alter the magnitude of a subsequent muscimol response. These data suggest that there is a modulatory effect of GABA<sub>A</sub> receptors on L-type VGCCs in CGN. (*RBL holds an MRC Studentship*).