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Schwann cells modulate short term plasticity of cholinergic autaptic synapses

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ABSTRACT OF THE TALK

Nicotinic synapses display use-dependent plasticity but the contribution of cellular environment, as well as the presynaptic mechanisms implicated in this process remain to be determined. To address these questions synaptic function was assayed in rat superior cervical ganglion (SCG) neurons microcultured in isolation from any other cell type and compared to those microcultured in the presence of Schwann cells of ganglionic origin. Schwann cells were not required for synapse formation in vitro because functional cholinergic autaptic synapses were established in both experimental conditions. The number of synapses was comparable between the two culture conditions but the frequency of spontaneous miniature excitatory postsynaptic currents was enhanced in those neurons grown in direct contact with glial cells. Schwann cells did not modify significantly facilitation but increased synaptic depression. In single cell microcultures, paired pulse stimuli showed a monoexponential recovery from depression with a time constant of approximately 60 ms, while in microcultures developed together with glial cells, recovery was bi-exponential with a significantly slower time course. Altogether, these results show that Schwann cells from sympathetic ganglia directly modulate use-dependent plasticity of nicotinic synapses in vitro by enhancing short-term depression. We are currently investigating the molecular mechanisms mediating the communication between Schwann cells and neurons.