Neural stem cells release soluble factors that modulate inflammatory cytokines expression in microglia

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Inhibition of microglia-mediated neuroinflammation is an important therapeutic target in order to avoid cognitive and motor impairment in brain ischemia. Reportedly, neural stem cells (NSCs) brain grafts have neuroprotective effects. It has been proposed that these positive effects are not caused only by NSC proliferation and generation of new neurons, but also by a modulation of the brain lesion environment.
Our primary aim was to ascertain whether NSCs were capable of modifying microglial activation *in vitro*.
We used ATP as inflammatory stimuli, since it is massively released from damaged neurons and is responsible of activation of microglia during ischemia. We demonstrated that N9 murine microglia cells incubated with conditioned media (CM) from NSCs culture blunted the response to ATP in term of intracellular calcium release. Moreover, CM pre-incubation significantly inhibited the expression of TNF-α, COX-2, and IL-10 that are up-regulated after ATP stimulation.
Reportedly, microglial cells can induced the transmigration of NSCs in the lesion site, by the release of soluble factors.
The aims of our research were i) reproduce the transmigration process between N9 and NSCs *in vitro* and ii) identify the chemokines most involved in this process and understand their role by experiments of mRNA interference.
In conclusion, our data demonstrate that NSCs release soluble factors that have an anti-inflammatory action blunting the N9 response to ATP stimulation. Finally, the RNA-interference technique applicated to MCP-1 could let us to understand whether in the activated N9 cells this chemokine may have a role in the transmigration process of NSCs.