

Making connections: gap junctions are pivotal for MSC-induced long lasting survival of sensory neurons

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The direct contact of Mesenchymal Stem Cells (MSCs) with Dorsal Root Ganglia sensory neurons is pivotal to prolong the neuronal survival and to support their maturation (1). Here we further investigated the mechanisms underlying this direct contact-mediated positive effect, focusing our attention on the possible interaction between MSCs and neurons, and in particular on gap junction formation.

We set up direct co-cultures of MSCs and sensory neurons, and after 30 days we analyzed them. The electron microscopy analysis evidenced the presence of junctions between MSCs and neurons only in direct co-cultures. Using a diffusible dye, Calcein, we demonstrated a direct interaction among cells, with a flow of dye from MSCs to neurons. To confirm the importance of such a connection we blocked it by using a gap junction blocker, the carbenoxolone (2). The use of gap junction blocker induced a decrease of neuronal survival in co-culture, thus demonstrating the important role of gap junctions for the positive effect of MSCs. We are now investigating the possible exchanged molecules, focusing our attention on some pro-survival miRNA, such as miRNA 29b and miRNA 142-5 (3), in order to identify the molecule able to positively affect the neuronal survival.

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References

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Keywords

Mesenchymal Stem Cells; Sensory neurons; Gap Junctions; Carbenoxolone.