

3rd International Conference on Tissue Science & Regenerative Medicine

September 24-26, 2014 Valencia Convention Centre, Spain

***In vitro* cell mobility: A mesenchymal stem cells marker for multipotency?**

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Mesenchymal stem cells (MSCs) are fundamental players in future cell-based therapies. These cells possess high proliferative ability, multilineage potential and immunomodulatory properties, all requisites essential for cell therapies. Nevertheless, intra-donor variability of MSCs is not fully characterized yet, leading to uncertain outcomes in the use of these cells. Here we propose a live imaging tool to characterize population of human MSCs derived from different donors, based on the *in vitro* mobility of the cells and to correlate results to the respective differentiation potential. Bone marrow human MSCs from 20 donors and at various *in vitro* passages (from P3 to P13) were evaluated. Track length of 70 cells per population were measured over a period of 24 hours, and distances were compared with the respective adipogenic, chondrogenic and osteogenic differentiation potential. We found that senescent populations were enriched with slow moving cells, compared with younger ones. Cells with larger cell body were moving less compared to smaller ones, while spindle shaped cells had an average speed. Our preliminary data showed that both fast cells and slow cells were characterized by low differentiation potential, while average moving cells were more effective in undergoing all three lineage differentiation. Heterogeneity in single cell motility within a population correlated with faster moving cells, while populations rich in slow moving cells tended to homogeneity (only senescent cells). In conclusion, *in vitro* cell mobility might be a useful tool to characterize MSC population and recognize prior to use the differentiation potential of MSCs.

Biography

Alessandro Bertolo has completed his PhD at the age of 32 years old at University of Bern, Switzerland. His PhD focused on the development of tissue engineering approaches based on mesenchymal stem cells application to treat intervertebral disc degeneration. He is currently involved in intervertebral disc studies both at *in vitro* and *in vivo* levels, as postdoctoral fellowship. Previously, he worked as fellow at S. Raffaele hospital, Milan, in the field on neural stem cells.

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