

# Meeting Report: MSC 2013

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The MSC 2013 meeting on *Adult Stem Cell Therapy & Regenerative Medicine* was held in Cleveland, Ohio, USA on August 19-21, 2013. The well-thought scientific program brought together a diverse international community from academia, regulatory agencies, industry for a ‘full immersion’ into the rapidly evolving field of cellular therapies for regenerative medicine. While the core of the meeting was on Mesenchymal Stem (Stromal) Cell (MSC) biology, the breath of the discussion was rather broad, extending to adult stem cell and embryonic cellular therapies.

A series of lectures introduced the basis for the clinical translation of stem cell research, from the laboratory to preclinical testing in preparation for regulatory agency approval of early human clinical trials; these lectures helped ‘demystifying’ the whole process, while highlighting the importance of adequate planning and of early implementation of the regulatory compliance. The major challenge to the transition from academic initiatives into widespread clinical applications, was recognized in the remarkable financial burden imposed by the regulatory framework that can be undertaken successful through partnerships with industry.

Several interesting presentations and a FDA advisory panel forum tackled the unsettled issues of defining MSC nomenclature, the need to address the complexity of cell models and optimization of assessment methods (*i.e.*, identity, potency, doubling time, etc.) for adult stem cell products obtained from different sources (bone marrow, adipose tissue, etc.) toward improved manufacturing standardization and product release criteria, as well as to maximize the therapeutic effects. Also, convincing data presented indicates that MSCs arise from perivascular cells (pericytes); this may explain the fact that multiple tissues from disparate anatomical

locations can be the source of MSCs with comparable phenotypes and biologic effects. The inference is that the exogenously administered MSCs preferentially home at the site of vascular damage or inflammation where they function as the native resident pericytes/MSCs do in small, minor injuries.

Further discussions focused on the fate, localization, persistence, method of detection, as well as mechanism(s) underlying the biology and paracrine effects of human MSC’s upon systemic or local in-oculum. The impact of the recently described activation of complement cascade, and its relation to the culture passage of expansion (apparently, more pronounced with multiple culture passages) that may potentially interfere with engraftment and function even though eliciting measurable biologic effects.

Several presentations offered a comprehensive overview on the broad range of disease models and testing ongoing or underway for veterinarian and human clinical applications. Multiple properties of adult stem cells (primarily from adipose tissue and bone marrow) were discussed supported by in vitro and in vivo experimental data, as well as preliminary clinical testing. Emerging data on the regenerative medicine applications (*i.e.*, orthopedic, cardiovascular, neurologic, gastroenterology, etc.) and tissue engineering approaches, as well as the recent progress in gene therapy utilizing adult stem cells were presented. The immunomodulatory properties of adult stem cells were reported in the context of the treatment of graft versus host disease in recipients of hematopoietic cell transplantation, of autoimmune diseases, inflammatory bowel disease and solid organ transplantation. Encouraging results on the neuroprotective, cardioprotective and tissue repair effects of adult stem cells (marrow-derived CD34+ cells, marrow-derived MSC, Adipose Tissue-derived vascular fraction or MSC, etc.) were

presented in experimental models of disease and preliminary clinical reports. Experimental data on the promising application of engineered MSC for cancer therapy were also presented.

What clearly emerged from this interesting meeting is the substantive scientific progress recorded in recent years exploring the therapeutic potential of adult stem cell therapies. We are living very exciting times, with the clinical translation of such therapies

already being a reality both in the US and abroad, and approximately 350 clinical trials initiated by academia and industry to test the immunomodulatory and trophic (regenerative) capacities of MSCs for the treatment of various disease states are listed in the [clinicaltrials.gov](http://clinicaltrials.gov) registry. Cellular therapies are gaining increasing recognition from clinicians and regulatory agencies for the measurable biological effects in different applications, which will generate more scientific questions that current and future research will help addressing.