**INTERACTION BETWEEN TELOMERASE AND MYOCARDIN A CRITICAL FOR CARDIOMYOGENIC DEVELOPMENT OF MESENCHYMAL STEM CELLS: AN IMPLICATION FOR CARDIOVASCULAR TISSUE REPAIR AND REGENERATION**

**Y.J. Geng**

University of Texas Houston Medical School, Houston, TX, USA

Myocardin A (McA), a nuclear transcription cofactor that promotes cardiovascular myocyte differentiation, may function together with telomerase, an enzyme that maintains telomere length, to promote mesenchymal stem cell (MSC) proliferation and myogenic differentiation. We investigated the interaction between McA and the catalytic subunit of telomerase, telomerase reverse transcriptase (TERT), and studied its effect on the myogenic regenerative properties of MSCs, including proliferation, survival, and myogenic differentiation. TERT and McA co-immunoprecipitated specifically in myogenic MSCs derived from murine adipose tissue stroma. In MSCs overexpressing TERT and McA, cells exhibited increased proliferation and differentiation, while retaining high expression of myogenic markers in the nucleus. In contrast, cell proliferation and differentiation were decreased in cells treated with siRNA for TERT or McA. SiRNA for TERT or McA reduced the expression of promyogenic transcription factors such as Oct-4, Nkx2.5 and MLC2v (at qRT-PCR), and in parallel decreased MEF2 nuclear expression (at immunoblotting). No change was seen in total MEF2 protein contents. Furthermore, overexpressing TERT and McA in MSCs enhanced the myogenic program by increasing binding between the serum response factor, a transcription factor critical for myogenesis, and the serum response element. The interaction between TERT and McA in myogenic MSCs may be important in the timing of myogenesis and in the proliferation and differentiation of MSCs. Thus, the cellular functions of telomerase may extend beyond its role in telomeric maintenance.