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Silencing of retinoblastoma proteins affected stem cell properties of mesenchymal stem cells

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Mesenchymal stem cells (MSCs) are primordial cells that produce skeletal muscle cells, the blood, vascular, and urogenital systems and connective tissues in the body. MSCs are of interest because of their multiple roles in the body. In addition to their ability to differentiate into mesenchymal tissues, they support hematopoiesis and can contribute to the homeostatic maintenance of many organs. The genetic programs controlling the stem cell state are strictly linked to regulation of cell cycle. Nevertheless, the analysis of which molecules participate in cell cycle regulation of several stem cell lineages is not exhaustive.

The Retinoblastoma gene family, RB1, RB2/P130 and P107, has a major role in controlling the G1/S transition through regulation of the E2F family of transcription factors. In addition, this protein family plays a role in regulating other cellular processes, such as differentiation and senescence. Nowadays, it is clear that the role of Rb1, Rb2/p130 and p107 depends on several parameters, such as animal species under investigation; cell type; cell status. Several studies lack of comparative analysis among the three Retinoblastoma family members. Moreover, their functions in the MSC biology remains largely uncharacterized.

We decided to analyze the role of these proteins in MSCs' functions since the mechanisms that regulate the relative quiescence of MSCs and its association with self-renewal and cell commitment are unclear, as is the contribution of molecular regulators of the cell cycle to these decisions. Understanding the mechanisms that govern these transitions will provide important insights into cell-cycle regulation of MSCs and possible therapeutic approaches of MSCs.

Biography

Umberto Galderisi has completed his Ph.D at the age of 27 years from University "Federico II" of Naples, Italy. He did his postdoctoral at Second University of Naples (Italy), at Thomas Jefferson University of Philadelphia (PA) and at MNHF of Paris, France. Currently he is Associate Professor of Molecular Biology at Second University of Naples and Adjunct Associate Professor at Temple University in Philadelphia (PA). He is Director of Stem Cell Research Activities of the Human Health Foundation Onlus (HHF), an Italian charity for basic medical research supported by the Banca Popolare di Spoleto, located in Terni, Umbria (www.hhfonlus.org). He is the President and Founder of the Stem Cell Research Italy, the first Italian Scientific Association, which gathers Italian scientists involved in stem cell researches. He has published more than 70 papers in reputed journals.