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Effect of extra cellular matrix in the differentiation of mesenchymal stem cells.
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The "brittle bone disease" Osteogenesis Imperfecta (OI) is caused mainly by mutations in the COL1A1 or COL1A2 genes coding for the α chains of type I collagen. Several years ago we generated the only knock in murine model for the dominant non-lethal form of this disorder, the BrtlIV mouse, reproducing the typical glycine substitution in the α1 chain of type I collagen (G349C) and moderately severe outcome of Type IV OI[1].
To investigate the OI molecular and cellular basis we evaluated *in vitro* the differentiation potential of mesenchymal stem cells from control and BrtlIV mice towards osteoblasts and adipocytes whose regulation in bone seems relevant for bone homeostasis. Our data suggest that two months age, at which the Brtl bone phenotype is more severe, is associated with an increased mesenchymal stem cells proliferation strongly directed to adipogenic differentiation[2]. To understand this unusual preferential differentiation to adipose cells our future attention will be directed to investigate the bone marrow microenvironment role. It is known that the extra cellular matrix promotes replication of mesenchymal progenitors and retention of their multipotentiality. So we will prepare a cell-free extra cellular matrix from both control and BrtlIV cultured murine marrow cells in order to compare the behavior (in terms of proliferation and differentiation potentiality) of control and BrtlIV mesenchymal stem cells cultured on BrtlIV and control cell-free extra cellular matrices respectively. Scanning electron microscopy and transmission electron microscopy will be crucial to characterize both the composition of the extra cellular matrix and cellular morphology.

References

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2. **A. Lupi**, A. Rossi, E. Campari, R. Tenni, G. Cetta, J.C. Marini, A. Forlino, Proliferation and Differentiation Potentiality of Mesenchymal Stem Cells on BrtlIV, a Murine Model of Osteogenesis Imperfecta, XXVII Italian Society for the Study of Connective Tissues (SISC) Meeting, Bologna, Italy, 8–10 November 2007 (oral presentation).