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Cryopreservation influence in the WJCs Proteome.

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Cryopreservation is the only mode of long-term storage of viable cells and tissues for cellular therapy, stem cell transplantation and/or tissue engineering. However the freeze-thaw process strongly contributes to cell and tissue damage with several mechanism, including oxidative stress, intracellular ice formation (IIF) dependent cell injury and altered physical cellular properties, i.e. osmotic and ion homeostasis. Our previous proteomics investigation was carried on Wharton's jelly cells (WJCs), fibroblast-like cells with similar properties to mesenchymal stem cells, therefore a rich source of primitive cells to be potentially used in regenerative medicine. The aim of the present work was to investigate molecular changes that occur in WJCs proteome at different culture conditions (freshly and post-frozen cell preparations) and to elucidate possible mechanism involved in maintaining active proliferation and maximal cellular plasticity in order to optimize *in vitro* culturing procedure. To analyze changes in protein expression of WJCs we performed a comparative proteomic analysis (2DE followed by MALDI–TOF MS) between fresh and post-frozen cell culturing. WJCs post-frozen showed a qualitative and quantitative changes compared to cells from fresh preparation, expressing proteins involved in replication, cellular defense mechanism and metabolism, that ensure freeze-thaw survival. However, further investigations are needed to clarify the biological mechanisms involved in maintaining active proliferation, plasticity, multipotency cell during *in vitro* expansion

Keywords
Wharton's jelly cells, Cryopreservation, Proteome analysis.