Metabolomics Characterization of Mesenchymal Stem Cell Differentiation in vitro using LC-MS Non-destructively

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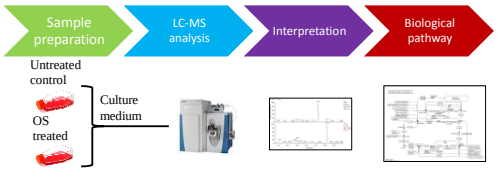
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I. Abstract Body

Real time monitoring of stem cells has been a growing area of interest over the past decade because of new regenerative medicine approaches. Also, the effect of culture composition on stem cell metabolic pathways and their regulation of cellular fate are of increasing importance. In our data, metabolomic analysis of stem cells and their physiological status during proliferation and differentiation stages were investigated. This was achieved through analysis of released metabolites by Liquid chromatography (LC)-mass spectrometry (MS). Live time analysis of their chemical compounds was performed for undifferentiated MSCs and their differentiated populations with a combination of univariate and multivariate analyses investigated concentration changes of metabolites and nutrients linked to the presence of MSCs in culture media. This non-invasive LC-MS-based analytical approach revealed significant metabolomic changes between the media from control and differentiated cells showing distinct effects of MSC differentiation on the environmental footprint of the cells in different conditions (control vs differentiated). A subset of compounds was directly linked to the time-course of differentiation, and represent interesting metabolite candidates as non-invasive biomarkers for characterising the differentiation of MSCs in a culture medium.

II. Image:



III. Reference:

2. Surrati, A., et al., Non-destructive characterisation of mesenchymal stem cell differentiation using LC-MS-based metabolite footprinting. Analyst, 2016. 141(12): p. 3776-87.

IV. Biography:

Since I started my PhD project I developed a novel approach to monitor stem cells and produced original data suggesting this new method could help evaluate the properties of stem cells for therapy by analyzing the substances they release in their environment. This approach is particularly novel as it can be applied without damaging the cells themselves, which would represent a major breakthrough compared to current standards.
Also, I have developed a novel approach that focusing more specifically on the application of stem cells for the repair of cartilage damage. This body of work contributing to ongoing research efforts to produce novel tools for regenerative medicine in order to increase health worldwide.

V. Presenting author details



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