Effect of conditioned media from osteo- and adipo-differentiating mesenchymal stem cells on triple negative MDA-MB231 breast cancer cells

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It is know that mesenchymal stem cells (MSCs) actively secrete multiple biologically-active factors during their process of differentiation which gives rise to a variey of cytotypes including bone and fat cells. It is also acknowledged that the chemokines secreted throughout MSC differentiation may play an important role in the development and growth of tumor cells, although literature data appear somewhat indeterminate due to the contradictory evidence often found.[1]

The purpose of this study was to evaluate the effect of conditioned media (CMs) from MSCs, cultured for 7, 14, 21 and 28 days in osteo-, adipo-differentiating and undifferentiated conditions, on MDA-MB231 breast cancer cells, an *in vitro* model system derived from a triple-negative breast cancer (TNBC). MTT assay showed that the CMs collected after 28 days of both osteo- and adipo-differentiation induced growth inhibition on MDA-MB231 cells after 24 h of incubation. In light of such evidence, these CMs were used to treat cells and perform cytofluorimetric assays to better evaluate their biological effects on viability/proliferation, cell cycle progression, apoptosis/autophagy induction and mitochondrial activity/reactive oxygen species (ROS) accumulation of MDA-MB231 cells.

The most interesting results regard the ability of CMs from osteo-differentiating MSC to induce an alteration of cell proliferation with an arrest in the G_2/M transition phase of the cycle coupled to both apoptotic and autophagic promotion. No accumulation of ROS and impairment of mitochondrial respiration was observed at the end of treatment. On the other hand, preliminary indications suggest that the CMs isolated from adipo-differentiating MSCs have different effect from those obtained by osteo-differentiating cultures, being the lethality unlinked to apoptosis and autophagy, and thereby prompting to get more insight into the anti-TNBC activity shown by the different CMs at the molecular level.

References

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