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Differentiation of murine dermal papilla cells into myogenic lineage

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Duchenne muscular dystrophy (DMD) is the commonest muscular dystrophy caused by the absence of dystrophin. Cell-based therapies still represent a promising therapeutic option. Multipotent-cells in the hair follicle papilla (DPC) are highly plastic, being reprogrammable to bone, fat, cartilage and bovine DPC have been shown to undergo myogenic differentiation.

To evaluate whether DPC are suitable cell type in cell-based therapies for DMD, mouse dermal papillae were microdissected from hair follicles of the whisker pad and cultured. DPC from the outgrowths were co-cultured with primary mouse myoblasts, H-2K myoblasts or normal and dystrophic human myoblasts. Lamin A/C and DAPI counterstaining were used to identify the contributions of DPC into myotubes. DPC myogenic differentiation was detected using murine-specific PCR-assays of the muscle-marker “myogenin”.

Effects of galectin-1, purmorphamine and rShh, on differentiation were also investigated. We showed that DPC can undergo myogenic differentiation in co-culture with all types of myoblasts. Murine-specific PCR-assays showed up-regulation of DPC-derived myogenin, suggesting that DPC underwent myogenic differentiation. None of the treatments increased myogenin expression in DPC; but, triggering Shh-signaling produced a dose-dependent pattern whereby lower levels of signaling promoted myogenic differentiation while higher levels inhibited it. Activating Shh-signaling upstream of Smo via purmorphamine, induced a biphasic differentiative response; however, the application of rShh hindered the differentiation of both cell types. Thus, murine DPC are a readily-accessible source of stem cells that can undergo myogenic differentiation *in vitro*. We aim to improve their differentiation efficacy to make them suitable candidates for therapeutic applications in muscle wasting disorders.

Biography

Mona Rashidi is a medical doctor graduated 2016 from Iran University of Medical Sciences, Tehran, Iran. She has finished her clinical trainings with cumulative GPA of 3.5 and is currently conducting research on dermal stem cells in collaboration with colleagues from other universities. Her work is focused on evaluating skin stem cells as source of cell for cell-based therapies in muscular dystrophies. She is also conducting research on Asthma/Allergy, gathering data on the association of Asthma and Adenotonsillectomy and other predisposition- factors. Considerable part of her work is devoted to the extrapolation of experimental data to the clinical trials.

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