Progenitor Cells of the Intervertebral Disc

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Low back pain is a common reason for sick leave (1), and up to 50% of low back pain was reported disc-related (2). However, the mechanism of the degeneration of the intervertebral disc (IVD) is still not clear. The nucleus pulposus progenitor cells (NPPCs) from the nucleus pulposus (NP) in IVD could be a potential cell population for cell therapy to treat IVD degeneration (3). NPPCs possess *in-vitro* multipotency and described to be positive for angiopoietin reporters (Tie2) (3,4). Unfortunately, the origin of these cells is unclear, and cell therapy is not very feasible yet, as in vitro cell expansion needs to be addressed.

The aim of this study is to enrich the NPPCs population during expansion or found a more efficiency isolation method. Firstly, I aimed to increase the yield of Tie2+ cells from the nucleus pulposus (NP) cell population by treatment with a PPARδ agonist. PPARδ agonist was demonstrated to increase the Tie2+ cell sub-population in hematopoietic stem cells (5). Secondly, NPPCs was the first found to from the colony-forming units-spherical (CFU-S) during the colony-forming assay of mouse NP cells and were then defined to be Tie2 positive (3). However, follow-up research almost only used standard monolayer culture to expand the NP cells. My research shows that spheroid culture (in ultra-low attachment flask) of human NP cells could significantly increase the NPPCs percentage of the whole population of NP cells. I also attempted to find a more efficiency isolation method to fishing more NPPCs from NP cells. We test the methods of ability of attachment and side population; however, the result shows these two methods not work.

As a result, PPARδ agonist treatment and spheroid culture could increase the NPPCs population during NP cell expansion. There still no new isolation method instead of the immunology assay based on the Tie2 marker.

REFERENCES

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