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MIR 3180-5P PROMOTES PROLIFERATION IN HUMAN BLADDER SMOOTH MUSCLE CELL BY TARGETING PODN UNDER HYDRODYNAMIC PRESSURE

Hypothesis / aims of study
Mechanical stimuli are key regulators of cell structure and function in both normal and disease conditions. We investigated the microRNA expression profile in human bladder smooth muscle cell(HBSMCs) subjected to hydrostatic pressure, and defined the role of miR 3180-5p in proliferation of HBSMCs induced by hydrodynamic pressure.

Study design, materials and methods
The HBSMCs were exposed to cyclic hydrodynamic pressure simulating bladder cycle. An miRNA array was used to examine the differential expression of miRNA in hydrostatic pressure group and control static group. The functional role of miR 3180-5p and targeting gene in HBSMCs was studied by examining cell proliferation after miR 3180-5p mimics transfection.

Results
Here, we identified nine upregulated and four downregulated microRNAs related to cell proliferation response to hydrostatic pressure, and the miR 3180-5p was most upregulated validated by qRT-PCR. The proliferation index improved from 21.67 ±4.74 in NC group to 40.30 ± 8.49 in miR 3180-5p mimics group($p=0.047$). The targeting PODN and podocan expression was down regulated by overexpression of the miR 3180-5p($p=0.041$), and this phenomenon was associated with an increase in cdk2 expression and decrease in p21 expression ($p<0.05$).

Interpretation of results
The main findings of this study are that the miR 3180-5p and targeting mRNA POND could promote the proliferation of HBSMCs under hydrodynamic pressure, and the cdk2 involved this biological process. To our knowledge, the identification of miR 3180-5p as a mechanosensitive miRNA in HBSMCs represents the first evidence linking miRNA to the proliferation in development and diseases of bladder.

Concluding message
The miR 3180-5p and targeting mRNA POND was first time demonstrated that it could promote the proliferation of HBSMCs under hydrodynamic pressure, and the cdk2 involved this biological process. Thus, miR 3180-5p may be a novel potential molecular target for regeneration of cell in tissue engineering bladder.

Disclosures
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