[gw22-e0441]

EFFECTS AND MECHANISMS OF ULTRASOUND MEDIATED NITRIC OXIDE MICROBUBBLES ON MIGRATION OF RAT BONE MARROW MESENCHYMAL STEM CELLS

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10.1136/heartjnl-2011-300867.188

Objective To observe the effect and mechanisms of NO to bone marrow mesenchymal stem cells (BMSCs) intervened by ultrasound mediated microbubbles.

Methods: Bone marrow mesenchymal stem cells were cultured in vitro. The subjects in this study were divided into ultrasound mediated NO microbubbles group (which contents 1:70,1:50,1;20 three group), ultrasound mediated blank microbubbles group, simple ultrasound radiation group, NO microbubbles group, simple microbubbles group and control group. Ultrasound (frequency 1.0 MHz, intensity 1.0 W/cm^2) was used. MSCs cell proliferation was detected by MTT, apoptosis and cell cycle of MSCs were observed by PI labelled staining and flow cytometric assay respectively, The effect of ultrasound mediated NO microbubbles on MSCs migration was observed by applying transwell, CXCR4 gene will be observed by RT-PCR.

Results Compared with control group, low concentration (1:50, 1:70) NO microbubbles has no effect on Apoptosis, proliferation and cell cycle of MSCs. Ultrasound mediated nitric oxide microbubbles group has more migrating MSCs 58.5±7.47 ($p<0.05$). CXCR4 gene express more in ultrasound mediated NO microbubbles 1.18±0.20 ($p<0.05$).

Conclusion Low concentration NO microbubbles is safe for MSCs, ultrasound mediated NO microbubbles promote the migration of MSCs, the mechanisms might enhance the expression of CXCR4 gene.