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Study on the effects of bone marrow-derived stem cells were used in chronic hyperactivity rats to cardiac injury treatment

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Objective overload and long-term overtraining can cause hypoxic and hypoxic damage to the myocardial structure of the body. In recent years, studies have shown that the stem cells promote angiogenesis in vivo, resistance to apoptosis, myocardial stem cell mobilization, and promote its proliferation in paracrine effect, such as vascular distribution. By animal experiments, this study explore MSCMs role in the improvement of heart function and its molecular mechanism to sports injury prevention and postoperative rehabilitation is of great significance of the heart, heart research provides the basis for the motion at the same time support.

Methods Wistar rat model of excessive swimming training. Grouping: rats were randomly divided into 4 groups (n=10), quiet feeding group (Q), general training group (ET), over-training group (OT), and MSCMs transplant-over-training group (MOT). Source and preparation of stem cells: the rat autologous bone marrow was extracted 1 day before surgery, and the bone marrow mononuclear cells were isolated by Ficoll density gradient centrifugation. Methods of stem cell transplantation: perfusion via coronary artery in MOT group rats; Test indicators and methods: cardiac tissue was taken after the end of 1d training (group Q, ET and OT), MEF2A factor was tested by real-time, gata-4 expression was tested by Western blot, and LVEF value was observed by cardiac color doppler ultrasound (before, after 1w, after 2w and after 3w, respectively).

Results MEF2A factor, gata-4 expression and LVEF value of the three groups of samples were detected: (1) compared with MEF2A factor in general training group (ET) and quiet group (Q), gata-4 expression was slightly improved, but there was no significant difference ($P>0.05$). After 3w, the increase of LVEF value presented significant differences (P while 1w and 2w showed no significant differences compared with the quiet group. (2) comparison between the over-training group (OT) and the quiet group (Q) showed significant differences in MEF2A factor, gata-4 expression, and LVEF decreased value ($P0.05$) between the two groups after 2w and the quiet group (Q). Cardiac tissue was taken after 2w to observe the expression of MEF2A, and gata-4 was compared with the silent group (Q) without significant difference ($P>0.05$).

Conclusions (1) based on the test data of general training group (ET), reasonable and scientific aerobic exercise can effectively enhance the cardiac function and improve the cardiac activity ability. (2) according to the test data of over-training group (OT), overloading and long-term over-training can lead to hypoxia of heart function and decrease of vitality, resulting in hypoxia and ischemia of the motor heart and damage of cardiac function. (3) according to the observation and test data of the MSCMs transplant-over-training group (MOT), MSCMs transplantation can effectively improve the cardiac function of sports injuries, enhance the cardiac vitality, and repair damaged cells and tissues to a certain extent. It can effectively prevent and treat heart injury caused by overtraining. At the same time, it provides animal experimental research support for the research of sports heart in sports medicine.