Recent findings of the effects of embryonic stem cells on the treatment of heart failure in animal models (a preclinical studies review)

A. Arti¹, A. Bader

Abstract

Heart failure (HF) is a serious health problem in developed countries and rest of the world. Typically in contrast with myocardium infarction (MI) that can cause suddenly, HF is a long term problem.

HF has two main types:

Systolic heart failure (SHF) that in this condition the problem arise as the heart pump function can not work sufficiently, therefore blood flow that leaves the heart (ejection fraction) decreases. This decreases depends on the severity of HF can be vary.

Diastolic heart failure (DHF) that in this condition the heart muscle can not fill with blood as diastolic blood pressure in this situation is low. The main reason for this situation is stiffness of the heart muscle.

HF is a common health problem across the world. It has estimated that in developed countries around 2% of adults suffer from it but with increasing the age this problem becomes severe and it rise to 6-10 % in patients over the age of 65. So, it shows that age and changing in life style (e.g. lack or reducing physical exercise) and in addition the other issues like hypertension, myocardium infarction (MI) can cause this main health problem. The researches on small animals especially on rats and mouse are developing rapidly to can answer to questions arise from different aspects of HF. In addition to routine treatments for HF new approaches seems necessary to can accelerate the treatment of this heart disease.

Stem cell therapy is a new promising approach. There are two main types of stem cells. 1- Adult stem cells (ASCs) 2- Embryonic stem cells (ESCs). In human to use ESCs is a challenging issue and it can in some countries use for therapy of patients under certain regulations, however, in animal models ESCs widely use in researches. ASCs is out of scope of this review.

The goal of this review is to evaluate the recent findings of the effects of ESCs on the treatment of HF in experimental models