Specific blood-derived cells promote survival in heart attack model

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A research team from McGill University (Canada) report a beneficial effect on cardiac function in mouse models when implanted monocytes - a type of white blood cell that is part of the immune system - helped preserve cardiac function following a heart attack (myocardial infarction).

Their study, published in the current issue of Cell Transplantation (19:4), is now freely available on-line at http://www.ingentaconnect.com/content/cog/ct/.

With heart failure a leading cause of morbidity and mortality, improving post-myocardial infarction therapies through natural adaptive responses, such as finding ways to boost and use the immune system, is an important area of research.

Monocytes, produced in the bone marrow, circulate in the bloodstream for a few days before moving to tissues throughout the body and play a role in attacking foreign substances in the body, including infection.

New blood vessel growth (angiogenesis) could play an important role in the repair of damaged heart tissue. The researchers therefore chose to grow (culture) monocytes, derived from mouse blood, under angiogenic conditions prior to transplantation to determine if these so-called monocyte derivatives could be beneficial.

"Our purpose was to assess the effect of monocyte derivatives (MDs) on

cardiac and endothelial cell proliferation and survival," said the study's lead author Dr. Jacques Galipeau, associate professor of medicine at McGill University's Lady Davis Institute for Medical Research. "In this study, we demonstrated that myocardial protection following infarction can be induced in part by growth factors released by MDs. This finding strongly suggests that these released proteins reduce cardiac cell apoptosis and enhance endothelial cell proliferation in vitro, and reduce fibrosis in vivo."

The McGill researchers found that when they transplanted the MDs into animal models of myocardial infarction, the cells secreted high levels of a variety of growth factors that provided anti-inflammatory properties and also played a role in protecting cells of the heart tissues (cardiomyocytes) from programmed cell death (apoptosis).

The researchers also noted that the majority of MDs did not survive more than two weeks in vitro, suggesting that the cells have an effect shortly after injection.

"Dr. Galipeau's group have clearly demonstrated a beneficial effect of the MDs on myocardial improvement in the post-myocardial infarction remodeling process," said Amit N. Patel, director of cardiovascular regenerative medicine at the University of Utah and section editor for *Cell Transplantation*." These results further demonstrate the benefits of bone marrow derived cells for cardiac cell therapy."

Provided by McGill University