

# Embryonic Stem Cells Protect and Treat Heart Patients

## Competitive Advantages

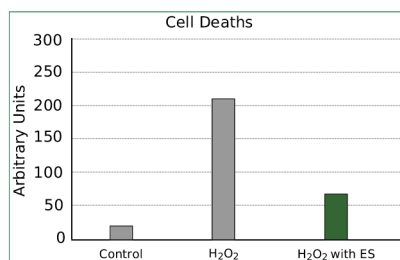
- Inhibits cell death and tissue scarring in the heart.
- May be used to prevent and treat ischemic heart disease and myocardial infarction.
- Does not cause trauma in the heart and has no major side effects.
- Echocardiography can be used to monitor treatment progress.

Cell death (apoptosis) and tissue scarring (fibrosis) are major factors in the impairment of cardiac function associated with myocardial infarction. The resulting damage often leads to chronic heart failure and death.

This invention is based on our finding that cardiac apoptosis and fibrosis can be prevented through the use of embryonic stem cells. When implanted in heart tissue, these cells release cytoprotective factors through the mediation of a specific protein, TIMP-1.

## Protecting Heart Cells

The chart below illustrates the protective effect of embryonic stem cells on heart cells exposed to hydrogen peroxide ( $H_2O_2$ ), a substance that causes cell death through oxidative stress.



When exposed to  $H_2O_2$  alone, the heart cells exhibit a death rate approximately three times higher than when they are exposed to the  $H_2O_2$  but protected by the factors released from embryonic stem cells.

In addition, in vivo studies on mice have demonstrated decreased apoptosis and improved cardiac function following stem cell transplantation and release of the cytoprotective factors.

## Safety

We expect the stem cells and their released factors to be generally safe for clinical use. To date, they appear to cause no trauma or major side effects.

## Monitoring Treatment

After stem cell implantation, patient progress can be monitored through the use of echocardiography.

## Next Steps

In vivo studies will be conducted on large animals to determine the effects and potential mechanisms of action of the released factors.

## Patent / Licensing Status

Patent pending. Exclusive rights available.

## Learn More

ES cells & apoptosis article  
[ajpheart.physiology.org/cgi/content/full/293/3/H1590](http://ajpheart.physiology.org/cgi/content/full/293/3/H1590)

## Primary Investigator

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[www.biomed.ucf.edu/index.php?option=com\\_sobi2&sobi2Task=sobi2Details&catid=4&sobi2Id=90&itemId=118](http://www.biomed.ucf.edu/index.php?option=com_sobi2&sobi2Task=sobi2Details&catid=4&sobi2Id=90&itemId=118)

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