



## A Strategy for Stimulating Heart Muscle Regeneration in Infants, Study Finds

Surgery often is life-saving for many infants born with heart defects, but one thing that doctors cannot do yet is replace heart muscle that is scarred and dysfunctional. McGowan Institute for Regenerative Medicine affiliated faculty member [Bernhard Kühn, MD](#), director of research for the Division of Cardiology at Children’s Hospital, and associate professor of pediatrics at the University of Pittsburgh School of Medicine, and researchers from the Heart Institute at Children’s Hospital and Boston Children’s Hospital hope to overcome the challenge by stimulating regeneration of heart tissue. The findings were described in *Science Translational Medicine*.



Children born with congenital heart disease are at greater risk of developing heart failure even after surgical correction of the problem.

“It is not surprising that survivors often develop heart failure later on,” said lead author, Dr. Kühn. “But when these patients were given adult medicines in clinical trials, it turned out that they were not effective. The need for pediatric-specific heart failure therapies is increasingly recognized.”

For the study, the research team examined the potential of recombinant growth factor neuregulin-1 (rNRG1), which stimulates heart regeneration by driving proliferation of heart muscle cells, called cardiomyocytes.

They treated newborn mice with injections of rNRG1 at various times after heart injury and found that early treatment starting the first day after birth boosted cardiomyocyte cell division and heart function, and reduced scarring to a significantly greater degree compared to treatment that began at 5 days after birth. The growth factor also drove cardiomyocyte proliferation in lab tests of heart muscle samples obtained during surgery from human infants with congenital heart disease.

“These findings suggest that rNRG1 administration in infants with these birth defects might be a new therapeutic strategy for pediatric heart disease,” Dr. Kühn said. “Delivering agents early on that encourage the heart to make new cardiomyocytes could help the heart perform normally and reduce the risk of developing heart failure later in life.”

More research needs to be done before clinical testing of this strategy, the research team says. Dr. Kühn began the research while a member of the faculty at Boston Children’s Hospital.

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[Abstract](#) (Neuregulin stimulation of cardiomyocyte regeneration in mice and human myocardium reveals a therapeutic window. Brian D. Polizzotti, Balakrishnan Ganapathy, Stuart Walsh, Sangita Choudhury, Niyatie Ammanamanchi, David G. Bennett, Cristobal G. dos Remedios, Bernhard J. Haubner, Josef M. Penninger and Bernhard Kühn. *Science Translational Medicine*; 1 April 2015; Vol. 7, Issue 281, p. 281ra45.)

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