NEWS RELEASE
UC San Diego
University Archives. RSS 6020

New Role Found for a Cardiac Progenitor Population

May 14, 2008

Debra Kain

In a discovery that could one day lead to an understanding of how to regenerate damaged heart tissue, researchers at the University of California, San Diego have found that parent cells involved in embryonic development of the epicardium - the cell layer surrounding the outside of the heart - give rise to three important types of cells with potential for cardiac repair.

In a study published online May 14 in advance of publication in the journal *Nature*, researchers led by Sylvia Evans, Ph.D., professor of pharmacology at the Skaggs School of Pharmacy and Pharmaceutical Sciences and professor of medicine at UC San Diego, discovered in mice that developing embryonic cells that form the epicardium develop into cardiomyocytes, or muscle cells, as well as into connective tissue and vascular support cells of the heart.

The UCSD team generated mice which enabled lineage studies of epicardial cells, utilizing a marker for these lineages called a T-box transcription factor, Tbx18. "The surprising finding was that during the earliest stages of development, myocytes are also generated from parent cells within the embryonic epicardium," said Evans. The Evans lab went on to demonstrate that, in the adult mouse, epicardial cells have lost their earlier embryonic ability to generate cardiomyocytes.

"Our findings raise the possibility that if we can restore the ability of adult epicardial cells in mammals to generate cardiomyocytes, it may enhance their future potential for cardiac repair following injury, such as a heart attack," said co-first author Jody C. Martin of UCSD's Department of Bioengineering.

While the adult mammalian heart has lost this capacity to generate new heart muscle, according to Evans, other investigators have demonstrated that zebrafish can fully regenerate their hearts following injury. This regeneration is associated with migration of Tbx 18-expressing cells to the site of injury, and the new formation of cardiomycytes. If Tbx18-cell migration is prevented, there is no repair. The UCSD researchers' findings suggest that one reason that zebrafish can regenerate their hearts may be that adult zebrafish epicardium somehow retains the capacity to generate cardiomyocytes.

Additional contributors to the paper include co-first authors Chen-Leng Cai andYunfu Sun, as well as Li Cui, Lei Bu, Lei Yang and Xiaoxue Zhang, UCSD's Skaggs School of Pharmacy; Ju Chen, Kunfu Ouyang and Xingqun Liang, UCSD Department of Medicine; Andrew McCulloch, UCSD Department of Bioengineering; Lianchun Wang, University of Georgia; William B. Stallcup, The Burnham Institute, La Jolla, California; and Christopher P. Denton, Royal Free and University College Medical School, London. The research was funded in part by a grant from the National Institutes of Health and an American Heart Association Scientist Development grant.

Media Contact: Debra Kain, 619-543-6163/p>