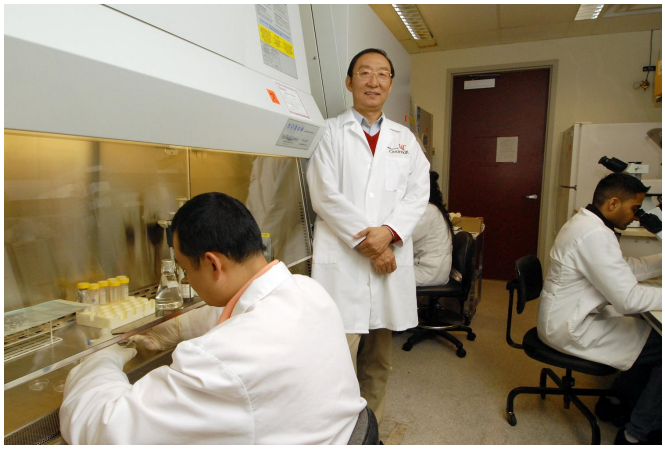
Heart attack treatment might be in your face

7 February 2017, by Angela Koenig



Professor Wang in his laboratory at the University of Cincinnati. Credit: UC

Researchers at the University of Cincinnati (UC) have received $2.4 million in federal funding to pursue research on a novel cell therapy that would repair heart damage using modified cells taken from the patient's own facial muscle.

"One of the major advantages of this technique in the clinical setting will be that we take cells from the patient themselves to lessen the risk of rejection and tumor formation. These are your own natural cells," says principal investigator Yi-Gang Wang, MD, PhD, a professor in the Department of Pathology and Laboratory Medicine and director of Regenerative Medicine Research at UC's College of Medicine.

Our cell therapy techniques, Wang says, have already been successful in small animal models, with the next step being large animal studies.

"Right now there is very limited heart muscle regeneration after a person has a heart attack," he says, adding that the only treatments that do exist are drug therapies, heart bypasses or heart transplants.

However, current treatments do not replace cells lost during heart attack, and come with additional dangers: reduced oxygen consumption from drug therapy, recovery and complications from bypass surgeries and the availability of a donor heart, which includes the risk of rejection.

"The most promising route from treatment of heart failure due to cardiovascular disease is to use cells that can promote the regrowth of healthy tissue," he says.

Over the last decade, Wang's research team has determined that facial muscle cells (masseter cells) develop in close proximity to heart muscle cells (cardiomyocytes) and have similar gene expression. By removing certain skeletal muscle genes and enhancing cardiac genes, masseter cells can be 'reprogrammed' into cells that have an identical genetic make-up to cardiomyocytes, including the ability to spontaneously beat in order to pump blood.

These masseter cells turned cardiomyocytes would then be administered via injection or a patch, Wang says.

"Our small animal studies already show it is feasible," says Wang, "and our techniques are the most efficient at generating cardiomyocytes."

The R01 grant (HL136025) comes from the National Institutes of Health (NIH) Research Project Grant.

Wang cites no conflicts of interest pertaining to the study.

Provided by University of Cincinnati Academic Health Center