

Breakthrough in adult heart repair

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Researchers from the Baylor College of Medicine and the Texas Heart Institute have discovered a new way to dramatically improve heart repair. The future goal is to use this knowledge to combat human cardiovascular disease by improving repair after a heart attack. The research has just been published in the scientific journal *Development*.

Professor James Martin led the team who uncovered the signaling pathway, called the Hippo pathway, that normally blocks heart repair in adult mice following injury. When the researchers removed certain signals, the hearts were able to regenerate. Martin's team showed that this was because the specialized heart cells, called cardiomyocytes, were able to proliferate much better: a feat that is essentially lost in normal injured hearts.

"The heart is very poor at repairing itself after various types of injury including the most common injury, the myocardial infarct. We were very excited to see full return of cardiac function in the Hippo-mutant hearts after injury. It was the culmination of a lot of hard work and also a little good luck," says Martin.

Lessons from development

Heart regeneration is possible during embryonic development, and even in newborn mice, but this ability is lost during adulthood. In previous work, published in *Science*, Martin's team identified a signaling pathway responsible for cardiomyocyte proliferation during development. Now they find that this same pathway controls proliferation and therefore

regeneration in the adult heart too.

"We approached the problem from the perspective of developmental biologists. Based on our previous observations, we thought there was a good chance that Hippo also functioned as a repressor of adult heart muscle proliferation," adds Martin.

Other animals including some fish and amphibians can repair their hearts even as adults, but it is thought that this ability was lost during the course of evolution. Now, with the breakthrough by Martin's team, there is the possibility that human [heart repair](#) could be "re-activated".

Hope for human heart disease

The [human heart](#) does not repair well after a [heart attack](#). One of the major problems is the substantial loss of cardiomyocytes, but if these cells can be convinced to proliferate instead of undergoing cell death, then the severity of heart disease could be dramatically reduced.

"The implications for treating [heart disease](#) are great. With recent advances, it is now clear that the heart muscle can be coaxed to make new muscle cells," says Martin. "This has been a very exciting and memorable year for [heart](#) regeneration research," he adds.

Provided by The Company of Biologists

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