

# Thyroid hormones reduce damage and improve heart function after myocardial infarction in rats

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Thyroid hormone treatment administered to rats at the time of a heart attack (myocardial infarction) led to significant reduction in the loss of heart muscle cells and improvement in heart function, according to a study published by a team of researchers led by A. Martin Gerdes and Yue-Feng Chen from New York Institute of Technology College of Osteopathic Medicine.

The findings, published in the [Journal of Translational Medicine](#), have bolstered the researchers' contention that [thyroid hormones](#) may help reduce heart damage in humans with cardiac diseases.

"I am extremely excited about the prospects of improving heart disease outcomes in patients by restoring normal [thyroid function](#) in the heart," says Gerdes, professor and chair of biomedical sciences at New York Institute of Technology College of Osteopathic Medicine. "Since thyroid hormones are inexpensive, significant health care savings could also result."

In the study, funded by the National Institutes of Health's National Heart, Lung, and Blood Institute and the [American Heart Association](#), scientists treated rats with thyroid hormones after [myocardial infarction](#) and examined changes at the cellular level. After eight weeks of treatment, researchers saw significant improvements in heart function and a reduction in the loss of cardiac myocytes, the cells responsible for

the heart's pumping ability.

"Reducing the loss of [cardiac myocytes](#) is a major [therapeutic target](#) after a heart attack since this should lead to improved patient survival and reduced disability," Gerdes said.

Gerdes, who has conducted heart failure research for 35 years, has focused on the two major forms of thyroid hormones known as T3 and T4. Previous animal studies have shown that myocardial infarction leads to reduced cardiac levels of T3, a change that animal studies have demonstrated can eventually cause heart failure by itself. However, blood hormone levels may not always reflect this cardiac tissue deficiency. Although tissue T3 levels have not yet been measured in human hearts, available evidence suggests the same hormone loss likely occurs after myocardial infarction.

"This study clearly demonstrates dramatic benefits in a rat model of myocardial infarction. The challenge now is to determine if humans benefit similarly," says Gerdes.

Gerdes noted that many physicians are opposed to treating heart patients with thyroid hormones, largely due to the potential of increased arrhythmias from overdosing.

"We need to conduct more research to determine which form, T3 or T4, works best in humans and how to administer and monitor hormone treatment in a manner that restores cardiac T3 without increasing serum hormones to above normal levels," he said. "We are encouraged because all animal models of heart disease studied to this point have produced beneficial results as long as non-toxic doses are used. More recently, we have also developed a treatment approach in rats that restores cardiac tissue T3 while maintaining blood hormone levels within the normal range. This is an approach that should also work in humans. So, I believe

we are now better prepared for clinical trials."

**More information:** [www.translational-medicine.com/content/11/1/40](http://www.translational-medicine.com/content/11/1/40)

Provided by New York Institute of Technology

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