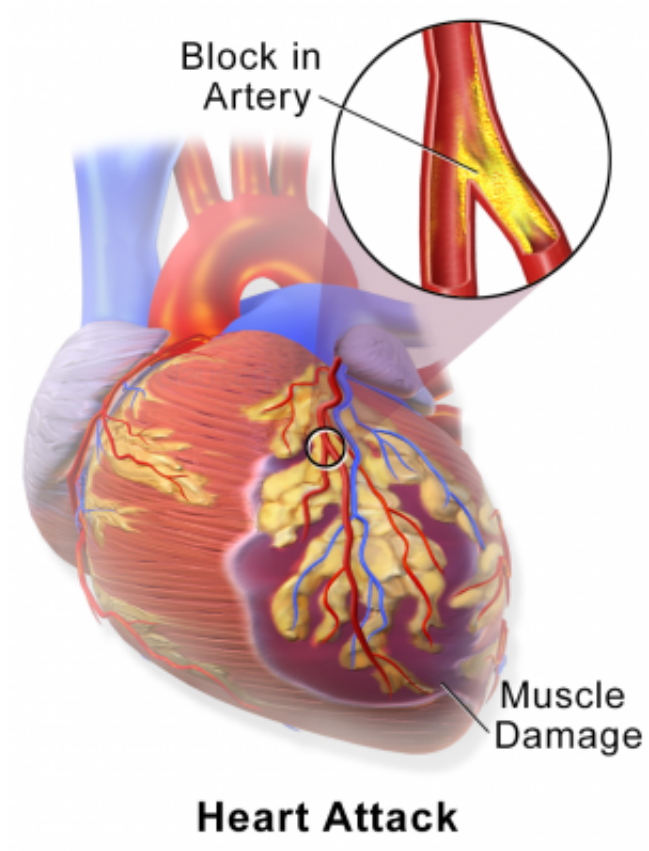
Diabetes drug shown to help body rebuild after heart attack

February 9 2016



Myocardial Infarction or Heart Attack. Credit: Blausen Medical Communications/Wikipedia/CC-A 3.0

New light has been shed on how a common diabetes drug can be used to aid recovery from a heart attack.

Heart disease is the leading cause of illness in diabetic patients. It accounts for more than half of all fatalities and the search for enhanced treatments is of high importance.

For the first time, researchers have explored the mechanism behind metformin, a key treatment used by diabetic patients to prevent heart disease. The findings are published today in the journal, *Cardiovascular Diabetology*.

Experts from Newcastle University, UK, Queen Elizabeth Hospital, Gateshead, UK, and King Abdulaziz University, Jeddah, Saudi Arabia, used stem cells from cord blood and cells from umbilical cord to construct a model simulating a heart attack in a lab.

They found new blood vessel formation that is essential for heart attack recovery, and they established metformin enhances the physiological process through which new blood vessels form.

The research has shown that lack of oxygen in the presence of high glucose levels - as occurs during a heart attack in diabetes - delays blood vessel formation whilst metformin reverses that process.

A further discovery is that metformin affects several new genes important in promoting the growth of new blood vessels.

As not all diabetic patients can take metformin, it is hoped that this research may lead to new drugs as there is now a better understanding of the action of the medication.

Dr Jolanta Weaver, Senior Lecturer in Diabetes Medicine at Newcastle University, led the study and said: "The outcome of heart disease interventions in patients with diabetes is much worse in comparison with non-diabetic individuals.

"As a result there is a demand for improved treatment approaches to enhance the outcomes of those with diabetes in order to increase heart attack survival rates.

"Our research is exciting as it has can instantly make a difference to the treatments we are exploring, offering a new approach to heart disease in diabetes and new therapies may now be developed.

"It is believed that our study is the first report describing the effect of the physiological concentration of metformin as seen in patients. Furthermore, our study concentrated on the time period vital during a heart attack when, with new therapy, we can help patients most."

Recent reports from the International Diabetes Federation highlight that 8.3% of adults have diabetes, affecting 382 million worldwide. It is estimated that this number will rise to 592 million by 2035.

Metformin is a cost-efficient drug usually used as a first-line treatment in Type 2 diabetes as it helps to make the body more responsive to insulin.

The research was funded by the Diabetes Research and Wellness Foundation, Queen Elizabeth Hospital Diabetes Charity, Newcastle University and King Abdulaziz University.

It is hoped that future studies of metformin's ability to aid heart attack recovery will focus on patient clinical trials.

Case study

Grandfather-of-one Brian Watson has lived most of his life with diabetes and welcomes the research.

The 61-year-old was only aged three when he was diagnosed with the condition and he is now secretary of Diabetes UK Gateshead, a support group for patients, their families and friends.

Mr Watson, of Low Fell, Gateshead, said: "It is very important that as much research as possible is done into diabetes and I welcome this study.

"Many people with diabetes get worried that their condition puts them at an increased risk of heart disease and a heart attack.

"This research is offering reassurance that experts are gaining a greater understanding into the treatment options available for diabetic patients so that more lives can be saved in the future.

"The diabetes research team at Newcastle University is doing a marvellous job and it is fantastic to see the advances that are being made. We are very lucky that Newcastle University is leading the way in diabetes research."

More information: Metformin Improves the Angiogenic Potential of Human CD34+ Cells Co-incident with Downregulating CXCL10 and TIMP1 Gene Expression and Increasing VEGFA under Hyperglycemia and Hypoxia within a Therapeutic Window for Myocardial Infarction, *Cardiovascular Diabetology*. DOI: 10.1186/s12933-016-0344-2

Provided by Newcastle University