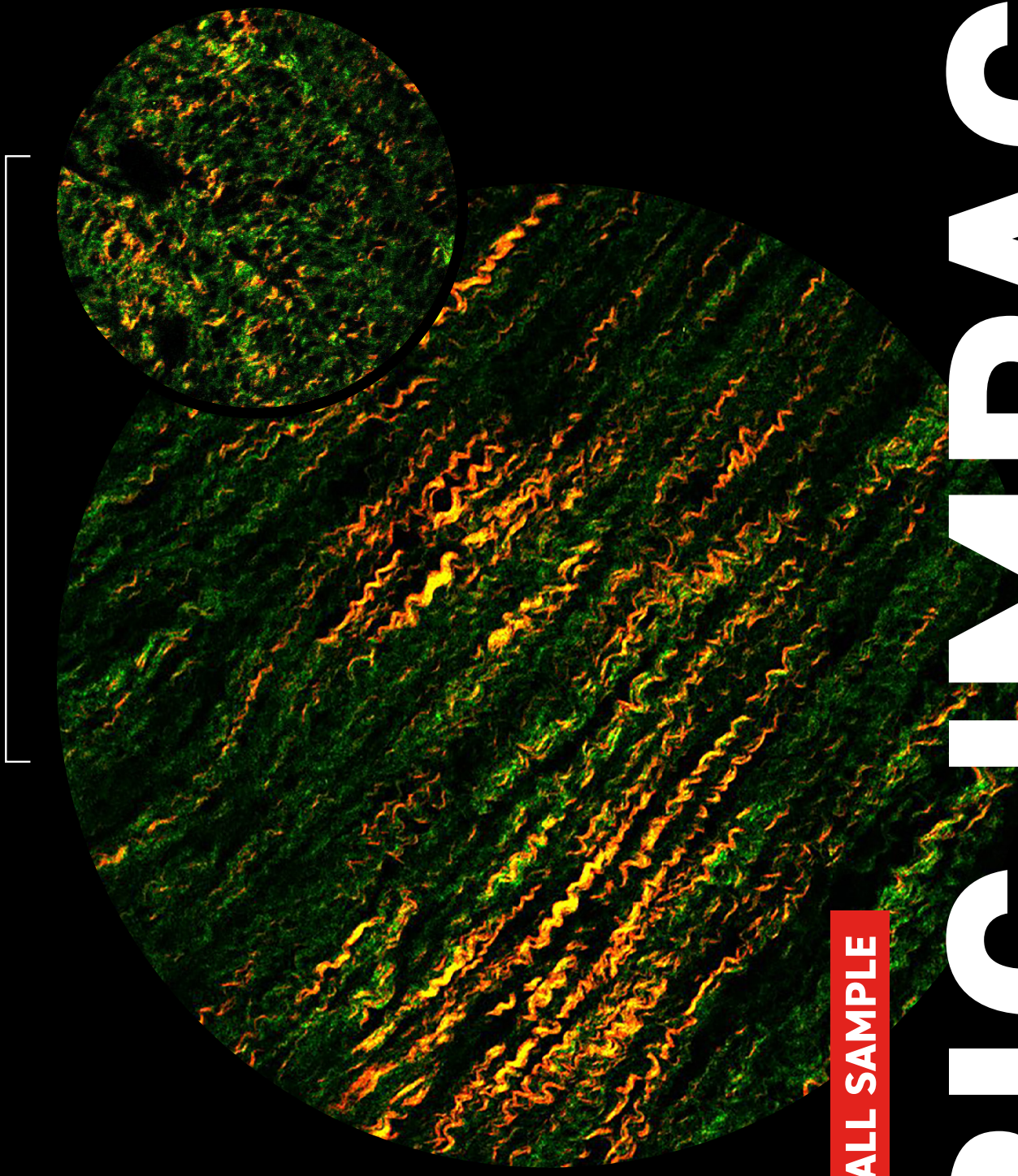
REPAIRING BROKEN HEARTS

MICROSCOPY AUSTRALIA

BIG IMPACT

A groundbreaking new treatment that repairs scarring caused by heart attack, using a protein derived form human blood, has shown a 40% increase in survival rates in animal models.



SMALL SAMPLE

Images: Second harmonic generation micrographs by Dr Rob Hume.
Top: scar tissue caused by heart attack before treatment. Bottom: scar tissue after treatment with novel protein demonstrating improved collagen fibre alignment.

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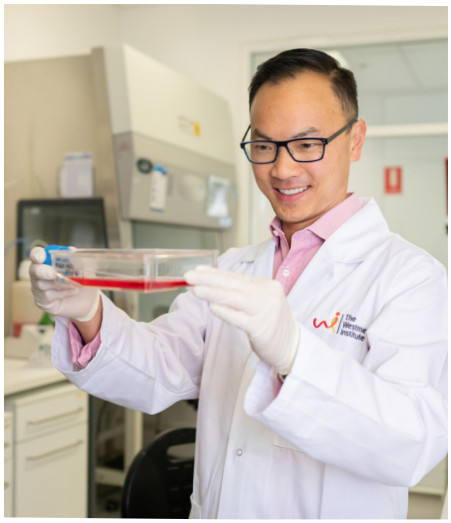

Lead researcher A/Prof. James Chong

CHALLENGE

Heart attacks are the leading cause of death in Australia. Each year around 55,000 Australians suffer a heart attack. This equates to one heart attack every 10 minutes. 45% of all heart attacks are "silent" because people don't realise that they are actually having a heart attack.

While there are good treatments if a heart attack is caught early, silent heart attacks and delays in getting to hospital, can cause extensive scarring of the heart muscle. This scarring weakens the heart muscle, increasing the risk of death from heart failure and dangerous rhythms in the period after the heart attack. To date, there has been very little treatment available to patients with scarring of the heart.

RESEARCH

Research by A/Prof. James Chong from the University of Sydney could revolutionise the prognosis of patients with heart scarring. It shows that protein therapy, using a protein derived from human blood called rhPDGF-AB, can significantly improve the function of a scarred heart. When tested on pigs, who have a similar heart to humans, it led to a 40% increase in the survival rate after a heart attack.

Dr Robert Hume, from the research team, used multi-photon microscopy at our University of Sydney facility to image collagen in scarred pig hearts. This showed that the protein treatment straightened the scar tissue and led to improved heart function.

Further animal studies are required to clarify safety and dosing, and then researchers can start moving towards human clinical trials.

IMPACT

- Greater longer term survival and improved quality of life for many more heart attack patients.
- Savings to the healthcare system from better recovery and reduced ongoing care costs.
- Treatment has potential for use in other scarred organs.

"[This treatment] is clearly a promising therapeutic option, and could potentially be used alongside existing treatments to improve heart attack patient outcomes and survival rates." A/Prof Chong, lead researcher.

"We now hope to further investigate the treatment, including whether it could be used in other organ systems impacted by scar tissue, such as the kidneys."

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