Gene research targets scarring process

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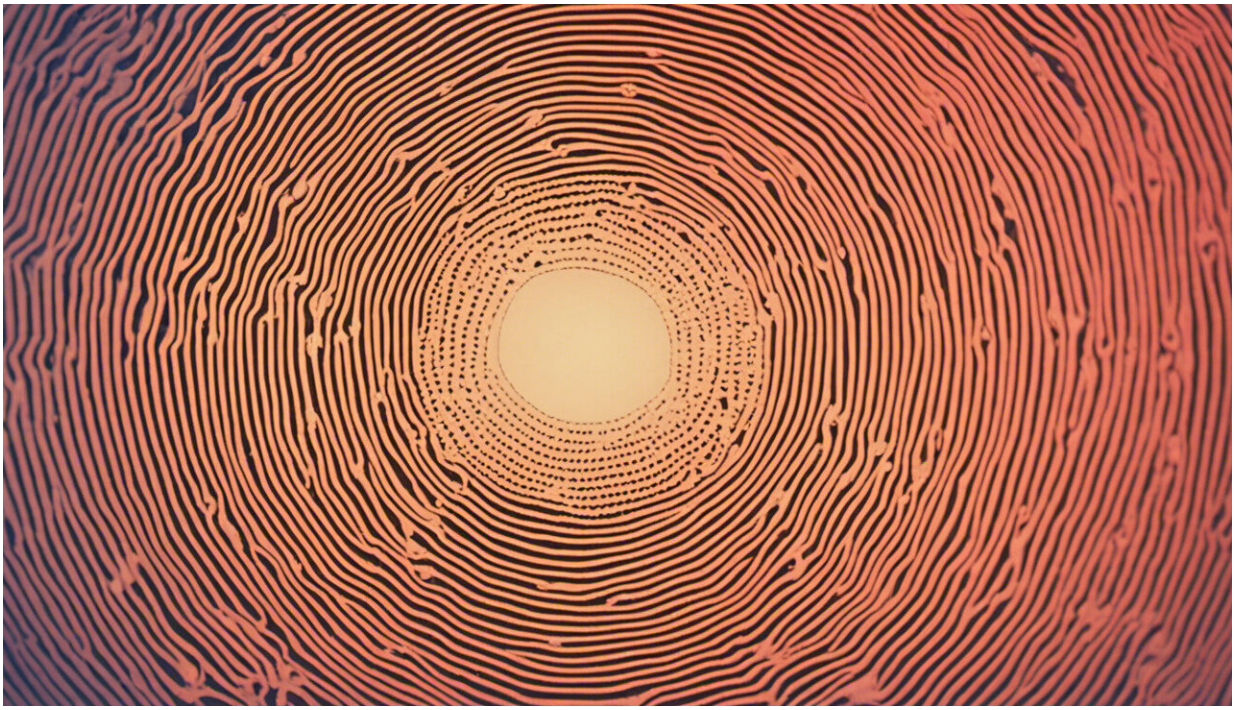

Credit: AI-generated image (disclaimer)

Scientists have identified three genes that may be the key to preventing scar formation after burn injury, and even healing existing scars.

In a world-first study, researchers at UWA's Burn Injury Research Unit found changes in the DNA and RNA of scarred skin cells compared to healthy ones.

They say treatments targeted at these genes could reverse the process that leads to scars being retained as the body makes new cells over its lifespan.

The researchers compared samples from burnt forearms of six patients to samples from the same sites on their undamaged arms with methylation and gene arrays to look for epigenetic changes—inheritable changes to the DNA other than to the DNA sequence itself.

Tissue is built when proteins bind to DNA and get a blueprint in the form of RNA that tells cells to build skin, hair, bone or muscle in a certain way.

Methylation is where methyl groups are added to the DNA at specific sites, stopping them being read by the proteins.

The researchers found burn injury changes this process, causing lasting effects to the tissue created.

Methylation analysis of the DNA identified 3298 methylation sites (out of 485,000) on 398 genes to have altered methylation patterns compared to the controls.

Gene expression analysis of the RNA showed 113 genes that were turned on or off differently to controls.

Scientists home in on controller genes

Lead researcher, PhD student Andrew Stevenson, says the 113 RNA and 398 DNA altered genes had 14 genes in common and the team chose three for further study that they believe are most involved in the process and most promising for treatment.

"These controller genes are sent off to be made again and again in a positive feedback loop, so small changes can have big effects downstream and can also activate other genes," he says.

One is known to promote collagen (what scars are made of) production in the gut and another in the tendons, while the third aids tissue development in the hands, arms and heart.

"Our techniques right now are quite crude, cutting out scars and shooting lasers into the tissue to make it heal faster and minimise scarring, so this could have big implications for future care," Mr Stevenson says.

"No one has looked at scar tissue at a genetic level before and we are using equipment and tests that have only been around about five years and mostly used to study cancer."

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