Can nanotechnology heal scar tissue?

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Think scars last a lifetime? Think again.

If you've ever had a nasty burn from hot water or a kettle, chances are you've come away with a scar.

These scars can last a lifetime and can be debilitating for victims of more severe burns.

But that might be about to change, thanks to a little thing (and I mean *really* little thing) called nanotechnology.

How little, I hear you ask? Try on a scale where things are measured in nanometres or *billionths* of a metre. To understand how small a nanometre is, pluck a hair from your head. That hair is 100,000 nanometres across.

Dr Tristan Clemons, a UWA researcher, does his work on this minute scale. And while working on the nanoscale is pushing our science and technology to its limits, it's on this tiny new frontier that the solutions to scar tissue might be found.

"Nanotechnology is answering a lot of questions about phenomena, which, up until now, have been unexplained," says Tristan.

"By understanding how things operate on the nanoscale, we're discovering a whole new world of scientific possibilities."

TINY PARTICLES—BIG POTENTIAL

So why do scientists need to work on the nanoscale to help heal burn wounds?

While the human body has been healing from burns for thousands of years, the process could be improved. Anyone with a scar can tell you that.

In the first step of the healing process, the body covers the wound with new cells in a process called reseeding.

"In the second stage, the body uses collagen to lay down new tissue and keep out infection. However, the body goes a little too far and expresses too much collagen. This leads to dense and fibrous scar tissue," said Tristan.

It's in the reseeding process that Tristan and his team hope to use nano-scaffolds to improve the healing process. These nano-scaffolds, which are tiny structures 100 times smaller than a human hair, allow us to better control cell growth in the first stage of wound healing.

"By better controlling the healing process, we can avoid the overexpression of collagen. This would prevent the formation of lasting scar tissue."

GIVING OLD SCARS NEW LIFE

While this work could prove to be revolutionary for victims still recovering from recent burns, it doesn't provide relief to people who already have scarring. Tristan's focus is on these people with existing scar tissue.

"We've seen people survive with 60 – 70% total surface area burns to their body. There's horrific scarring that accompanies that, and quality of life after survival of such a traumatic event is severely diminished because of that scar tissue," said Tristan.

"We're looking at ways we can modify scar tissue to be more like healthy tissue by using nanoparticles as delivery agents."

With the research still in its infancy, a nanotechnology-based cure to scar tissue could be over 10 years away. But Tristan is hopeful that this is just the beginning of the possibilities.

"Because we're working on something that is a fundamental problem of fibrotic disease, the application beyond just burns is quite large."

All this amazing work just goes to show even the tiniest stuff can have a huge impact for the future.

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