



# Eye contact

When a Auckland man suffered alkaline burns to his cornea after high-pressure concrete was accidentally squirted into his eye, the wound refused to heal and doctors thought there was nothing more they could do to save his eye.

Enter Professor Colin Green and The University of Auckland's Connexin Biology team. For the past 10 years they have been developing a unique wound-healing gel called Nexagon®. The drug isn't registered yet but ophthalmologist Sue Ormonde received permission for compassionate use. She placed Nexagon® gel on the cornea and was rewarded to see the wound heal quickly and the man regain full sight.

Nexagon® is based on pioneering research into the biology of connexin (gap junction proteins involved in cell to cell communication) which could change the way doctors treat wounds from leg ulcers to damaged arteries. It goes back to 1998 when Colin made an important discovery about gap junctions. It was thought that these junctions opened at the wound to help the healing process. But when Colin tested this theory on damage in the brain he found the reverse - when the junctions were blocked, the wound got smaller, not bigger. "We decided this had to be a generic response so we started looking at skin wounds and other tissues in the body."

Throughout this discovery Colin, who is now Professor of Ophthalmology and Translational Vision Research, collaborated with Professor David Becker, a London-based cell biologist. "We discovered that when you injure your body, you get an over-production of proteins that inflame the wound and this hampers the healing. It is probably something that evolved a long time ago when injury was likely to lead to a massive influx of bacteria and we needed a big inflammatory response. With modern hygiene we don't need it."

After help from UniServices, the University's commercialisation company, Colin and David founded CoDaTherapeutics (NZ) Ltd in 2003. Three years later they co-founded CoDa Therapeutics, Inc, which is based in San Diego. This company is developing two drugs:

Nexagon® gel works by stopping connexin proteins being made at the site of surface wounds. It is in Phase Two human trials in New Zealand and the United States.

The second, Peptagon, binds to gap junction channels at a wound site to reduce damage spread and inflammation. It is in an earlier stage of development but Colin says the aim is to deliver it internally through the blood stream to stop blood vessels leaking and to reduce inflammation and lesion spread after, for example, stroke and heart attack.

"We're also focused on macular degeneration in the eye which affects the vision of 10 percent of the population aged over 65," says Colin. "It's a chronic disease caused by inflammation at the back of the eye which we believe causes blood vessels to leak, leading to further inflammation and vision degeneration. We're trialling Peptagon to prevent disease progression, and even start the healing process."

The applications for this new biology will continue to open up, says Colin. "Until very recently the industry approach to wound healing has been to add an excess of something already present such as a growth factor. We're the first company that's said 'Hang on, if we stop something earlier on we can get vastly better healing.'"

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