

# RESEARCH DIRECTIONS

## How fast can we heal?

**Dr Michael Muller and Professor Neil Merrett from the School of Medicine are researching the bacteria present in various wounds and how they affect the repair process. This research is funded by the Australian Wound Management Research Foundation.**

'Most of the time when we have a cut or scrape our body fixes it without any problems,' says Dr Muller. 'Our body's ability to repair wounds is a normal physiological function which often happens quickly and without incident. However, there are times when people may experience a delay in the healing process resulting in pain, scarring, and even limb amputation or death due to sepsis. The aim of this research is to determine if certain bacterial toxins present in infected wounds cause cells essential for the healing process to stop functioning normally. This may result in a delay of the body's ability to repair wounds. If this is the case, then how do we overcome it? The causes of delayed wound healing are poorly understood although bacterial infections in conjunction with ageing, diabetes or poor vascular function are important risk factors. Due to the ongoing treatment these wounds require they contribute substantially to increased healthcare costs.'

An essential process during normal wound healing is the growth of new cells to replace damaged tissue. Researchers will investigate the role of pyocyanin (a bacterial toxin that stops cell growth and causes them to age prematurely) to test if its presence in wounds delays the healing process. This toxin has been identified in wound dressings of patients and in laboratory studies it was found that it prevented skin cell growth. In this study, wounds affected by the toxin will be examined for delayed healing and the presence of prematurely aged cells.



This project will demonstrate a new approach to understanding why infected wounds do not heal properly, and assisting treating doctors to make better decisions about therapies. In turn, this will provide clinical benefits for all patients, including those suffering from post-operative infections, and those with pre existing medical conditions such as peripheral vascular and venous disease which also impair wound healing. The resulting improvements in healing time and wound repair quality would also save health care costs for the Australian community.

**Project Title:** Bacterial Toxin-Induced Cellular Senescence as a Cause of Delayed Wound Repair  
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