

# RESEARCH DIRECTIONS

## What pain does to the body

**Professor Vaughan Macefield from the School of Medicine is leading research with Dr Ingvars Birznieks to investigate the physiological changes caused by long-term pain. This project is being supported by a grant from the National Health and Medical Research Council.**

‘Chronic pain is increasingly being recognised as a disease in itself, rather than simply a symptom,’ says Professor Macefield. ‘While pain is recognised as one of Australia’s biggest and most expensive health issues, it is also one of the most neglected.’

One in five people suffers chronic pain and it costs the country about \$35 billion a year, according to Access Economics. The psychological effects of long-term pain are well documented, but relatively little is known about what causes physiological responses to chronic pain. Pain is important for survival by helping to avoid tissue damage, galvanising the body’s fight-or-flight response and promoting conservation of energy and, in turn, healing. However, according to the International Association for the Study of Pain, the role of perceived pain in physiological deconditioning, muscle activity, motor control and balance reactions is “incompletely investigated”.

The three-part research plan tests the effect of prolonged muscle pain – created experimentally in healthy volunteers – on sympathetic nerve activity to muscle and skin, and on heart rate, respiration, blood pressure, skin blood volume and sweat release, as well as on the sensitivity of stretch receptors in muscle.

By undertaking detailed, invasive investigations in healthy awake human subjects, rather than anaesthetised animals, the researchers are better placed to interpret the mechanisms underlying the complex chain of physiological changes that cause long-lasting pain. The study will show mechanisms



by which people with chronic pain have nearly twice the rate of high blood pressure (39 per cent) as others. Preliminary observations suggest it may also explain why some people develop high blood pressure and others do not.

The integrated series of experiments in this study is expected to put to rest the debate as to whether coupling between pain stimuli and muscle contraction can promote a “vicious cycle” process that leads to the development of chronic pain. The project will also reveal mechanisms as to how pain interacts with sensory and motor function. Such understanding is crucial for the development of pain treatments and to prevent pain becoming chronic, as well as having implications for lessening the risk of injury among athletes and falls in the elderly.

**Project Title:** The effects of tonic muscle pain on the sympathetic and somatic motor systems in human subjects

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