

# Research Directions

Office of Research Services

## ***Dr NO: Nitric Oxide and High Blood Pressure***

**Professor Vaughan Macefield from the School of Medicine and colleagues from the National Hospital in Denmark and the Royal Prince Alfred Hospital are exploring the basic mechanisms that cause high blood pressure through a National Heart Foundation Research Grant-in-aid project.**



'High blood pressure (hypertension) is very common, affecting close to 50% of Caucasians during their lifespan', says Professor Macefield. 'The current trend towards a less physically active lifestyle is no doubt contributing to the increasing incidence of hypertension which is quickly becoming one of the leading causes of atherosclerosis (thickening of the arteries), cardiovascular illness and death in industrialized countries. In most people, the underlying mechanisms of hypertension have remained elusive, despite an increase in the research effort over several decades. The present project is focussed on testing one of the potential underlying mechanisms for the development of high blood pressure: a deficiency in the body's production of Nitric Oxide (NO).'

Nitric Oxide is a chemical compound that occurs naturally in the body. It is a potent vasodilator – relaxing the smooth muscle of blood vessels, causing the vessels to increase in diameter and thereby decreasing blood pressure. The majority of basic research on NO has focussed on what might be going wrong with the thin cellular lining of the blood vessels but in this collaborative study with Dr Mikael Sander from the National Hospital, Copenhagen, Prof David Celermajer from the Royal Prince Alfred Hospital and Prof Annemarie Hennessy from the School of Medicine, Prof Macefield will examine how NO affects the nervous system that controls blood vessel constriction, in healthy people and in those people with different types high blood pressure.

Using fine needle microelectrodes inserted through the skin and into a peripheral nerve of awake human subjects, Prof. Macefield is able to record the electrical signals conducted by muscle vasoconstrictor nerve cells thereby assessing their role in the underlying hypertension. By infusing a chemical that blocks NO production, L-NAME, into patient's blood vessels, the team will be able to determine how this vasodilator interacts with the vasoconstrictor nerves cells. Already, the team has shown that in patients with spinal cord injury, blood pressure reaches very high levels following infusion of L-NAME. This suggests that ongoing production of NO contributes to the low blood pressure associated with spinal cord injury, and points to potential treatments that could improve blood pressure and tissue perfusion following spinal cord injury.

**Project Title:** Nitric oxide and sympathetic reflex control of blood pressure in health and hypertension

**Funding has been set at:** \$66,000

June 2007

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