

CENTRE FOR UROLOGICAL RESEARCH

Most men will require treatment for some degree of prostate problem in later life. Prostate cancer is the most common form of cancer in men, responsible for about 3,000 deaths each year. Benign prostate hyperplasia (BPH), while not life threatening, is similarly significant. About 90% of all men aged over 80 could have their quality of life dramatically affected by this condition.

The Centre for Urological Research (CURE) is recognised internationally as a leader in understanding hormonal function in the prostate. CURE is amongst an elite few research teams seeking insight into the fundamentals of prostate growth, with a view to addressing both cancer and benign disease. Through increased knowledge as to how and why aberrant growth occurs in the prostate the team is seeking to develop better treatments for all forms of prostate disease. Additionally it is focussed on assisting with the development of more accurate and definitive methods of diagnosis.

CURE's scientists work closely with clinicians and other scientists in universities, hospitals and research institutes throughout Australia and overseas. They interface with government, biotechnology and the pharmaceutical industry, thus enabling the research to reach its potential.

Human prostate tissue grown from stem cells

In 2006 the CURE team took a giant step forwards in understanding prostate disease by growing human prostate tissue in the laboratory using embryonic stem cells. In a world first, the CURE scientists created an invaluable research tool: healthy human prostate tissue equivalent to that of a 20 year old man can now be grown in 12 weeks in vitro. This tissue is enabling scientists to monitor the progression of the prostate from a normal to a diseased state and observe factors that play a role in the development of prostate disease. It is a perfect model for testing the different hormones and environmental factors that are thought to play a role in the onset of prostate disease.



Controlling prostate cancer cell growth

It is thought that the cells immediately surrounding malignant cells in the prostate could be responsible for sustaining tumours and encouraging the cancer to proliferate and spread. By controlling a tumour's microenvironment, scientists at CURE are trying to remove the tumour's support system and thus stop its growth. Investigations are currently in progress to determine the relationship between elevated inhibin levels and the spread of prostate cancer throughout the body.

Research is also focused on betaC-activin as a possible therapeutic target that could control prostate cancer growth. Activins are recognised potent growth and differentiation factors, however the precise physiological role of betaC-activin is unclear. Mouse models have been developed at CURE to examine the biological effects of increased and absent betaC-activin, to establish if it could be a growth regulator.

Estrogen and the prostate

While estrogen is best known as the female sex hormone, it is also required to balance the male hormone, testosterone, in the healthy prostate. Scientists at CURE have demonstrated that if estrogen fails to bind to its targets or receptors in the prostate problems such as BPH occur. Pre-clinical testing of possible treatments based on this insight are currently being carried out.

Predisposing factors for abnormal prostate growth

Changes in hormone levels during certain periods of development can critically impact on the prostate, potentially resulting in permanent changes that predispose the prostate to cancer and benign disease. Increased understanding of exactly how and when this damage is done to the growing prostate could shed valuable light on environmental factors that could be contributing to the increased incidence in prostate disease. In the longer term it could also help identify possible preventative measures.



Distinguishing aggressive from latent cancer

One of the most intractable aspects of prostate cancer management is differentiating between patients who will develop life-threatening metastatic cancer and require therapeutic intervention, and patients with relatively latent, slow growing disease that will never reach a point that needs treatment. There is, therefore, an urgent need for new markers to distinguish between these two groups. CURE is currently seeking to determine if inhibin alpha subunit could be used in a diagnostic to determine the nature of the cancer present in the prostate.

Prostate tissue bank

CURE is part of the Australian Prostate Cancer Collaboration, managing the Victorian branch of Australian Prostate BioResource, a national prostate tissue bank. This bank provides scientists with much-needed access to prostate cancer tissue samples. Men undergoing radical prostatectomy who agree to donate their prostate tissue to this bank are supplying scientists with the invaluable material they need to understand prostate cancer and to test potential new therapies.

Community education

CURE also takes an active role in community education. It has strong links with Andrology Australia, a Federal Government initiative providing community and professional education on male reproductive health. Members of the scientific team speak regularly to community groups and conduct tours of their laboratories to interested parties.

