

Garvan's Breakthrough Medical Research 2007 - Cancer Research Update

Background

Although derived from normal cells, cancer cells have distinctive features that can be exploited to aid diagnosis, treatment, and prognosis. To do this, we need to know much more about the fundamental processes that govern cell behaviours: their division, their survival, and their differentiation into complex tissue structures. With this knowledge, we will be better able to stop the formation and early growth of cancers.

Garvan has one of the largest cancer research programs in Australia. As well as 7 teams conducting basic research into the cell and molecular biology of cancer, we have six translational research groups studying a number of the most commonly diagnosed and most lethal cancers: breast, colorectal (bowel), lung, ovarian, pancreatic and prostate. In 2007 scientists from the cancer program published **31 articles about new discoveries** in prestigious journals. Below are just some examples from the highlights of our work in 2007

2007 Major Highlights

Prostate Cancer

Garvan initiated the first trial of a biomarker for prostate cancer outcome in Australia. This follows the discovery in 2006 by Garvan researchers of a new marker for identifying aggressive prostate cancers. Men with low levels of the marker called AZGP1 in the prostate at the time of surgery have a greatly increased risk of developing life-threatening metastatic cancer – where the cancer spreads to other parts of the body such as the bones. This new marker has made it possible to identify men who would benefit from a more aggressive treatment at the time of surgery when the cancer may be curable. Men at a lower risk of metastatic disease will also benefit by deferring treatments that have a negative impact on quality of life. The new trials, if successful, will lead to the adoption of an AZGP1 test in clinical practice – representing a major advance in the treatment of prostate cancer sufferers.

Ovarian Cancer

Garvan scientists have determined that cancer cell DNA with altered patterns in a biochemical process called methylation can be found in the blood of women with ovarian cancer, paving the way for a new diagnostic approach.

Methylation is a normal biological process that regulates gene function. During tumor growth, however, methylation is abnormally accelerated, preventing (de-activating) protective genes which would otherwise slow or halt the disease from activating. These changes are called **epigenetic** changes.

Pancreatic Cancer

Pancreatic cancer is the fifth leading cause of cancer death in Western societies, with a 5 year survival rate of less than 10%. The treatment and survival of patients with pancreatic cancer has not changed for over thirty years because there has been little research into the molecular and cell biology associated with it. Our team has recently discovered that the presence of abnormal genes may predict response to therapy for pancreatic cancer and may represent a marker of metastatic disease at the time of surgery. We are also instigators of and major partners in the NSW Pancreatic Cancer Network which facilitates a multi-disciplinary approach to researching and treating this lethal disease and providing patient and carer support.

Lung Cancer

Garvan has identified ways in which the gene DLEC1 may be used as a biomarker for lung cancer, helping determine the prognosis of patients. Methylation causes the inactivation of DLEC1 in lung cancer. The team's work also shows that methylation may be synchronized in two genes (DLEC1 and MLH1) during lung cancer development.

Breast Cancer

Tamoxifen is the most effective breast cancer treatment currently available. Garvan scientists have been researching why aggressive cancers do not respond to this treatment. We have identified that the gene Id1 drives some of the more aggressive and metastatic varieties. By "turning off" Id1 in established breast cancer tumours in mice, the growth of tumours was reduced, and in 40% of cases the tumours shrank away. The team will now focus on further manipulating Id1 to see if the potential of this exciting new discovery can be fully realised to extend or save the lives of hundreds of women. [Click here to read the press release.](#)

Garvan scientists have also described the importance of the Transforming Growth Factor (TGF) signaling pathway in early-stage breast cancer and observed that critical genes in the pathway are epigenetically silenced or de-activated in the precursor cancer cell. The TGF signaling pathway is involved in many cellular processes in both the adult organism and the developing embryo including cell growth and cell differentiation.

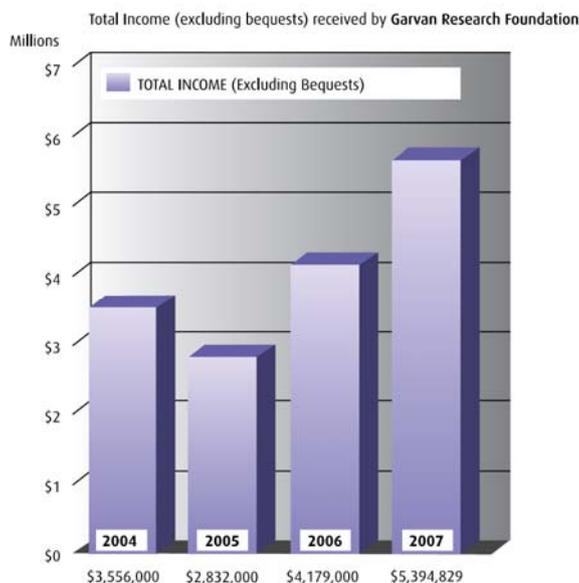
Cancer and Appetite

Garvan scientists have found that most common cancers produce large amounts of the protein MIC-1, which in turn targets receptors in the brain that switch off appetite. This leads to the extreme weight loss, common in late stage cancer, that often speeds death. Antibodies against MIC-1 may make it possible to switch appetite back on. Hopefully this will give people the strength to survive treatment and improve their chances of recovery. [Click here to read the press release.](#)

GARVAN AT A GLANCE - 2007

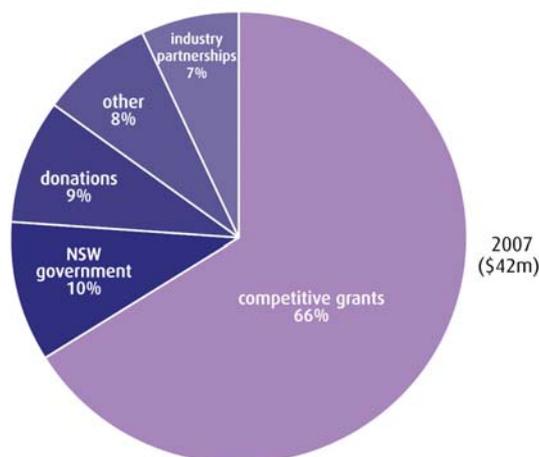
Garvan Research Foundation Income Growth

Garvan Research Foundation is the marketing and fundraising arm of Garvan Institute. In 2007 donations from the public (excluding bequests) increased by **30%** to over **\$5.3 million**. In 2008 Garvan Research Foundation must raise at least **\$7.6 million** from the public to help fund the Institute's planned research program.



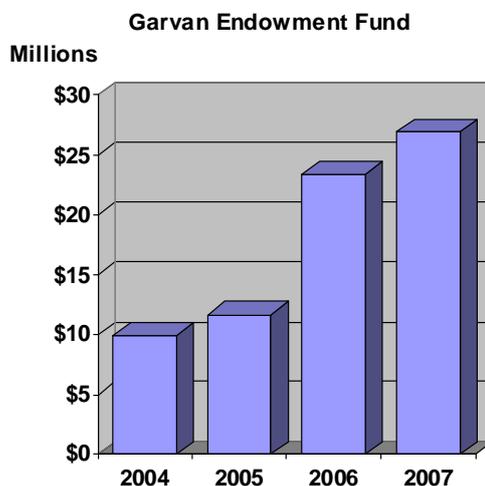
Garvan Institute Sources of Income

Donations from the public constituted **9%** of the Institute's total income for 2007. This excludes earnings from our Endowment Fund.



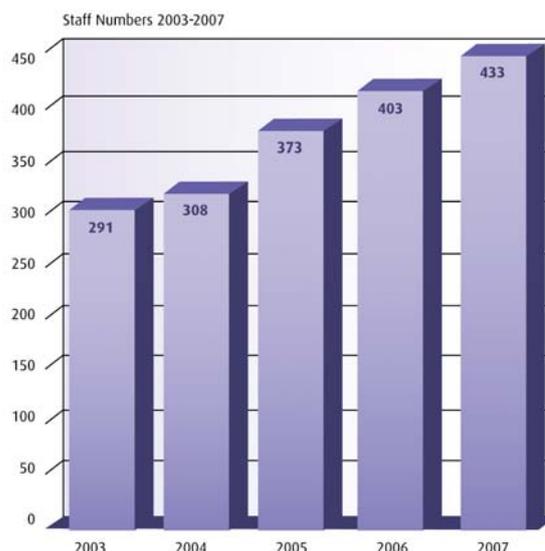
Endowment Fund Growth

Garvan's Endowment Fund gives Garvan the security of predictable funding into the future. The fund has grown from \$10 million in 2004 to **\$27 million** in 2007.



Growth of the Institute's Research Capacity

Over the past 5 years the Garvan has significantly increased our research capacity across our 5 program areas. Our staff numbers have grown by almost 50% since 2003.



Garvan Publications

Breakthrough research by Garvan scientists appeared in **153** publications in 2007. Each paper published constitutes a **new piece of knowledge**, and scientists aim to publish in the most highly regarded journal in their research field. Each journal has an "impact factor" which is a common measure of its relative importance within a specific discipline. Research organisations use "average impact factor" measurements to determine the overall significance of their research output. For example, in 2007 Garvan achieved an **"average impact factor" of 8.2 for the top 80% of its publications**. This is an excellent result, well above the international benchmark.