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GARVAN INSTITUTE

Cancer genetics to combine forces with nanotechnology to fight breast cancer

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Associate Professor Susan Clark, head of Garvan's Epigenetics Research Group, will play a leading role in a $5 million national research program called "Nanoscaled epigenetic biosensors: How combining two novel technologies will help Advanced Breast Cancer" announced today by the National Breast Cancer Foundation.

This program will involve a unique team of Australian researchers from the Garvan Institute of Medical Research, the Universities of Queensland and Newcastle, and the Peter MacCallum Cancer Research Institute, and will include experts in the fields of nanotechnology, surgical oncology, epigenetics, cancer genetics, pathology and bioinformatics. By combining resources, the group aims to have a significant impact on the early detection and treatment of breast cancer.

The identification and treatment of women with early stage breast cancer, who are at risk of developing advanced breast cancer, is one of the most important aspects of breast cancer management. Once cancer cells have spread past the breast, in other words once the cancer has metastasised, the prognosis for patients is poor.

"Our grant is aimed at developing a test that will tell women early if breast cancer has returned after treatment, so they can receive earlier intervention rather than having to wait anxiously to see if another lump or symptoms return," said Professor Clark.

The research team proposes to couple two state-of-the-art novel technologies: nanoscaled biosensors and epigenetic breast cancer markers. Biosensors are tiny, uniquely bar-coded particles that can be used to detect specific changes associated with cancer DNA. Professor Clark and her colleagues plan to identify breast cancer specific DNA codes that can be recognised with a simple blood test using these tiny barcodes.

In her opinion, women need more follow up after breast cancer surgery to ensure that metastatic breast cancer is detected earlier. "When a woman has breast cancer surgery, such as a lumpectomy or mastectomy, lymph glands are also often tested for cancer cells, or signs of metastasis," she said.

"As it is often difficult to detect the cancer cells in the lymph nodes, subsequent monitoring is often based on return of cancer symptoms, and they are much more challenging to treat at this later stage."

"We are proposing to test a woman's blood with the nanoscaled biosensors before and after breast surgery, to determine whether or not we can detect metastatic DNA from the breast cancer. If positive, the surgeon

at the time of surgery will know if they need to perform more aggressive treatment, and in particular whether or not the sentinel lymph glands need to be removed."

"The combination of nanotechnology and epigenetics research with clinical trials has the potential to further our knowledge about breast cancer in addition to improving diagnosis and treatment. This multi-disciplinary program gives us the opportunity to make major advances that would be impossible were the primary research teams working separately."

ABOUT GARVAN

The Garvan Institute of Medical Research was founded in 1963. Initially a research department of St Vincent's Hospital in Sydney, it is now one of Australia's largest medical research institutions with approximately 400 scientists, students and support staff. Garvan's main research programs are: Cancer, Diabetes & Obesity, Arthritis & Immunology, Osteoporosis, and Neuroscience. The Garvan's mission is to make significant contributions to medical science that will change the directions of science and medicine and have major impacts on human health. The outcome of Garvan's discoveries is the development of better methods of diagnosis, treatment, and ultimately, prevention of disease.

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