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Media release

LUNG CANCER GENE IDENTIFIED
AND NEW DRUG TREATMENT HOPE

St Vincent’s researchers have contributed to a long-awaited breakthrough in the fight against the world’s most fatal cancer – cancer of the lung.

The discovery paves the way for clinical trials in the new year using powerful drug treatment to shrink tumours in selected patients diagnosed with squamous cell lung cancer.

As well, St Vincent’s is perfecting a method for early and accurate identification of patients with a faulty gene associated with squamous cell lung cancer.

Working with colleagues in Germany, the St Vincent’s Melbourne team has found that patients with squamous cell lung cancers have many copies of the FGFR-1 gene (Fibroblastic Growth Factor-1) and this makes a tumour continuously multiply and grow – making it ‘immortal’. While most people have two copies of this gene, patients with this particular cancer typically have 10-15 copies.

Squamous cell is the second most common type of lung cancer, after adenocarcinoma, and is usually associated with past smoking. In Victoria alone, some 2500 people are diagnosed with lung cancer each year – and of these, 30 to 40 per cent would have squamous cell lung cancer.

According to researcher, Associate Professor Gavin Wright, the director of Surgical Oncology at St Vincent’s Hospital in Melbourne, researchers have possibly discovered a way to switch-off the ‘immortality’ of cells found in squamous cell lung cancers.

“We know this FGFR-1 gene makes the cancer cells multiply and spread. If we block the FGFR-1 receptor on the cancer cell, the ‘immortal’ cancer cell undergoes the normal programmed cell death that ‘tired’ or diseased cells are supposed to – in a similar way that skin peels and is replaced by healthy new skin,” Associate Prof Wright says.

Two drugs, already in existence but until now not identified as useful, are designed to target this very gene. Early trials have shown that the two drugs cause squamous cell lung cancers in mice to disappear. Human trials are likely to start in Victoria and at the Max Planck Institute in Cologne early in the new year.
Background

St Vincent’s Hospital in Melbourne began collecting lung cancer samples from patients in 2002. This was made possible by ‘banking’ the frozen tissue in the Victorian Cancer Biobank – a service provided by the Victorian Cancer Agency at no cost to researchers. The significant cost of DNA sequencing meant that St Vincent’s and Peter MacCallum researchers could only test 60 tumours for gene abnormalities. Fortunately, the Max Planck Institute in Cologne was doing the same. St Vincent’s joined forces and contributed 300 tumour samples and the Max Planck Institute 400 samples. The remaining 300 samples came from a range of sources around the world.

Armed with the world’s largest collection of lung cancer samples, The Max Planck Institute then funded the detailed DNA sequencing of the 1000 tissue samples.

Together, they identified that in about 25 per cent of patients with squamous cell cancers there are far too many copies of the FGFR-1 gene, which causes the cells to overgrow and become immortal.

Because gene sequencing is prohibitively expensive, a St Vincent’s researcher and pathologist, Prue Russell, is perfecting a simpler test to identify the gene in individual patients. Current research at St Vincent’s is determining the accuracy of the test which could provide opportunities for early intervention for patients around the world. By identifying tumours with the faulty gene, researchers may soon be able to ‘switch off’ the gene, just as they are now able to do with some people susceptible to other gene-related cancers.

Today’s news represents a major advance which can be compared to the historic identification of genes associated with breast tumours and melanomas.

Interview opportunities

- A/Professor Gavin Wright, Director of Surgical Oncology, St Vincent’s Hospital Melbourne
- Dr Prudence Russell, Department of Pathology, St Vincent’s Hospital Melbourne
- Mr Russell O’Toole, husband of patient Sandy O’Toole who donated her tissue to the project before sadly dying from an adenocarcinoma lung cancer 21 months ago. Her family and friends then raised money to help the project proceed.

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