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Application of Pharmacogenomics for Rational Chemotherapy of Lung Cancer

Status	Current
Competition	Applied Genomics and Proteomics Research in Human Health
Sector	Health
Genome Centre	Genome British Columbia
Project Leaders	Stephen Lam & Victor Ling

Project Description

Personalized approach to health care of lung cancer victims

Every year, lung cancer kills more people than breast, prostate and colon cancer combined. Fewer than 15% of patients with lung cancer survive more than five years, largely because at the time of diagnosis, most patients are beyond cure by surgery or radiotherapy. Chemotherapy offers some hope in controlling the disease, both in the lungs and in other parts of the body, but anticancer drugs are toxic and relatively ineffective.

While many new cancer-fighting agents are under development, Victor Ling of the B.C. Cancer Agency points out that the challenge is to be able to test them quickly and economically: “The conventional approach to new agent development is time consuming and very costly. After the usual open and randomised clinical trials, which take years to conduct and are costly to perform, there is little guarantee that the new agent will actually make a significant impact on the outcome for patients.”

However, there is increasing evidence that genomic information from cancer tissues will allow researchers to classify cancers according to their biological behaviour. “This capability will help us predict a patient's response to chemotherapy,” explains Dr. Ling, “ultimately enabling researchers to apply a personalized approach to the health care of lung cancer victims.”

The Application of Pharmacogenomics for Rational Chemotherapy of Lung Cancer project will analyze a large collection of lung cancer specimens from patients and lung cancer specimens transplanted in mice before and after standard chemotherapy, to generate a DNA fingerprint that can distinguish those who benefit from particular treatments from those who do not. From the repository of transplanted lung cancer grafts, they will also test if patients whose cancers are resistant to one chemotherapy regimen will also be resistant to other regimens. The DNA fingerprint of cells that are resistant to different anticancer drugs will be determined.

This project will lead to significant advancements in the treatment of lung cancer. It will enable researchers to identify the minority of patients who will benefit from current chemotherapy, thus saving valuable health care resources. It will also relieve the vast majority of patients from relatively non-effective and toxic treatments and thus improve their quality of life. In addition, it will enable researchers to identify patients for novel experimental therapy trials that will dramatically accelerate the development of new anticancer drugs, and provide comprehensive data for the discovery of molecular targets for development of new anticancer drugs.