

HUMPHREY OEI INSTITUTE CANCER RESEARCH NEWS

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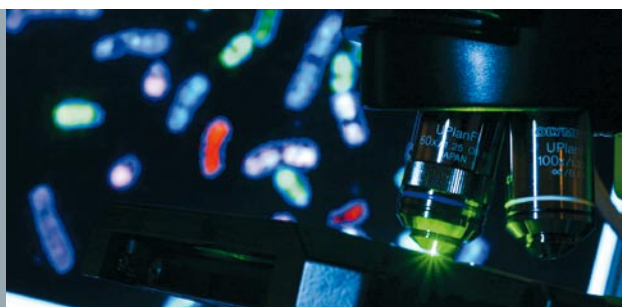


National Cancer
Centre Singapore
SingHealth

**Today's Research
Tomorrow's Cure**

*A publication of the Humphrey Oei Institute
of Cancer Research for the community*

RESEARCH IN THE LIMELIGHT SURVIVAL OF THE FITTEST



In the human population, individuals are unique, due to differences in genetic make-up. Polymorphisms are variations that occur in the DNA sequence and are a normal part of human genetic variation. They can affect an individual's phenotype, for example difference in hair colour, as well as how an individual develops a disease or responds to a chemical. A team led by A/Prof Caroline Lee, is looking for genetic polymorphisms that play important roles in an individual's response to drugs. A/Prof Lee is a Principal Investigator at the centre's Division of Medical Sciences, Humphrey Oei Institute of Cancer Research (HOICR) and holds a joint appointment at the Department of Biochemistry, National University of Singapore. The highlight of her research is the use of a novel method to search for polymorphisms, more specifically single nucleotide polymorphisms or SNPs.

"This method for identifying SNPs is based upon Darwin's theory of natural selection. When humans are exposed to different environments, such as different food, medicine or viruses, the polymorphisms that help us to survive better in this environment will increase in frequency. We use this natural selection method to identify functional polymorphisms that help individuals adapt to the environment. So far, we have been fortunate and most of the SNPs identified have been functional," explained A/Prof Lee.

A/Prof Lee and her team are in the process of developing a SNP-chip, which she hopes to bring to the clinic. This will enable

doctors to create their patients' genetic profiles, and could help them to better customise patients' drug therapies.

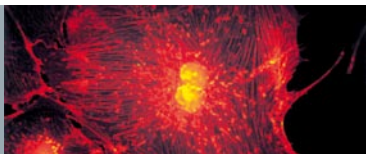
Her laboratory is also interested in understanding the molecular mechanisms underlying liver cancer, one of the most prevalent cancers in the world. A/Prof Lee has identified a protein molecule, called FAT10, that is highly expressed in liver cancers. A/Prof Lee went on to show that FAT10 causes abnormal mitosis and chromosome instability, which are typically associated with tumours.

"Now that we understand this mechanism better, hopefully we may be able to identify targets for FAT10. This could be used in new drug discovery or cancer diagnostics for liver cancer," said A/Prof Lee.



"The ultimate aim is to get closer to personalised medicine, where we can look at the genetic profile of an individual and predict whether he will be susceptible to certain complex disorders, or be more or less responsive to certain drugs."

A/PROF CAROLINE LEE



KEEPING YOU POSTED



NCCS LAUNCHES HUMPHREY OEI INSTITUTE OF CANCER RESEARCH

to Strengthen its Research Programmes

- *New Institute has been established with \$20 million donation from Mrs Mavis Khoo-Oei, Chairman Goodwood Group*
- *Government gives matching grant to Institute*

The National Cancer Centre Singapore (NCCS) officially launched the new Humphrey Oei Institute of Cancer Research on 19th April 2007. The Institute has been established with an endowment of \$20 million from Mrs Mavis Khoo-Oei, in memory of her late husband Mr Humphrey Oei. This Institute embraces all the research activities currently carried out by NCCS.

Mr Lim Hng Kiang, Minister for Trade and Industry, was the Guest-of-Honour at the launch ceremony and Mrs Mavis Khoo-Oei, Chairman of Goodwood Group was the Special Guest. They officiated the sculpture unveiling ceremony.

NCCS Director Prof Soo Khee Chee said: "We are deeply encouraged by this generous donation, which will be matched dollar for dollar by the government. Putting all our research divisions under HOICR will strengthen our organisation by giving us a common identity. We want to court the best brains locally and from around the world to work with NCCS,

as we are the national institutional home for cancer experts. Our scientists have been receiving international recognition for their work, winning several accolades and awards in the process. However, for NCCS the true winner will be the day when we see our research work being moved from the bench to the bedside, to cure our patients by giving them not just quality but also affordable health care."

The Institute will enable NCCS to take its research work to a higher plane. As an institution, it can create the research culture as well as improve links between the academic and the professional communities, and facilitate more opportunities for funding of its research programmes. With this launch, three research divisions in the NCCS have come under the fold of the Institute, namely:

- Division of Medical Sciences
- Division of Clinical Trials & Epidemiological Sciences
- Division of Cellular and Molecular Research

In conjunction with this inaugural event, world-renowned virologist Sir John Skehel delivered the 2nd Humphrey Oei Distinguished Lecture. His lecture was on "The Origins of Pandemic Influenza". Because of his research, the medical community has a better understanding of the pandemic influenza virus outbreak in 1918 that claimed more than 20 million lives, and it has provided new insights into the pandemic potential of the H5N1 influenza viruses. This lecture was particularly relevant in view of daily discussions on the possibility of a bird flu pandemic.

GETTING TO KNOW YOU



Dr Paula Lam

DEVELOPING NEW THERAPIES



Her first ambition was to be a mathematician. Not surprising, she only studied biology when she went to junior college. But today Dr PAULA LAM is one of the 152 centre researchers tirelessly working to develop new cancer therapies. Dr Lam tells why she had a change of heart and how she is embracing research challenges.

Q *What made you decide to venture into being a researcher in the cancer area?*

A The funny thing is that I never studied biology, not until the GCE "A" level. In fact my favourite subject was mathematics, and I originally envisioned becoming a mathematician. However, I decided to commit myself to the field of cancer research, after I lost my beloved father to this deadly disease. It has been a fulfilling career for me and I am very happy to play a role in the fight against cancer.

Q *What research do you do at the National Cancer Centre?*

A Conventional cancer therapy has its limitations. Surgery may not always be the most appropriate treatment, since not all regions of the tumours are easily accessible. Treatments, such as radiotherapy and chemotherapy, kill normal proliferating cells, in addition to the cancerous ones, resulting in unpleasant side-effects. To overcome these problems, my laboratory aims to develop an ideal carrier or gene vector, which can deliver therapeutic agents into cancer cells more effectively. One of our research objectives is to develop novel vectors, which support stable and controllable therapeutic gene expression, only in tumour cells with uncontrolled cell divisions. This makes our research like a magic bullet, to specifically target and kill the cancer cells, rather than a bomb, which would take out not only the cancer cells, but many of the normal cells too.

We have also initiated studies in an attempt to understand the interaction between stem cells and tumour cells in the tumour micro-environment. While, neural stem cells are known for their ability to track tumour cells, not much is known about precisely how and why this takes place. Deciphering the cellular factors and mechanism involved for this tumour tropism could be pivotal for our current design of therapeutic modalities for cancer gene therapy.

Q *Is research stressful? How do you relax and recharge your batteries?*

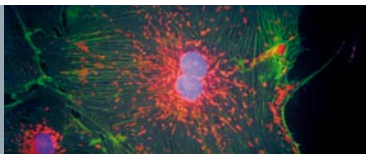
A Research can be stressful at times. The actual work hours vary, with my longest work "day" being a 72-hour non-stop time course experiment. Like other jobs, we may have to work on weekends from time to time. But more important, we need to constantly keep up with the latest literature and churn out good ideas and data, which is necessary to gain funding and grants.

Getting good data is one of the things that keeps me excited about research, but on the other hand, getting bad data gives me insomnia! Either way, research can be energy-draining, so a family vacation or cycling by the East Coast is a good form of relaxation for me. Actually anything that is "non-research-based" can be relaxing. It could be as simple as bringing my niece and nephew to Swensen's for an ice cream, and having a bit for myself!

Q *What new breakthroughs in cancer research do you hope to see in the next 5 years?*

A I would like to see breakthroughs that help us to further our understanding on the role of "stem" cells in a tumour microenvironment setting. For example, if more is known about how stem cells track tumour cells, strategies could be developed for effective deliveries of therapeutic genes. Of course, the idea of developing a cancer vaccine is also a very attractive concept.

"...This makes our research like a magic bullet, to specifically target and kill the cancer cells, rather than a bomb, which would take out not only the cancer cells, but many of the normal cells too."



CORRIDOR CONVERSATIONS



HUMPHREY OEI
INSTITUTE OF CANCER RESEARCH

Two Top Research Institutes Join Hands to Work on TRANSLATIONAL RESEARCH PROGRAMME

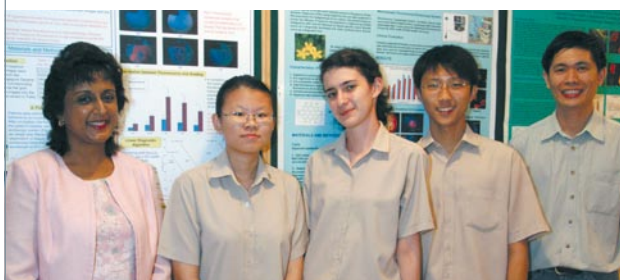
With the objective of expediting translational research and clinical investigations, the National Cancer Centre Singapore (NCCS) signed an international collaboration agreement with the Van Andel Research Institute (VARI) based in Michigan, USA. This major move aims to marry the expertise of doctors and researchers of both countries and move the two institutions towards creating a borderless medical community for research and treatment.

The NUS VARI lab will conduct research on those cancers that are rare and thus difficult to study in the US, but are more prevalent among the Asian population, such as kidney cancer, cholangiocarcinoma (bile duct cancer), head and neck cancers, and non-Hodgkin's lymphoma (specifically natural killer-cell lymphoma). The NCCS – VARI lab will also compare the differences in biology, behaviour and drug responses between Caucasian and Asian cancer patients. These studies will develop novel diagnostic and prognostic tools to accurately predict patient response to cancer drugs. It is hoped that drug efficacy will increase and drug toxicity and side effects will decrease.



Left to right: Mr David Van Andel, Chairman and CEO, Van Andel Institute, Dr George Vande Woude, Director of Van Andel Research Institute, Dr Bin Teh, Distinguished Scientific Investigator and Prof Soo Khee Chee, Director, NCCS.

NCCS MENTEES CLINCH TOP PRIZE



Left to right: A/Prof Malini Olivo, with the winning JJ team comprising Ng Xinyi, Asgarova Rana and Clarence Zhuang, and Mr James Kah.

As part of the community outreach to imbue our youth with the passion for Science and Research, National Cancer Centre Singapore (NCCS) has been actively promoting research amongst students from local junior colleges/centralised institutions and polytechnics, to groom young aspiring scientists. With the mentorship of NCCS' scientists, 3 young aspirants from Jurong Junior College (JJ) clinched the top prize at the Singapore Chemical Science Fair (SCSF), organised by the Department of Chemistry, National University of Singapore on 10th March 2007.

SCSF is an annual research competition to promote chemical science research projects in schools and polytechnics in Singapore. This year, it drew strong competition from top institutions such as Raffles Junior College and Hwa Chong Institution. "NCCS believes in nurturing future researchers in cancer biology and genetics. It is our way to give back to the community and we are privileged to share the joy of these aspiring young scientists," said A/Prof Malini Olivo, Principal Investigator, Tan Chin Tuan Laboratory of Photodynamic Diagnosis and Treatment, HOICR, NCCS. The winning JJ team comprises Ng Xinyi, Asgarova Rana and Clarence Zhuang.

Equipping the New Generation of Scientists

Under the mentorship of Mr James Kah, a PhD student from National University of Singapore (NUS) who is attached to the NCCS laboratory, the JJ team spent 6 months to develop a protein assay by tapping on the unique optical properties of gold nanoparticles. Protein assays determine the amount of protein in an unknown solution. Existing commercial protein assays such as the Bradford assay and BCA assay are usually costly and require up to a few hours to diagnose the amount of protein, but the team has developed a rapid and cost-effective protein assay, which might even be commercially viable. The community partnership scheme will certainly provide these young researchers with the insight, expertise and tools to work on translational research in the future.