

2015 PSTA WINNER CITATIONS

PRESIDENT'S SCIENCE AWARD 2015



Professor Patrick Tan
Cancer and Stem Cell Biology
Duke-NUS Graduate Medical School Singapore/Genome Institute of Singapore

Professor Teh Bin Tean
Division of Medical Sciences
National Cancer Centre Singapore

Professor Steven Rozen
Cancer and Stem Cell Biology and Centre for Computational
Biology Duke-NUS Graduate Medical School Singapore

“For outstanding integrative and translational research in Asian cancer genomics”

Professors Patrick Tan, Teh Bin Tean, and Steven Rozen are recognized for their discoveries of new genes and molecular pathways in various types of Asian cancers. Over the past eight years, these scientists have pursued multi-disciplinary and collaborative “team-science”. Using innovative genomic platforms and biological approaches including next-generation sequencing, they have interrogated the genomes of Asian cancers, identifying novel targets for improved therapeutics and diagnostics.

Asian cancers represent a vast unmet clinical need. The World Health Organization estimates that in 2012, there were 14 million new cancer cases worldwide and 8.2 million cancer-related deaths. These numbers will rise dramatically over the next two decades and will particularly impact Asia. By 2030, 70% of the world’s cancer deaths will occur in Asia and developing countries. Importantly, because different cancers can display tremendous geographic variation, many cancers endemic to Asia are different from those in Western countries, and comparatively little is known about their underlying molecular genetics. Thus, Asian cancers are an urgent area to which scientific and medical attention should be focused to develop novel therapeutic, diagnostic, and preventive strategies.

The Tan/Teh/Rozen team has addressed this problem through an integrated biological research program spanning basic science, translational research, and clinical studies. Focusing on four Asian malignancies (stomach, biliary tract, urinary tract, and breast fibroepithelial tumors), the team identified novel genetic alterations, investigated relationships between these alterations and environmental factors, and mapped how these contribute to disease. Their results have led to strategies for the improved diagnosis, treatment, and prevention of such cancers. The Tan/Teh/Rozen “team-science” approach, reflected in their outstanding record of joint publications and trainee co-supervision, has resulted in a steady stream of notable scientific breakthroughs documented by multiple publications in high-impact journals including Nature Genetics, Cancer Discovery, and Science Translational Medicine. Some of the team’s key discoveries include:

- a) Discovery of specific molecular signatures associated with exposure to aristolochic acid (AA), a carcinogen found in certain herbal remedies, and its role in liver and bladder cancer.
- b) Identification of genes mutated in breast fibroepithelial tumors, including the MED12 gene that is mutated in 60% of breast fibroadenomas, a condition found in 10% of women worldwide
- c) Demonstration of the role of chromatin modifier genes such as ARID1A and BAP1 in stomach and biliary tract cancers.

The team's work has also garnered substantial translational impact and attracted significant industry funding of close to S\$4 million for collaborative research projects with multiple pharmaceutical companies such as Roche, GSK, Bayer, Novartis, and Principia Biopharma.

The team is also internationally recognized as a leader in the field of Asian cancer genomics, by being invited to participate in the International Cancer Genome Consortium to lead programs in biliary tract cancers and T-cell lymphomas. Team members Tan and Teh have also been elected to the American Society of Clinical Investigation, a prestigious honor society of physician-scientists.

The team's research has been performed in their capacity as faculty members of Duke-NUS Graduate Medical School Singapore, in collaboration with other national institutes. Professors Tan and Teh carry joint appointments with the Genome Institute of Singapore and National Cancer Centre Singapore respectively, and the team is also affiliated with the Cancer Science Institute of Singapore and the Institute of Molecular and Cell Biology. For their outstanding research on Asian cancer genomics, Professors Patrick Tan, Teh Bin Tean, and Steven Rozen are awarded the 2015 President's Science Award.