



PRESS RELEASE

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NUS and NCIS researchers apply novel digital medicine platform to give lymphoma patients a new ray of hope

After promising results from initial patients, research team hopes to raise funds to conduct a phase 2 clinical trial at NCIS and NCCS, to validate the technology for routine use in patient care

Singapore, 25 July 2020 — An AI-driven digital medicine platform, called Quadratic Phenotypic Optimisation Platform (QPOP), developed by researchers from the Cancer Science Institute of Singapore (CSI Singapore) at the National University of Singapore (NUS) is helping doctors make better clinical decisions when treating cancer patients.

“QPOP customises a drug ‘cocktail’ for every patient. Using artificial intelligence, the tool ranks potential patient response to more than 500,000 drug combinations to identify the most effective drug combinations for a patient in less than one week. With just a small amount of blood or tumour sample from patients, QPOP derives potential drug combination effects by mapping the response that a smaller predetermined set of drug combinations had on the specific patient’s cancer cells. This enables doctors to make more informed decisions on possible treatment outcomes for patients,” said Associate Professor Edward Chow, who is the leader of the team that developed QPOP and Principal Investigator at CSI Singapore.

71-year-old Madam Peggy Tay is a cancer patient who has benefitted from the application of QPOP to devise her treatment plan. Madam Tay was first diagnosed with Diffuse Large B-cell Lymphoma (DLBCL), an aggressive type of blood cancer, in May 2012. She underwent chemoimmunotherapy with a good response, but suffered a relapse in January 2019. After a brief response to salvage chemotherapy, her disease relapsed again in September 2019.

CSI Singapore researcher Assistant Professor Anand Jeyasekharan, who is also the medical oncologist treating Madam Tay at the National University Cancer Institute, Singapore (NCIS), said, “Relapsed DLBCL is an area of unmet clinical need. Patients who have disease that is refractory to more than two lines of chemotherapy do poorly, and there are no standard options of care. CAR-T cell treatment is promising but cost can be a key consideration. We decided to enrol Madam Tay in our study which looks at using QPOP for clinical decision-making.”

QPOP: Improve decision-making for cancer treatment

When QPOP was performed, it showed that Madam Tay's cancer had a strong sensitivity to a combination of palbociclib and everolimus medication. However, this combination had only been tested in breast cancer, with no available data in lymphoma. Hence, she was first offered treatment with a standard regimen of R-GDP for relapsed lymphoma. As predicted by QPOP, Madam Tay did not respond to this treatment.

At this point, since there were no other options, Madam Tay and her family were offered the option of off-label (non-standard) treatment with the palbociclib-everolimus combination, and they were keen to give it a try. "Madam Tay was started on the treatment in December 2019, and immediately started feeling better. She needed some dose reductions along the way, but the latest scans show complete resolution of her aggressive lymphoma lesion. She is now only taking palbociclib as a 'maintenance' therapy. She has had a remarkable response to treatment, and she is currently in remission and doing well," explained Asst Prof Jeyasekharan.

In 2018, QPOP was also used to achieve positive treatment outcomes for a patient who was suffering from hepatosplenic T-cell lymphoma, another type of blood cancer.

Assoc Prof Chow said, "These early successes in lymphoma have taught us a lot about how to use QPOP to improve patient outcomes. In addition to providing strong evidence that therapy custom-tailored to the patient is possible, this work has provided the foundation to move forward with the larger clinical trials needed to make QPOP more clinically available."

QPOP testing is currently only offered in the context of a clinical research study, conducted through the lymphoma teams at NCIS and National Cancer Centre Singapore (NCCS), enabled by a national collaborative grant on lymphoma.

Phase 2 clinical trial in the works

The research team at CSI Singapore, NCIS and NCCS now hopes to raise funds to conduct a phase 2 clinical trial where approximately 60 patients with relapsed lymphoma will be randomised into two groups - QPOP-guided choices and physicians' preference. Since the overall outcomes for refractory lymphoma on standard treatment are poor, the trial will help clinicians understand if using QPOP-defined treatment will help improve the survival and quality of life for these patients.

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About the Cancer Science Institute of Singapore (CSI Singapore)

CSI Singapore is a state-of-the-art University research institute affiliated with, and hosted at the National University of Singapore. It was established in 2008, with a “Research Centre of Excellence” grant, one of only five in Singapore, by the National Research Foundation and the Ministry of Education.

The institute is an anchor for research expertise in three broad programmes; Cancer Biology & Stem Cells, Experimental Therapeutics, and the RNA Biology Centre; these programmes form expansive platforms for CSI Singapore’s focus on key cancers, namely in gastric, liver, lung and leukaemia which are endemic in the Asian populations. CSI Singapore aims to position Singapore as a global-leader in the field of Biomedical Sciences. Its mission: to conduct a multifaceted and coordinated approach to cancer research, extending from basic cancer studies all the way to experimental therapeutics and in doing so, improve cancer treatment.

For more information on CSI Singapore, visit <https://www.csi.nus.edu.sg/web/>

About the National University Cancer Institute, Singapore

The National University Cancer Institute, Singapore (NCIS) offers a broad spectrum of cancer care and management covering both paediatric and adult cancers, with expertise in prevention, screening, diagnosis, treatment, rehabilitation and palliative care. The Institute’s strength lies in the multi-disciplinary approach taken to develop a comprehensive and personalised plan for each cancer patient and his or her family.

Our award-winning clinician-scientists and clinician-investigators conduct translational research and clinical trials, providing patients with access to evidence-based cancer diagnostics, technology and therapies.

For more information about NCIS, please visit www.ncis.com.sg.