



Dear Colleagues,

Welcome to the June 2015 (Issue 7) update of POLARIS. Supported by A\*STAR's Strategic Positioning Fund (SPF) program, POLARIS is now two and a half years old! Over the past months, we have continued to focus on establishing the necessary infrastructure to enable precision and genomic medicine through the nation, by strengthening current partnerships and building new ones.

Recent notable developments include:

***POLARIS is CAP-accredited!***



One key requirement for realizing the goal of precision medicine involves building local facilities to deliver “clinical-grade” genomic sequencing data in a robust and reliable fashion. We are delighted to report that both POLARIS laboratories at A\*STAR and SingHealth have successfully obtained College of American Pathologists (CAP) accreditation in early 2015! Certification by CAP is regarded internationally as the “gold standard” in clinical accreditation for diagnostic pathology and laboratory medicine. Prior to actual inspection, participating laboratories must demonstrate a successful track record of external proficiency testing results (where blinded samples are sent to labs for sequencing and assessment). CAP inspectors are subsequently dispatched to the laboratories for on-site inspection of processes, data output, and clinical quality. To our knowledge, the POLARIS labs are among the first labs in Asia to obtain CAP accreditation specifically for NGS services, and represent an important competitive edge to the Singapore biomedical landscape. Specifically, the POLARIS CAP labs are now able to provide facilities and expertise by which promising clinically-relevant “made-in-Singapore” research can be further validated and tested in a clinically-accredited setting. Such validation and testing will be critical for future mainstream clinical implementation, product development, or commercial licensing.

***Partnership with SingHealth, TTSH, and NUS SPH on Clinical Pathogen Sequencing***

Riding on the success of our pilot collaborative study published in *Emerging Infectious Diseases*<sup>1</sup>, the POLARIS team has enlarged our collaboration with Dr Hsu Li Yang and collaborators at the Central TB Laboratory (SingHealth), Tan Tock Seng Hospital, and Saw Swee Hock School of Public Health to perform a prospective study sequencing *Mycobacterium tuberculosis* isolates from hundreds of patients in Singapore. This work, which has been funded through the Ministry of Health, aims to definitely assess the role of next-generation sequencing (NGS) as a possible replacement for conventional genotyping methods for pathogen outbreak monitoring and disease epidemiology. Dr Hsu said, “NGS provides far more discriminatory power compared to conventional genotyping methods for TB isolates, and will potentially enable more rapid determination of drug resistance. Results from a CAP-accredited lab will also engender more confidence among clinicians and public health officials.”



***POLARIS in the Scientific Literature***

The continued track-record of the POLARIS team is further reflected in the form of several recent peer-reviewed articles in the biomedical and scientific literature. One example of a study utilizing POLARIS

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<sup>1</sup> Chee et al., (2015) Multidrug-resistant tuberculosis outbreak in gaming centers. *Emerg Infect Dis*. <http://dx.doi.org/10.3201/eid2101.141159>

technology was published in *Genome Biology* by Dr Iain Tan<sup>2</sup>, NCCS Consultant and GIS Clinician-Scientist. Using the POLARIS Xplora™ Cancer panel designed to profile the top 800 most recurrently mutated genes in cancer, Dr Tan examined patterns of genetic mutations in colorectal cancer between primary tumors (those arising in the colon) from tumors that had spread to the liver. Compared to previous cancer studies, the Xplora™ panel provides much greater sensitivity in being able to detect mutations in the most relevant cancer genes, and can also allow the researcher to examine tumor heterogeneity and subclonality. Dr Tan said “This is a powerful tool for at least 3 reasons (1) It identifies several classes of genetic alterations (e.g. single nucleotide substitutions, in-dels, amplifications and potentially fusions) simultaneously. (2) It has one of the most comprehensive coverage of cancer associated genes (~ 800 genes) currently available (3) High depth sequencing gives us greater ability to identify sub-clonal alterations. All of these advantages empower us to dissect the biology underlying cancer progression and drug resistance.” The POLARIS Xplora™ Cancer panel is now available on a research-use basis – interested parties are encourage to contact [polaris@gis.a-star.edu.sg](mailto:polaris@gis.a-star.edu.sg) for more information.

Internationally, there is growing momentum that the precision medicine journey is a global one, requiring international cooperation, data sharing, and community standards for technical and clinical reporting. To encourage international dialogue, multi-regional consortia such as the Global Alliance for Genomics and Health (GA4GH) and Global Genomic Medicine Collaborative (G2MC) have been established. POLARIS members are involved in several of these consortia. Reflecting this, in a recent *Science Translational Medicine* article reviewing global efforts in precision medicine<sup>3</sup>, POLARIS has been cited as an example of how upstream genomic findings can be translated to clinical implementation.

#### ***Upcoming events – A\*STAR SPF symposium***

Finally, we should note that POLARIS is just one of several A\*STAR SPF programs funded in recent years. To find out more about the A\*STAR SPF family, we encourage interested parties to attend the A\*STAR SPF symposium, to be held on 17<sup>th</sup> June 2015 at level 4, Matrix building, Biopolis. Besides POLARIS, symposium attendees will receive updates on other major SPF programs, including those focused on companion diagnostics (CDIC), circulating tumor cells, and disease-programs on ophthalmology (SIPRAD), rare diseases (GODAFIT), and cardiology (ATTRACT). We hope to see you there!

Best regards

Patrick Tan  
(On behalf of the POLARIS Team)



<http://polaris.a-star.edu.sg/>

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<sup>2</sup> Tan et al., (2015) High-depth sequencing of over 750 genes supports linear progression of primary tumors and metastases in most patients with liver-limited metastatic colorectal cancer. *Genome Biol.* 12;16:32.

<sup>3</sup> Manolio et al., (2015) Global implementation of genomic medicine: We are not alone. *Science Translational Medicine* 7;290:p290ps13