



International  
Cancer Genome  
Consortium

**Cancer genome researchers band together – Joint effort seeks to describe changes in 50 tumor types.**

Toronto - February 15, 2011. Cancer is a leading and growing cause of death worldwide, accounting for more than 7 million deaths in 2004, representing 13% of all cases of mortality. The World Health Organization estimates the number of annual cancer deaths will rise to 12 million in 2030. Cancer is not just a disease of the developed world—more than 70% of all cancer deaths occur in low- and middle-income countries.

At the same time, genomics technology continues to grow exponentially in its capacities. Ten years after the Human Genome Project produced its first draft of the human genome sequence, the availability of new, ultra-low cost and high-throughput DNA sequencing technologies has yielded a dramatic increase in the volume of sequence data that can be generated.

As a disease fueled by mutations in the genome, cancer may be where the growing power of genomics tools meets one of humanity's greatest challenges. The expanding understanding of cancer mutations has led to some significant success toward making personalized medicine a reality.

In 2007, the International Cancer Genome Consortium (ICGC) was established to bring together researchers from around the globe who are working to characterize genomic changes across a range of cancer types. The goal of the ICGC is to comprehensively describe the genomic, transcriptomic, and epigenomic changes in 50 different tumor types or subtypes that are of clinical and societal importance across the globe. For each of the 50 different cancer types or subtypes, ICGC project participants are being asked to sequence 500 tumor specimens and fully matched control samples.

As of January this year, the ICGC has received commitments from funding organizations in Asia, Australia, Europe, and North America for research institutes in 13 jurisdictions. So far, funding organizations have committed more than \$500 million for 36 projects. Projects that are currently funded are examining tumors affecting the bladder, blood, bone, brain, breast, cervix, colon, head and neck, kidney, liver, lung, oral cavity, ovary, pancreas, prostate, rectum, skin, soft tissues, stomach, and uterus. Over time, additional nations and organizations are anticipated to join the ICGC.

The ICGC has developed policies and quality control criteria to help harmonize the work of member projects. It provides coordination to ensure that the projects in the Consortium cover a wide variety of cancers. Where groups are studying the same kind of cancer, they have agreed to collaborate.

Ultimately, over 25,000 tumor genomes will be sequenced worldwide. This will provide a comprehensive catalog of genomic abnormalities associated with cancer, a collection of data

that will reveal the repertoire of mutations that cause this wide-ranging disease and help define clinically relevant subtypes of cancer. The data will also provide a rich resource for the world's researchers who are working to develop new treatments to improve patient care.

The ICGC is enabling access to this rich trove of oncogenomic data through its data portal, available to the world's researchers through the ICGC web site at [www.icgc.org](http://www.icgc.org).

To maximize the public benefit from the research, scientists participating in the Consortium have agreed not to file any patents or to make other intellectual property claims against the data they are producing. Instead, ICGC members are making their findings freely available. By opening the data to the world's researchers, the Consortium members hope that treatments will be more quickly developed that target the mutations driving the different kinds of cancer.

The ICGC is working to ensure that data is accurate, organized, and standardized to maximize its utility to researchers. Already, datasets for breast, liver, pancreatic, lung, and skin cancers are available through ICGC's data portal.

The Data Coordination Center (DCC) is intended to provide ready data dissemination while protecting sensitive patient information. Common standards are being applied for the data collected. The portal provides detailed information about the samples used and the mutations that have been detected—including simple substitutions, copy number alterations, structural rearrangements, mutations affecting microRNA, and changes in gene expression. Information on alterations that affect DNA methylation and splice junctions will also be forthcoming.

The DCC is housed at the Ontario Institute for Cancer Research (OICR) in Toronto. The OICR is one of the co-founding ICGC institutions. As members of the ICGC, OICR researchers are analyzing the genomes of pancreatic and prostate cancer. The ICGC is part of OICR's overarching effort to help translate laboratory research more effectively into clinical practice. Through ICGC, OICR hopes to contribute to more precise diagnosis of cancer, the creation of more targeted therapies, and the more effective use of information to guide the medical management of patients with cancer.

Members of the Consortium have agreed upon common standards of ethical oversight and informed consent, ensuring that all samples will be coded and stored in ways that protect the identities of participants who made their tissue specimens and medical histories available for research.

In December 2010, more than 120 researchers met in Australia for the "ICGC Scientific Workshop", where Consortium members shared their experiences in setting up the research pipelines required to analyze large numbers of tumors. Attendees addressed the challenges they've faced in standardizing lab techniques and analysis methods across all ICGC sites and obtaining better sample purity and volume across all projects.

Currently, the ICGC has commitments from its worldwide partners to study more than 15,000 tumor genomes, which is approximately 60% of the ICGC's goal of analyzing 25,000 tumor genomes. In the years ahead, ICGC will continue to work to attract more research

partners. Meanwhile, the ICGC also wishes to ensure that biomedical researchers around the world are aware that they can already obtain and use ICGC data.

This vast data resource will be put to best use if it is mined rapidly and fully by researchers working to create new cancer drugs and to discover more personalized approaches for the treatment and prevention of cancer.

The challenge ICGC has set for itself is to provide much more genomic information about cancer so that researchers around the world can duplicate the early successes and find hundreds of specific treatments for cancer patients.

By working together and sharing information, the members of ICGC can catalog cancer genomes much more efficiently than any one country working alone. The information that the ICGC makes available to the world's researchers will be an important foundation for better understanding cancer so that we can more effectively diagnose and treat this pervasive and disparate disease in the decades ahead.

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To interview Dr. Tom Hudson  
Rhea Cohen  
Director of Communications  
Ontario Institute for Cancer Research  
Email: [rhea.cohen@oicr.on.ca](mailto:rhea.cohen@oicr.on.ca)  
Telephone: 416-673-6642  
Mobile: 416-671-2846