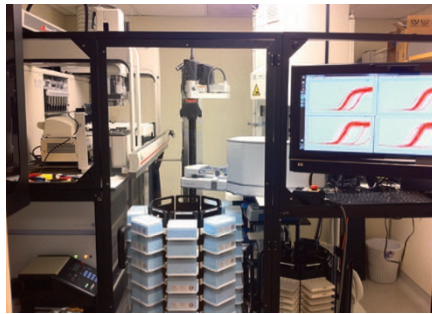


Massive biobank yields first results—with more to come

MONTREAL — In a conference room here at the International Congress of Human Genetics (ICHG), Kyle Lapham loads an app on his iPhone and a four-way split screen of various pieces of lab equipment pops up on the display. “This is a live view of my robot right now in San Francisco,” he says. Lapham, a lab automation specialist at the University of California–San Francisco (UCSF), has the ability to constantly monitor his robot so he can conduct experiments around the clock. And, with this setup, he has managed to run the largest analysis of telomeric DNA to date in a span of just five months.

The project is made possible thanks to the Kaiser Permanente biobank, a massive DNA repository linked to the California health insurer’s medical records. Lapham’s findings about telomeres represent the first results to trickle out of the \$62 million project, which has collected 170,000 samples to date, with plans to assemble 500,000 total by the end of 2014. It is the largest such biorepository in the US.

Numerous studies have shown that telomeres, the caps on the end of chromosomes that protect DNA from degradation, generally shorten with age. But, according to Lapham’s data, this is only part of the story. Using a whopping 105,000 samples taken from the Kaiser resource, Lapham showed that older individuals typically have shorter telomeres, but only up to age 75. After that, the average telomere length actually goes up, presumably because those elderly people with the shortest



Automated analysis: The ATLAS robot.

chromosome tips don’t live far into their golden years. He reported the findings at the ICHG last month.

Road ATLAS

No one had ever seen such a selection bias in telomere lengths before. But, then again, no one had ever looked at such a large sample of individuals. To enable the research, “something new had to be designed,” says Lapham, who works with telomere pioneer Elizabeth Blackburn. So he built ATLAS, the Automated Telomere Length Analysis System, to run analyses around the clock. At full tilt, ATLAS was cranking out more than 30,000 quantitative PCR reactions each day, and Lapham managed to test all his samples in sextuplicate in just five months. “We got a massive amount of throughput,” he says.

The project was not without its glitches, as ATLAS malfunctioned several times over

the course of the experiment. Fortunately, however, Lapham had rigged up a monitoring system—complete with video cameras, digital sensors and remote handling capabilities—that alerted him via iPhone alarm if anything went astray. For instance, Lapham recalls waking up one morning at 4 a.m. after a curved pipette tip had caused ATLAS to pick an entire tip box and send it crashing into a sample plate. “I was not happy,” he says. But, from the comfort of his apartment, Lapham watched the video footage on his phone, instructed the robot to clear the problem equipment and then went back to bed.

Lapham’s results are just the tip of the iceberg with what scientists hope to learn from the Kaiser resource. Neil Risch, director of the UCSF Institute for Human Genetics and co-director of Kaiser’s Research Program on Genes, Environment and Health (RPGEH), presented data here outlining the ethnic diversity, genetic structure and family relatedness of 100,000 people genotyped for around 700,000 single nucleotide polymorphisms each—all done in just a little more than a year. “Nobody has done anything like this on this type of scale,” says Risch. He is still conducting quality control checks on the data and has yet to link the genetic information to the participants’ medical records. But those analyses are coming.

“There’s a lot of excitement,” says RPGEH executive director Cathy Schaefer. “We’re awash with data. And, as the cohort ages, the database just gets richer and richer.”

Elie Dolgin

Stanford program gives discoveries a shot at commercialization

In the late 1990s, Daria Mochly-Rosen, a protein chemist at the Stanford University School of Medicine in California, discovered that a certain class of drugs that inhibit enzymes known as protein kinase C could reduce cardiac damage after a heart attack. Working with Stanford’s Office of Technology Licensing (OTL), she patented the finding with hopes of licensing it to a pharmaceutical company. No one showed any interest.

Determined, Mochly-Rosen made the rounds with her colleagues in the pharmaceutical industry. But her pharma contacts wanted a drug to prevent heart attacks, not something to give after them. “They told me to go away,” she says. So, in 2002, Mochly-Rosen and her then-graduate student Leon Chen founded KAI Pharmaceuticals to commercialize this technology. To see the process through, Mochly-Rosen took a year off from academia to raise money for her company, work through the regulatory process with the US Food and Drug Administration (FDA) and launch a clinical trial.

Upon returning to Stanford, Mochly-Rosen realized that her invention was surely not the only one stuck in limbo at the OTL.

To help her colleagues commercialize their inventions, she started SPARK, which “stands for nothing,” admits Mochly-Rosen, now senior associate dean for research at Stanford. “The program is just about sparking.”

Now in its sixth year and run by Mochly-Rosen and Stanford physician Kevin Grimes, SPARK consists largely of a Wednesday-night get-together of around 70 professors, postdocs, graduate students and industrial advisers. The group works on commercializing about eight projects a year—selected from a pool of about 150 projects that were languishing at OTL—within a two-year window, ultimately getting the inventor to form a company or licensing the technology to a biotech. Selected projects receive approximately \$50,000 from the SPARK program for each of the two years and direct mentorship from industry advisers and academic colleagues.

To date, roughly 40 of SPARK’s 80 projects have been taken up by commercial companies. Impressed by this high success rate, other institutions are now hoping to copy the Stanford model. Just this month, for example, Mochly-Rosen visited the National Taiwan University in Taipei to chat with