Straight talk from… **Marc Hodosh**

These days, if you want to have your entire genome sequenced, you need to spend about a million dollars and wait for months. But the Archon X Prize for Genomics—an international competition for speedy gene mapping—might change this by giving companies a huge incentive to develop better DNA sequencing technologies. The $10 million prize, first announced in late 2006, was donated by Stewart Blusson, a philanthropist and mining multimillionaire. Marc Hodosh, senior director of the Archon X Prize, explains why genomics was chosen for an X Prize and predicts what lies ahead for the field.

What is the genomics X Prize for and how will it be judged?

The prize of $10 million is for the first team that can accurately sequence 100 human genomes in ten days at a maximum cost of $10,000 per genome. X Prize judges will evaluate each attempt to determine a winner. The tricky part is that each competitive team is developing its own approach to meet the challenge—proprietary technology that the X Prize Foundation does not have. We have an accuracy requirement, and to verify results, we are going to sequence 100 genomes in advance and then manually match one percent—a statistically significant number—of our test genes against each competitor's results.

How will this competition affect gene mapping and medical research?

It will usher in the era of personalized medicine, which has the potential to save millions of lives. This technology could allow your doctor to test your genome, and, when the results come back, say, "It looks like you might be at risk for this disease… but if you do such and such, you could stop it." Many diseases could be prevented, such as diabetes, heart disease and Parkinson's. But if we don't have the ability to do full-genome sequencing quickly and cheaply, we're never going to get there.

What is the fastest speed at which we can currently map an individual's entire genome?

Nobel laureate James Watson's genome was recently sequenced in a few months at a cost of a million dollars. The current method uses a lot of chemical reagents and labor to sequence hundreds of thousands of base pairs at a time. But there are about 3 billion base pairs in the human genome, and the current technology can't be scaled up.

To sequence 100 genomes in ten days, we need revolutionary ideas, not just incremental improvements on current technology. Some of the teams are going after this with chemistry-based solutions, while others are using nanotechnology.

Why pick gene mapping as the objective for this competition rather than, say, a vaccine for HIV or a cure for cancer?

We are looking at other healthcare and life sciences prizes in the future. We are starting with genomics because people want personalized medicine—drugs that are more tailored and treatment before they get diseases they can't recover from. Despite the rapid advances that have been made in genomics, it's still an industry that needs a push to get to the next level. We're going to get to personalized medicine someday, and this is a very essential first step.

What other incentives do researchers have design speedy gene mapping technologies, and how will this prize make a difference?

A $10,000 genome is an enormous challenge. There are other marketing forces in the industry that drive companies not to work on this goal and instead to focus on other concepts and products that could potentially bring in revenue. And so one of the things that we're doing by launching this competition is inspiring scientists to go after the big goal.

Which groups have stepped up to compete?


X Prize Foundation

Six teams have been announced so far. They come from both sides of the Atlantic. One well-known company is 454 Life Sciences, located in Connecticut. Other established companies that are competing include VisiGen Biotechnologies, which is located in Texas, and the Foundation for Applied Molecular Evolution in Florida.

And then we have some newer companies. Reveo in New York is using nanotechnology —a novel approach in this field. We also have a team from the UK called base4innovation. The prominent geneticist George Church recently entered the competition by launching the Personal Genome X-Team, which is a group of researchers from Harvard Medical School [in Boston].

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Why enlist celebrities—such as Larry King, Paul Allen and Stephen Hawking—to get their genomes sequenced?

Because this technology will help prevent disease and has the potential to affect so many different areas of medicine, we want to involve a wide variety of individuals. We are launching a program in 2008 called the Genome 100. A group of 100 individuals, including those mentioned, will be our spokespeople for the competition and will have their genomes sequenced by the winning teams. We're going to find ways to involve the public in the 100 selection process, possibly through some sort of voting system.

When do you predict there will be a winner?

Announcement of a winner is probably somewhere in the range of two to four years away. George Church is very optimistic that his team may be ready to make an attempt in the next year or year and a half. But each team has various goals, and they're all working as hard and fast as they can.

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