

## Extra Feature Story

### Genomes Offer Murky Clues to Personality, Physical Traits

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**Advances in genome sequencing are making it possible for people to learn about personality traits, such as thrill-seeking, physical attributes, such as "fast-twitch muscles" or hair loss, and diseases inherited from your biological parents.**

Scientific breakthroughs over the past few decades have made it possible to look deep into your cells and map out the chemical blueprint that makes you a unique human being.

The chemical blueprint for every person resides in their genes, DNA codes passed down from generation to generation.

Now that scientists have figured out how to read that genetic code, genome sequencing is available to the general public. For a price, people can provide a sample of their cells to researchers, who will then be able to reveal information about risk for disease, as well as clues to their ancestry.

The option to reveal secrets of one's genes raises the question: how much knowledge about yourself is too much?

The ability to map human genomes also raises questions about privacy, ethics, discrimination, and the dangers of "recreational genetics."

#### Personal Genome Project

Scientists interested in learning more about what makes humans human want more people to submit their genome for sequencing so that more can be learned about genetic differences, causes of disease and to improve the sequencing technology. At the same time, some entrepreneurs see personal genomics as a way to make money.

In 2001, the Human Genome Project, sponsored in part by the U.S. Department of Energy, released a monumental finding: it had completed a first draft of the human genome. This means it had identified roughly all the basic genes for a human, not for a specific human.

Private companies and public research agencies have refined that rough draft, and now a new endeavor, the Personal Genome Project, aims to encourage the public to submit their genomes for research.

Similar to how crowd-sourced Web sites such as Wikipedia operate, the originators of the Personal Genome Project hope that a large sample of human genomes will enable them to learn more about how to use genome technology to improve human health and understanding of the human species.

## **Learning About Yourself**

One volunteer for the Personal Genome Project, Harvard psychologist Steven Pinker, had his genome sequenced and shared the results with the world in the New York Times Magazine.

When scientists sequenced his DNA from a sample of spit, they revealed some interesting truths, confirmed some suspicions he had about himself and suggested that genes are not the final word on what happens in your life.

For example, Pinker learned he has genes associated with seeking new experiences and average memory, and confirmed that he has genes associated with light hair and blue eyes.

Other gene predictors turned out wrong. According to his genes, he should be bald, but he has a full head of hair and he has a fast-twitch muscle fiber gene, but he prefers hiking to basketball.

Pinker decided not to learn if he had a gene variant that triples his chances of developing Alzheimer's disease, writing that he wouldn't be able to do anything with that knowledge but worry and wait.

He adds that while genes are very important to determining who we are, science still has difficulty understanding why people in similar environments are different from each other, even when genes are accounted for.

"All this sets the stage for what we can expect from personal genomics. Our genes are a big part of what we are. But even knowing the totality of genetic predictors, there will be many things about ourselves that no genome scan — and for that matter, no demographic checklist — will ever reveal," Pinker writes.

## **New World of Science**

The company that sequenced Pinker's genome, 23andme, offers customers their risk factors for 14 diseases and 10 traits, as well as other information for \$399. The high-end genome sequencing company, Knome, will sequence your entire genome and cross-reference it with all the most current genetic research -- for \$99,500.

While this information could be useful and interesting, there is a concern that health insurance companies or employers could use your genetic information against you if it became available. Who would want to insure someone who is very likely to get cancer?

So while the Personal Genome Project is working to encourage people to share their genomes, the government and civil liberties groups are looking into ways to prevent discrimination based on genetic differences.

In 2008, former President Bush signed the Genetic Information Nondiscrimination Act, which prevents health insurance companies and employers from using genetic information to discriminate.

But as to how individuals and institutions will deal with the larger ethical and cultural questions raised by the bloom of genetic information, only time will tell.

-- **Compiled by Quinn Bowman for NewsHour Extra**

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