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TRACING HUMAN MIGRATION

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Move over Ellis Island. People curious about their ancestors now have a new way to trace their roots. And instead of centuries, the record goes back about 60,000 years.

Researchers from the National Geographic Society and IBM are asking the public to participate in a study that will trace the path of human migration as it's written in the genetic code.

The scientists plan to analyze the DNA of more than 100,000 people over the next five years of their research partnership, collecting samples from indigenous peoples around the world as well as volunteers from the general public.

The success of the project depends on how many people participate, said Ajay Royyuru, who leads the Computational Biology Center at IBM's Thomas J. Watson Research Center in Yorktown.

"The fascinating thing about this project is the size, scale and scope of what needs to be done. We are attempting to reach out to literally the whole population of the planet," Royyuru said. "The detail that you can get by looking at larger quantities of data is really where the story is."

The Genographic Project is a major expansion of earlier work by Spencer Wells, a population geneticist and explorer-in-residence at the National Geographic Society, who used DNA from about 10,000 people to trace mankind's history to a tribe of hunter-gatherers in Africa 60,000 years ago.

The 2002 National Geographic documentary and book, "The Journey of Man: A Genetic Odyssey," told the story of that research.

Wells said his earlier work painted "broad brush strokes" that only hinted at the complex routes people took as they left Africa. He hopes to fill in the details with the new project, which will gather at least 10 times the data.

Key questions such as whether there was one or many waves of migration from Africa and where exactly those people ventured might be answered with more genetic information, Wells said.

Wells and Royyuru will study DNA samples to search for genetic markers that act like signposts showing the way back across miles and years.

Genetic markers that originate at a specific time and place tell scientists that an individual was part of a family tree. "If you share a marker with someone, you're related to them," Wells said.

Wells learned that his own Y chromosome carries the M173 marker, which is present in many western Europeans, including 70 percent of men from southern England. He also learned that he carries markers that show his ancestors once hunted and gathered on the steppes of central Asia. He also learned that his forebearers traveled through through the Middle East because he carries the M89 marker.

"It traces all the way back to our origins in Africa, but it tells the story of the journey, which is kind of cool," Wells said.

Royyuru, who was born in the central Indian city of Bhilai before emigrating to America and settling in Congers, traced his lineage to the southern part of india.

"The interesting thing is my story and Ajay's story intersect in the Middle East with the M89 marker. We are effectively cousins," Wells said.

Recruiting the public to participate will give average people a chance to see these kinds of connections in their own ancestries, Wells said.

"Everybody is interested in their own history, and in particular the question that everybody asks at some point: Where did we come from? How did I get to where I live today, and where did we originate as a species? And that's what this research is trying to do. We're trying to answer those deep questions about humans and how we're related to each other," Wells said.

Researchers in the field will collect blood samples from tribes in all corners of the world, but the public can participate by ordering a test kit and submitting a swab of cells from their cheek. Participants will be assigned a random number and can check on the project through the Web.

Royyuru said the results will be stored anonymously and no medically relevant information will be kept. The security of DNA will be tight even in the field, where ThinkPads with fingerprint readers will guarantee privacy.

"People are sensitive about volunteering this kind of information. The genome is the most personal information you possess. So when we get the data we have to make sure the data is secure," he said.

Joann Boughman, executive vice president of the American Society of Human Genetics, said people who participate in genetic studies need to be aware of how their information will be used.

In studies such as the Genographic Project, researchers commonly remove names or other identifiers to shield participants, Boughman said.

The Genographic Project is just one of hundreds of DNA databases popping up around the world as scientists take advantage of new opportunities to understand human genetics.

Researchers at the University of Pittsburgh, for example, are collecting DNA from Native Americans to trace their roots. Mormons collect DNA for genealogical research. The government of Iceland is sponsoring a study whose goal is to analyze the DNA of every citizen.

While the military, the FBI and state law enforcement agencies collect DNA samples for identification, scientists are looking to increase medical knowledge and diagnose disease. All newborns, for instance, are tested for genetic conditions at birth that could be deadly if untreated.

Knowledge about human migration from the Genographic Project will be used by archaeologists, paleoanthropologists, paleoclimatologists and linguists.

"The time is right for a project like this because of the convergence we can see between biotechnology and the genome revolution," IBM's Royyuru said.

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How to participate

· If you're interested in joining the Genographic Project, you can order a participation kit on the Web for $99.95, plus shipping and handling.

· You will be asked to swab the inside of your cheek. These cells will contain your genetic information. Only data related to migratory history will be kept.

· You will receive a random number with the kit, which allows you to check on the project through the Web. The number will not be connected to your name. Your personal results will be stored anonymously and the sample will be destroyed.

· Proceeds from the sale of the kits will pay for future field research by National Geographic and will support education and cultural preservation among the indigenous groups participating in the study.

· On the Web: www.nationalgeographic.com/genographic

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