

The peopling of the Americas: Genetic ancestry influences health

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At one time or another most of us wonder where we came from, where our parents or grandparents and their parents came from. Did our ancestors come from Europe or Asia? As curious as we are about our ancestors, for practical purposes, we need to think about the ancestry of our genes, according to Cecil Lewis, assistant professor of anthropology at the University of Oklahoma. Lewis says our genetic ancestry influences the genetic traits that predispose us to risk or resistance to disease.

Lewis studies genetic variation in populations to learn about the peopling of the Americas, but his studies also have an impact on genetic-related disease research. Some 15,000-18,000 years ago, people came from Asia through the Bering Strait and began to fill the American continents. The Americas were the last continents to be populated, so Lewis wants to understand how this process happened. His recent study focuses on South America and asks what part of the subcontinent has the most genetic diversity.

A complete understanding of this research depends on a very important population genetic process called the "founder effect." The geographic region with the most genetic diversity is characteristic of the initial or "parent" population. For example, a group of people leave a parent population and become founders of a new daughter population in an uninhabited geographic region. They typically take with them only a small set of the parent population's genetic diversity. This is called a founder effect.

The world pattern of founder effects in human populations begins in Africa. The genetic diversity in the Middle East is largely a subset of the genetic diversity in Africa. Similarly, the genetic diversity in Europe and Asia is largely a subset of the genetic diversity in Africa and the Middle East. The genetic diversity of the Americas is largely a subset of that in Asia. As a result, DNA tells a story about [human](#)

[origins](#), which began in Africa and spread throughout the world

Lewis is interested in the founder effects within the Americas with a particular focus on South America. At the outset, Lewis expected western South America to have a more diverse population than eastern South America because most anthropologists believe South America to have been peopled from west to east. Unexpectedly, the genetic data from the Lewis study was not consistent with this idea.

In this new study, Lewis looked at more than 600 independent genetic markers called short-tandem repeats. These markers were dispersed throughout the human genome. They were initially published by Lewis and his colleagues in large scale collaboration; the dataset is the largest survey of Native American genetic diversity today. Surprisingly, genetic analysis of these data estimated more genetic diversity in eastern than western South America. This was not the first time Lewis observed this pattern.

Lewis first observed this pattern in 2007 with his post-doctoral advisor using a more limited genetic dataset. The fact that the new genome-wide dataset provided a similar result was surprising; this result questions the most widely accepted scenario for the peopling of South America. While the focus of this study was South America, a similar and interesting pattern of [genetic diversity](#) emerged in North America. The pattern suggests another major founder effect in North America, but after the initial founder effect from Asia.

A founder effect provides an opportunity for dramatic changes in the frequencies of genetic traits. Genetic alleles or traits may be rare in a parent population, but because of the founder effect they can become common or even lost in the daughter population. These traits include those that may predispose for a risk or resistance to disease.

"We cannot assume that all Native American populations will have similar trait frequencies nor will they have similar expectations for genetic risk or resistance to disease. Rather, the history of founder effects in the Americas, and around the world, contributes to the understanding of how well one local population might reflect a broader community," says Lewis.

A paper by Lewis on this subject is currently available on "Early View" in the scientific journal *American Journal of Physical Anthropology*.

Source: University of Oklahoma

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