

Cal State Migration Tales, and Genetic Trails

Tracking Genetic



Photo by Ben Ailes

By Donna Hemmila

Students in professor George Miller's anthropology and museums class expect to get hands-on experience creating an exhibit. This year, for the first time, Cal State East Bay students became the exhibit.

Immigrants All! Our Migration Tales and Genetic Trails opened Feb. 24 in the university's C.E. Smith Museum of Anthropology. The exhibit demonstrates the migration patterns of humans in a centuries-long journey out of Africa across the continents.

When the students brainstormed the idea for the exhibit, Miller said, they wanted to show the diversity of the Cal State East Bay community and to challenge the perceptions people have about race and ethnicity.

To do that they turned to the hottest trend in anthropology – DNA analysis.

About 25 students in the class and another 45 faculty, staff, family and friends, gave DNA samples to trace their own roots back through thousands and thousands of years.

"Thirty percent of those tested came back with results that were unexpected," said Miller. "Some were quite surprising."

Using a company in Houston called Family Tree DNA, the students took their own DNA



Photo by Ben Ailes

Anthropology professor George Miller checks a display of DNA sequences students created.

samples using a simple kit to swab the inside of their cheeks. For \$99 per sample, the company performed a genetic genealogy test that traces the ancestral origins of the DNA donor.

Family Tree DNA compared the Cal State East Bay DNA to its databases and provided all participants with information about where their distant ancestors originated. The company is doing testing for a National Geographic-sponsored project similar to the one at Cal State East Bay.

"I think of myself as truly being a citizen of the world now," said Monica Aguilar-Barriga, one of the students in the exhibit. "I feel like I have this longer history than I had."

She was born in Mexico and had always thought her family came from Spain. Her test results revealed she is descended from a group originating in Southeast Asia 60,000 years ago that later migrated to the Americas through Polynesia and the Bering Strait.

"You think you know where you're from, but do you really know where you're from?" she asked.

Carmen Cuellar, a graduate student in anthropology and the exhibit coordinator, knew both of her parents' families came from Spain.

"My mom wanted us to be from royalty," Cuellar said, but the results from her DNA test proved more exciting than an aristocratic title.

Cuellar discovered her ancestors originated in the Middle East 7,000 years ago in the Fertile Crescent area that's now part of Syria. As that group migrated west it split off with some going to Central Europe and some to Portugal and Spain. Along the way they changed the course of human civilization by spreading the development

of agriculture.

Archeological evidence shows signs of early agriculture - animal bones and domesticated grains - following the same migration pattern as Cuellar's DNA markers.

"We don't know if they developed agriculture, but they basically took it on the road," she said. Both sides of her family in Spain still farm in their villages and live off the land.

Twenty of the students who supplied DNA tell stories like this in a video display that is part of the exhibit. When visitors enter the museum, they will find a large map of Africa painted on the floor with footsteps leading on one side to a room featuring Europe and on the other Asia and the Americas.

Since local elementary schools will bring their classes to campus to see the exhibit, the anthropology students have also created a comic book that explains the science behind the project. But anyone who sees the exhibit will come away with more than a science lesson.

"It's an amazing thing to get a different perspective on modern day ethnicity and how the U.S. views immigrants," said Miller. "We're all immigrants really."

How it works

Female students in the Cal State East Bay test group traced their maternal line with analysis of mitochondrial DNA. This type of DNA lives outside the cell nucleus and is passed down only through females.

Male students in the class tested their paternal lineage with analysis of their Y chromosome DNA. Some of the men chose to test their Y chromosome and mitochondrial DNA, or mtDNA, to gain knowledge of both sides of their ancestry.

When a man and woman reproduce, their DNA combines, creating a unique individual. Mitochondrial DNA and the Y-DNA do not recombine when a man and woman reproduce. That means that genetic material changes little over time.

When changes or mutations do occur, they create a genetic marker that can be traced back through time to a single common ancestor. Evidence of the marker in different geographic locations allows researchers to follow the global movement of people through time.

Michael Elliot, Carmen Cuellar (center) and Lori Wright put the finishing touches on a museum exhibit.

Immigrants All! Our Migration Tales and Genetic Trails

C.E. Smith Museum of Anthropology
Meiklejohn Hall, Room 4047
February through June
Opening Reception: Feb. 24, 4 p.m. to 7 p.m.
Museum Hours: Monday through Friday
10 a.m. to 4 p.m.
For information call 510 885-3104