Team seeks to learn how humans adapt to high places

February 15 2012, By Yesenia Amaro

How did early humans learn to live at the highest altitudes on earth?

That's what Mark Aldenderfer, dean of the University of California Merced's School of Social Sciences, Humanities and Arts, is trying to find out. "That's really one of the major questions that lies behind our (research) project," he said.

This summer, Aldenderfer, mountain climber Pete Athans, and a group of other researchers will depart to the Himalayas to continue to excavate and find answers to questions that remain unanswered from a long-term research project that began in 2008. They'll venture to the Upper Mustang region of Nepal to continue to their cave excavations.

The goal of this project is to look at the migration of people from the Tibetan Plateau, across the Himalayas from the South Indian Plain up into the Himalayas and perhaps beyond, Aldenderfer explained. Researchers have some knowledge of the initial stages of the movement of people into the region, but the population's history is a lot more complicated, Aldenderfer said.

"It's a project looking at the population movement, looking at the origins of the people living in this high-elevation environment," he said. "We are trying to understand how strong that movement was - how did they get up there? Why did they get up there?"

The reason researchers are looking at the Upper Mustang is because it's a

harsh and forbidding environment. "There are people who live successfully in high elevations, but there are biological constraints on your life at high elevation," Aldenderfer explained. "Of course, there's less oxygen so you can't work as hard. You actually need more calories to live in high elevations successfully, and women - especially women - need to adapt to the rigors of high-elevation life because they need to bring their births to full-term."

Pregnant women are at particular risk because they face the challenges of having a low-weight infant or suffering a spontaneous abortion, among other dangers, he said. "If your body is not capable of creating an environment for your child, you could easily lose it," he said.

Still, Aldenderfer said people live at high elevations today, and they thrive and reproduce, which has led the researchers to try to find the process that helped them adapt to that environment.

In 2010, a group of scientists came up with an analysis that suggested there are three genes in a person's genome that promote high-elevation adaptation, Aldenderfer said. "The question, though, is how old is this set of genes? How far back in time can you trace them? Do they really work?" he asked. "They're suspected of promoting high-elevation adaptation, but it's unclear whether they actually do that."

Aldenderfer said that with this project, he will research how old these adaptations are to see whether those genes, in fact, do provide adaptation benefits. In his archeological role, he'll continue to recover remains of people from that region.

Researchers hope to do DNA testing to see where the recovered remains are from and determine whether they possessed these genes, he said. "We haven't actually done the genetics work yet," he said.

This summer, during their six-week trip, researchers will continue to excavate because they need a larger sample of remains. Some of the remains they have already examined go back as far as 3,000 years, Aldenderfer said. "We just need a larger sample, especially with the early time period," he said. "Our really important goal is to find material of the very earliest inhabitants of this region so we can really test our ideas. That's our hope in this next expedition."

Researchers are seeking funding from the National Science Foundation because it's expensive to do the genetic testing. Aldenderfer said the testing costs about $1,300 a sample.

The samples would have to be sent to the Centre for Evolutionary Medicine at the University of Zurich, in Switzerland, to be tested.

More information: ©2012, the Merced Sun-Star (Merced, Calif.) Distributed by MCT Information Services