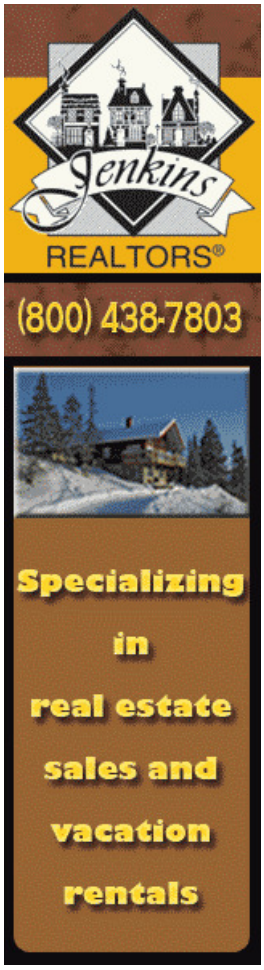

Appalachian professor documents oldest evidence of leprosy found in India

By ASU News Service

Dr. Gwen Robbins, an assistant professor of anthropology at Appalachian State University, is the lead author of a paper reporting the analysis of a 4000-year-old skeleton found in Balathal, India, bearing evidence of leprosy. The skeleton predates any other skeletal evidence of leprosy by 1,600 years. It is also the first evidence of leprosy in prehistoric India.

Dr. Gwen Robbins

Robbins' research has been published in the online journal PloS One (Public Library of Science). Other authors of the paper are recent anthropology graduate Kelsey M. Gray from Appalachian, Malcolm D. Schug from UNC-Greensboro, and V. Mushrif Tripathy, V.N. Misra, R.K. Mohanty and V.S. Shinde of Deemed University in Pune, India.

Robbins studied the skeleton currently housed at Deccan College in India while she was a doctoral student at the University of Oregon. She traveled to India with her advisor, John Lukacs, to work on another project. On a return trip to India in 2001, she analyzed several skeletal remains recovered from the Balathal excavation site.

"I realized that it was probably evidence leprosy very early in Indian prehistory, but being a first-year graduate student I postponed writing the article until after my dissertation research," Robbins said. Given the demands on doctoral students and delays in publishing the Balathal site descriptions and inventory, it was 2008 before Robbins was able to revisit the data she obtained from earlier visits to India.

"This skeleton has diagnostic characteristics of leprosy particularly on the margins of the nasal aperture, which are eroded and eaten away," Robbins said. "The skeleton also has lesions on the cheekbones and the mouth that can be caused by other conditions like syphilis or maxillary sinusitis, but there are some key differences that indicate leprosy is the best diagnosis."

Robbins' and her colleagues' research demonstrates that leprosy was present in human populations in India by the end of 2000 B.C. and provides support for one hypothesis about prehistoric transmission routes for the disease. The finding also supports the hypothesis that the Sanskrit text "Atharva Veda," written before the first millennium B.C., is the earliest written reference to the disease and that burial traditions in the second millennium B.C. in one northwestern Indian village bear some resemblance to practices in the Hindu tradition today.

The researchers' findings also support Hindu scriptures that refer to a disease believed to be leprosy as early as 1000 B.C. The Sanskrit writings suggest an herbal remedy for treating both leprosy and tuberculosis.

An Indian or African origin for the disease has often been assumed based on historical sources that support an initial spread of the disease from Asia to Europe with Alexander the Great's army after 400 B.C. Skeletal evidence for the disease was previously limited to 300-400 B.C. in Egypt and Thailand.

Although leprosy is associated with the Indian sub-continent, recent genomic research indicates that it originated in Africa, where it is believed both leprosy and tuberculosis evolved about 40,000 years ago from a common ancestor. Some researchers have suggested that the disease spread to Asia during the third millennium BC through interaction among the Indus civilization, Mesopotamia and Egypt. Previously, there was no evidence for the disease in India until 600 B.C., when it was referenced in writings.

This timeline is consistent with the idea of leprosy as an urban illness, spread by crowded and unsanitary living conditions.

Robbins hopes to recover ancient DNA from the skeleton to determine if the strain of bacterium that infected the individual from Balathal is similar to strains common in Africa, Asia and Europe today. If successful, this

work could shed additional light on the origin and transmission routes of the disease.

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