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Breakthrough DNA study links B.C. woman, 5,500-year-old “grandmother”

BY RANDY BOSWELL, POSTMEDIA NEWS JULY 5, 2013 9:21 PM

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Members of the Metlakatla First Nation community near Prince Rupert, B.C., collaborated with an international team of researchers in a genetic study of aboriginal peoples — both present-day and prehistoric — on Canada's northwest coast.

Photograph by: Handout/Courtesy of Metlakatla Treaty Office , Postmedia News

A groundbreaking genetic study led by a team of U.S. and Canadian anthropologists has traced a direct DNA link between the 5,500-year-old remains of an aboriginal woman found on a British Columbia island, a second set of ancient female bones from a nearby 2,500-year-old site and — most stunningly — a living Tsimshian woman from the Metlakatla First Nation, located close to both of the prehistoric burials along B.C.'s North Coast near the city of Prince Rupert.

The findings are the first of their kind to be generated using powerful new techniques to analyze the complete mitochondrial genome of the individuals studied, reconstructing a millennia-spanning line of maternal descent and providing remarkable new evidence of a people's enduring occupation of a specific geographical area.

The scientific achievement is also seen to have significant implications for First Nations' land claims and treaty rights, giving aboriginal groups a powerful new tool for demonstrating deep-rooted links between the present and hyper-distant past.

“Having a DNA link showing direct maternal ancestry dating back to at least 5,000 years is huge as far as helping the Metlakatla prove that this territory was theirs over the millennia,” said First Nations archeologist Barbara Petzelt, a co-author of the study who also served as the chief liaison between scientists — including one of this country's top physical anthropologists, Jerome Cybulski of the Canadian Museum of Civilization —

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and the Metlakatla community.

“I believe this is really a unique collaboration,” added Metlakatla treaty official and researcher Joycelynn Mitchell, also a co-author of the study. “It’s very exciting to be able to have scientific proof that corroborates what our ancestors have been telling us for generations. It’s very amazing how fast technology is moving to be able to prove this kind of link with our past.”

The study, published this week in the U.S.-based Public Library of Science journal PLOS ONE, also identified what appears to be an “extinct” genetic line represented by two other sets of remains from Alaska and B.C. that date from 10,300 and 6,000 years ago respectively. No living person is known to share the DNA signature that was found in both of those individuals.

In a third set of findings, three current, unidentified residents of West Coast aboriginal communities were all found to share an ancestral connection with an ancient individual whose 5,000-year-old remains were unearthed from [Dodge Island](#), also near Prince Rupert.

“This is the beginning of the golden era for [ancient DNA](#) research because we can do so much now that we couldn’t do a few years ago because of advances in sequencing technologies,” study co-leader Ripan Malhi, an anthropologist and professor of genomic biology at the University of Illinois, said in a research summary. “We’re just starting to get an idea of the mitogenomic diversity in the Americas, in the living individuals as well as the ancient individuals.”

Malhi told Postmedia News it was “pretty surprising” when the research team established a clear genetic link between the 5,500-year-old female — whose remains had been excavated from an ancient settlement site on Lucy Island, B.C. — and the 2,500-year-old individual (also from Dodge Island).

That surprise led to elation when the team found that the directly related prehistoric individuals had “the exact same mitogenome of a living Tsimshian person” — a discovery that was “especially surprising,” said Malhi, “since it’s a rare lineage. In my mind, I expect that lots of these rare lineages would have gone extinct after European contact and colonization because of the high mortality that was associated with contact” as cultures clashed and the introduction of [Old World](#) diseases decimated many New World populations.

The tracing of maternal lineages by comparing present-day and ancient DNA signatures drew a global spotlight earlier this year when a team of scientists in Britain — including B.C.-born geneticist Turi King of the University of Leicester — proved that a skeleton dug up under a parking lot in that English city was the deposed 15th-century monarch [King Richard III](#).

Along with archeological and genealogical evidence, it was Turi King’s tracing of a direct [mitochondrial DNA](#) connection between King Richard and Canadian-born furniture maker Michael Ibsen — whose family was known to have descended from the same maternal line as Richard — that finally clinched the identification.

But while the Richard III research bridged a genetic gap of 528 years and 17 generations, the B.C.-based study has connected a living woman with a “grandmother” or “great aunt” from more than 5,000 years ago — a span of time covering at least 200 generations.

Significantly, said Malhi, the PLOS ONE findings are based on complete mitochondrial DNA profiles of the individuals studied rather than sampled segments of genetic material.

“You can narrow it down tighter and you can also have more confidence in the link that you’re making,” he said of the “mitogenome” technique. Only

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one other comparably detailed study has been carried out on an ancient individual in North America, a 2008 sequencing of the complete maternal DNA signature of a 4,000-year-old "paleo-Eskimo" man whose remains were found in Greenland.

But Malhi said genetic findings are only one part of a multi-layered set of evidence illuminating a First Nation's connection to its past. Oral histories, linguistic studies and classic archeological excavations that turn up ancient tools and other remnants of past cultures remain key to reconstructing the stories of historic and prehistoric communities, he said.




"Archaeology is one important source of information about the past, and oral traditions give us a lot of verifiable information about the past cultural events and patterns," agreed co-author David Archer, an anthropology professor at Northwest Community College in Prince Rupert, in the study overview. "But the genetic information is something that is immediately recognizable. If somebody is told that their DNA links to somebody who was present 2,500 years ago and also to someone who was present 5,500 years ago, you can summarize that in a sentence and it's very easily understood and it's exciting."

Researchers from Jilin University in China and Washington State University were also involved in the study.

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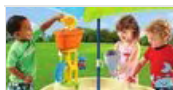
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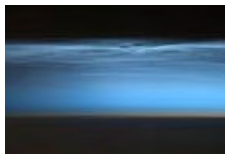
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