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Yakutia: The History of an Indigenous People Confronted with the Colonial Experience

In northeastern Siberia, centuries of Russian imperial expansion initiated by the Cossacks slightly altered the biology of the Indigenous populations of Yakutia. Genetic and microbial analyses of 122 individuals buried between the 14th and 19th centuries reveal remarkable stability despite major cultural, health, and dietary upheavals. This was recently demonstrated by an international study coordinated by scientists from l'Université de Toulouse and from the CNRS within the Centre for Anthropobiology and Genomics of Toulouse (CAGT, CNRS/Université de Toulouse), published in Nature on 7 January. These results, made possible by the exceptional preservation of the subjects in the Siberian permafrost, shed new light on the history of an Indigenous people living in one of the most extreme environments on Earth.

Since the 16th century, the history of Siberian indigenous peoples has been inscribed within the history of the region's conquest by European populations, which were drawn by animal furs. The Yakuts, who inhabit a region where winter temperatures can drop as low as –60°C, and who today are part of the Russian Federation, saw their way of life profoundly transformed by the introduction of Christianity, the arrival of new foodstuffs such as grains, and exposure to devastating infectious diseases such as smallpox. In light of these major and enduring upheavals, what biological impact did this colonization have on the population?

In this part of the world, the ground remains permanently frozen (permafrost), offering exceptional conditions for the preservation of human remains. Scientists exhumed 122 individuals from the permafrost, ranging from the Iron Age through the 19th century. "*Preservation in this environment is unmatched compared to what I have seen in nearly 40 years of excavating archaeological remains across the globe. The bodies were so intact that we could conduct autopsies similar to those performed by forensic pathologists. In addition to the bodies, their clothing and jewellery also survived intact, providing a rare opportunity to compare biological and cultural data,"* explains Éric Crubézy, a member of CAGT, Professor at the Institut Universitaire de France, and director of MAFSO (French Mission in Eastern Siberia) for more than 15 years.

"*Beyond what is visible to the naked eye, the preservation on the microscopic scale was also exceptional. This allowed us to sequence not just the genomes of many individuals, but also the microbes preserved with them. This was true not only for those that made up their oral microbiome, but also for any agents that may have caused their death, such as smallpox,*" adds Andaine Seguin-Orlando, an Associate Professor at the University of Toulouse who performed the molecular analyses at CAGT.

Genetic analysis reveals that the genetic origins of the Yakuts date back to the 12th and 13th centuries, when local populations mixed with migrant groups coming from the south of the region, likely pushed northward by the expansion of the Mongol Empire. "*This is a very interesting case where the oral history transmitted from generation to generation by the Yakuts regarding their origins is confirmed by genetic analyses,*" explains the co-author of the study Perle Guarino-Vignon, who led the bioinformatic analyses. Contrary to what one might expect from a colonial conquest, the ancient DNA also reveals remarkable genetic continuity with the present-day population. "*The analyses show that Yakut genetic heritage has remained stable from the 16th century to today,*" she continues. "*Unlike the Americas, where colonization caused demographic collapse, Yakutia appears to be a territory where settlers and some of the Yakut elite developed an economic partnership. There was therefore no conquest through demographic replacement, possibly due to the logistical difficulties of settling in such an extreme environment.*"

Yakutia's environment–exceptionally harsh and ill-suited for large-scale grain agriculture—prevented the establishment of large Russian settlements. Colonial authorities therefore relied on local populations, particularly for the lucrative fur trade, even integrating segments of the Yakut elite within the imperial structure. The scientists also extended their analysis of the 122 bodies to determine the composition of their oral microbiome. "*This is one of the most surprising findings,*" emphasizes Ludovic Orlando, a CNRS Researcher and director of the CAGT, who coordinated the study for nearly a decade. "*Despite the introduction of new grains, tobacco, and vodka through trade with the Russians, the composition of Yakut oral microbiome changed very little between 1600 and 1900. This suggests that even though dietary changes were real, they did not fundamentally alter their oral ecosystem.*"

Among the most remarkable discoveries are smallpox strains dating from the late 17th and early 18th centuries, as well as the grave of a traditional shaman, interred in the late 18th century. This woman, who descended from the most powerful clan and was the last individual found with traditional shamanic markers, was the product of a consanguineous union. "*She likely represents an attempt by her clan to preserve ancestral spiritual traditions in the face of growing Christianization,*" analyses Éric Crubézy. Genetic data also reveal extremely low levels of consanguinity in the rest of the Yakut population.

The smallpox strains that were identified are distinct from those circulating in Europe at the same time, and were responsible for devastating epidemics, demonstrating the exposure of indigenous populations to new pathogenic agents.

This research, the result of more than 15 years of excavations conducted by MAFSO in close collab-oration with Yakut teams, demonstrates the extraordinary resilience of the Yakut people. It also highlights the crucial importance of Siberian permafrost—now threatened by climate warming—as a natural archive for reconstructing the history of Arctic peoples.

Forearm of the frozen shamaness of Sordonokh, Verkhoïansk, adorned with a silver bracelet and the beaded edge of her ceremonial coat, preserved in the Siberian permafrost.
Photo credit: Eric Crubézy.

Bibliography

An ancient DNA perspective on the Russian Conquest of Yakutia.
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