The extinct population of walruses in Iceland

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Historical records from 13-14th centuries, old place names and hundreds of fossil and subfossil skeletal remain finds suggest that Atlantic walrus *(Odobenus rosmarus rosmarus*) was more common in Iceland during the settlement and Commonwealth period (c. 870–1262 AD) than in present times. The nature and status of the walruses in Iceland and possible human interference has until now remained unclear. This study presents the first biomolecular examination of Icelandic walrus using ancient DNA analyses and radiocarbon dating. The results support a local walrus population up from 6500 BCE until the 12th century AD, well within the period of Norse settlement. Comparison of mtDNA-sequence variation from 28 bone remains in Iceland with 367 sequences from walruses from the species range within the N-Atlantic shows a clear distinction of a unique and now extinct Icelandic population. A sequence of five mtDNA genomes support there was a monophyletic ancient Icelandic walrus mitochondrial lineage, with 12 unique SNPs. The current evidence suggests that the population went extinct following Norse settlement, environmental causes not overruled. A shared haplotype found in one specimen from Iceland, and in low frequency in East Greenland and Franz Josef Land, may be a result of shared ancestry or ancient admixture. Our findings lend support to theories claiming that the settlement of Iceland may have been driven to a larger extent by demand for valuable natural resources, such as walrus ivory, meat and fat, than previously anticipated.

Key words: mtDNA, phylogeography, ancient DNA, dating, settlement

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