A Neanderthal Extinction Hypothesis: Birth Complications due to Megaloencephaly

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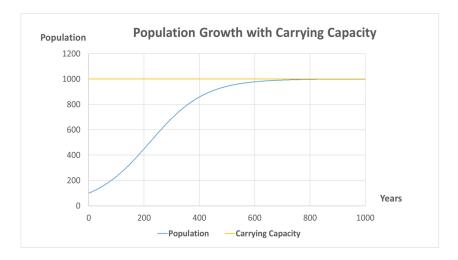[2]Akdeniz University
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Abstract

Homo neanderthalensis is the closest relative to Homo sapiens in the tree of human evolution. It is estimated that the Neanderthals became extinct around 30 thousand years ago. Several hypotheses have been put forward to explain this extinction. Larger brains hence larger heads were favoured by evolution among the Hominids for over two million years but stopped being an advantage due to trade-offs between bipedal walking, larger brains and birth. Our hypothesis states that H. neanderthalensis became extinct as a result of their larger head circumference, compared with H. sapiens, leading to birth complications. We use population dynamics to demonstrate that a small difference in the rate of mortality during birth can cause extinction of one population. We simulate two populations with an Agent Based Simulation technique to show that in the case of interbreeding between two populations, unexpected results can emerge depending on random events in simulations. We demonstrate that sharing the same habitat with capacity constraints over thousands of years, with a relatively higher death rate during birth could be the main cause of the slow decline in the H. neanderthalensis population, and its eventual extinction.

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Population   **Population Dynamics with two species equal start**

700
600
500
400
300
200
100
0

0   1000   2000   3000   4000   5000   6000

Years

—— sapiens   —— neanderthal   —— total

Population   **Population dynamics with two species unequal start**

700
600
500
400
300
200
100
0

0   2000   4000   6000   8000   10000

Years

—— sapiens   —— neanderthal   —— total

Mortality by Age

0,02
0,018
0,016
0,014
0,012
0,01
0,008
0,006
0,004
0,002
0

Chance of Mortality

1   11   21   31   41   51   61   71   81   91

Age

2

Neanderthal Population by Year

Neanderthal Genes %