The Neanderthal correlation

A question of breeding.

Jeff Hecht

"You don't really want to know," Beth said, her eyes glancing up from her messy desk to the clock and back down without meeting mine.

"I do want to know," I insisted. After three years of correlating the reconstructed Neanderthal genome with modern human populations, she had to have found something interesting. The idea had sounded great when she had suggested it, and the grant committee had loved my proposal. But with the final report ten months overdue, they wouldn't approve any new proposals.

"You'll wish you hadn't said that if I tell you," she said, staring down. "People are going to be upset about this."

"I want to know," I insisted. What I really wanted was a report to drop on the contract officer's desk, but saying that hadn't worked the last time. Or the time before that. Beth gets too deep into her research. I run a big human-genetics lab. I deliver results; I don't invest my ego in big-picture hypotheses or in worrying why the Neanderthals died out. "I don't have an oar in the debate over whether or not the Neanderthals interbred with Cro-Magnons. I just want to know what the data say."

"Really?" she asked, not looking convinced at all. "You said that the last time, remember?"

I didn't. I tried to ignore her obsessions. "Please," I asked.

"It's not just you. Nobody is going to want to hear this. Believe me, John, believe me."

"I'm a scientist. I want to know the truth!" More importantly, I wanted to finish the contract; that was my job as principal investigator. I'd always succeeded before; that was why after two decades at the university I was department chair and Beth was still a research assistant.

"Are you sure?" Beth asked, looking a little less uncertain.

"Yes," I said, trying to smile. "I know you've got something very interesting to tell me." That sometimes worked.

She nodded, her usually expressionless face showing a shadow of a smile. "I found strong genetic correlations between Neanderthals and modern subpopulations," she said. "A lot more than I had expected."

"What about correlations coming from the last common ancestor?" That was the safe correlation. Sapiens and Neanderthals had split around 800,000 years ago, so they had to share lots of genes that chimps didn't have.

"Some are," she said. "They're easy to find because they're in all modern populations. These genes are present in only some modern subpopulations, and the

statistics show only about 25,000 years of divergence between the Neanderthals and Sapiens. That has to be interbreeding. The earlier studies had missed it because they hadn't considered the changing impact of natural selection over time."

"You can back that up?"

"Absolutely," Beth was always meticulous about her data.

I didn't have to force a smile. "That's fascinating," I said. "It will make *Nature* for sure." It would get a lot of people hot under their collective collars, but that was fine. Evidence of interbreeding with Neanderthals would create a new paradigm for hybridization being behind the rapid advance of modern humans and make me famous. "What genes are involved?"

"That's the surprise," Beth said, and she smiled so broadly that she looked almost attractive despite her unkempt red-grey hair and nondescript clothes.

"Oh?"

"The genes for red hair and pale skin didn't match well enough to show a correlation, but I found a correlation for genes linked to other traits. There's a gene cluster linked to advanced mathematics skills, information processing, logic, analytical intelligence, concentration skills, obsession-compulsion and Asperger's

syndrome. That cluster correlates very strongly. I can trace some genes back to the interglacial around 450,000 years ago, and others back to another burst of evolutionary innovation during the Eemian interglacial about 130,000 years ago." She rambled on with endless details.

Something wasn't right. She was linking genes for advanced mental skills to Neanderthals. "I'm confused," I said when she paused for a breath. "You're correlating genes linked to modern human intelligence with Neanderthal populations. What am I missing?"

"You didn't want to hear me, I knew that."

"No, I want to hear you. I just asked a question."

"You don't, because I already told you."

I looked at Beth blankly, realizing I was missing a key part of the puzzle. "You said these were Neanderthal genes?"

"Yes, they were," she said. "They weren't in the modern human genome until Neanderthals interbred with Cro-Magnons between 25,000 and 30,000 years ago."

"Advanced mathematical processing? Shouldn't that have been missing from the Neanderthal genome?"

"No, I found that Neanderthals lacked genes linked to successful socialization and management skills. They could count perfectly well, but they couldn't deal with groups. Socialization genes came from Sapiens."

"You're trying to tell me..." I said, but my mental censor blocked the idea.

"That human mathematical intelligence came from Neanderthals? That's what the data say. The Cro-Magnons had the social skills. But that isn't all."

I stared at her. I couldn't tell that to the research council.

As usual, she couldn't read the warning look on my face. "The hybridization was successful in the Stone Age, but the environment has changed. I found that modern culture selects for socialization but against the Neanderthal traits for mathematics and intelligence," she said, and looked down. "I don't know how you'll survive when our genes are gone."

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