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What's Up With the 2% Difference and Why it Matters

Bio-anthropology is an extremely integral part of anthropology, and also a very controversial one. DNA (Deoxyribonucleic acid), known as the building block of life, is the basis of the controversy among bio-anthropologists and all people because of two things; it explains that homo sapiens are similar to chimpanzees ninety-eight percent of the time, and it also explains that humans originated from Africa (thus implying that all humans are African). The Human Genome Project, which sequenced all of the DNA for humans, is what allowed an understanding of DNA and how it works. The two authors discussed in this article examine two different aspects of bio-anthropology. Robert Sapolsky explains what the actual differences in the DNA imply, and Jonathan Marks examines the social and political implications of using science to determine the history of a species.

It is important before discussing bioethics to understand what the two percent difference is between humans and chimpanzees. “Humans and chimps each have somewhere between 20,000 and 30,000 genes,” (Sapolsky, 2007, p. 45) thus it is likely to have differences in each gene. Sapolsky gives the interesting analogy explaining that one difference can mean everything in a gene: “Imagine the deletion mutation that turns the sentence ‘I’ll have the mousse for desert’ into ‘I’ll have the mouse for desert.’” One change can completely change the appearance of a feature or species entirely. The differences within that two percent are great, and quite logical. “Chimps have a great many more genes related to olfaction than we do. The 2 percent distinction also involves ... genes related to the immune system, parasite vulnerability, and infectious diseases: chimps are resistant to malaria, and we [humans] handle tuberculosis better than they do.” (Sapolsky, 2007, p. 46) The main difference though, lies in the number of neurons,

as the chimpanzee brain is one-third the size of the human brain. Sapolsky states firmly, “The difference is sheer quantity. Qualitative distinctions emerge from large numbers. Genes may have something to do with that quantity, and thus with the complexity of the quality that emerges.” (2007, p. 46-7) The differences are important, and two percent is actually quite a lot when dealing with DNA. This is something though that not everyone knows.

Jonathan Marks explains that the similarity between chimpanzee and human DNA is misunderstood: “...it sounds profound, but only when presented without the context that human DNA is statistically constrained to match banana DNA over 25 percent of the time.” (2002, p. 4) Since there are only four nucleotides, there is automatically a 25% random chance of matching. Marks gives many historical examples of science trying to explain differences in blood type and race. He explains that often this method has failed, “With genetic data, it seems, one could find entities that did not really exist, or impose cultural assumptions on the data and mistake them for patterns inherent in the data, yet still cloak oneself unimpeachably in the mantle of modern science.” (2002, p.5) Marks focuses a lot on the history of bio-anthropology, because it is important to recognize that we may learn more in the future that could change the meaning of the two percent difference. Marks recognizes this importance, and with humor, explains the duty that anthropologists have when studying DNA: “Unlike chemists, who have the leisure to study boron without having to worry what boron thinks of them, anthropologists work at the mercy of other people’s thoughts and attitudes about them.” (2002, p. 7) There are social and political ramifications to the information that science provides about history, and it can cause many issues. Ethics need to be used, and science needs to be clearly

understood by humans. Most don't know what that two percent difference is, and it matters one thousand percent that that DNA is different, even if by that small proportion.

Citations

Marks, Jonathan. 2002 “Contemporary Bio-Anthropology” in Anthropology Today, Vol. 18:4, pp. 3-7.

Sapolsky, Robert. 2007 “The 2% Difference” in Annual Editions: Physical Anthropology 2007/2008, pp. 45-47. E. Angeloni, ed.