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The Regional Continuity and Replacement Model

Anthropology

Ever question where modern humans come from? Well you and practically everyone else has as well. Without getting into any kind of religious explanations, anthropologists have come up with a pretty darn good explanation. Well two explanations actually: the replacement model and the continuity model. They're both contradictory, but rather similar in the fact that they rely on fossil records to explain it. I'm going to explain them one at a time, and explain the reasoning and evidence behind them. However discretion should be used as neither methods can actually be proved or disproved yet.

The replacement model is a model designed by Christopher Stringer and Peter Andrews. It proposes that modern humans evolved from earlier archaic humans about 195,000 years ago, but *only* in the east of Africa. Evidence for this is based off of the earliest modern human fossils: Omo 1, and fossils from the South African Border Cave are good examples. After modern humans evolved, they migrated to the rest of the Old World (Europe, China, Russia, etc) replacing or otherwise killing off the rest of the archaic humans like the Neandertals, Homo Erectus, etc. This means that everyone living today would share an ancestry with Africans. Evidence supporting this interpretation of the fossil record is the fact that the oldest modern/pre-modern fossils are only found in Africa and no where else until nearly 60 thousand years later! This explanation of human origins matches perfectly with fossil based evidence, and DNA evidence as well. A breakthrough by Rebecca Cann revealed the fact that humans living today have remarkably similar Mitochondrial DNA. The mitochondria is the powerhouse in cells which have a remarkable ability to keep their DNA from becoming corrupted or

changed over vast amount of time. People can only receive mitochondrial DNA from their mothers, and as such mitochondrial DNA has been called, by Rebecca Cann, a *Mitochondrial Eve*. A Mitochondrial Eve is named so from the bible of Adam and Eve. The fact that the DNA almost never changes lets us track our ancestry very very far back. Cann spent nearly 20 years sampling mtDNA from women of various ethnic backgrounds such as Asia, Europe, Americans, and Africans. A junior graduate student named Mark Stoneking also added samples from aboriginal Australians and New Guineans. Their collective paper was published in *Nature* where they wrote about how their findings indicated that all living humans were descended through a single mother who lived about 200,000 years ago in Africa. (Cann RL, Stoneking M, Wilson AC) This directly supports the underlying concept of the replacement model, however there's one argument against it: a strong point in Cann's theory is that where modern humans have lived the longest should also be where there is greater mtDNA diversity. Since Africa is where the greatest diversity in mtDNA is, modern humans have lived there the longest. The counter argument here is that there are other factors involved with mtDNA diversity, simply having a greater population would increase the amount of diversity in it. Finally the other argument against the replacement theory is that there's a possibility that older fossils have not been found yet in places other than Africa.

The second, and equally as possible, model that explains the origins of modern humans is the Regional Continuity Model by Milford Wolpoff. It explains that modern humans evolved simultaneously, but separately, across the Old World (Milford Wolpoff). For example modern Chinese humans evolved from early Chinese Homo Erectus which

explains their shovel-shaped incisors while Europeans and Africans rarely do (Lauren C. Denton). Europeans often have heavy brows and angular faces much like their Neandertal ancestry. Remarkably there's very little differences in modern humans today given if the regional continuity model is true. The fact that all modern humans are so similar today, according to the regional continuity model, is from something called gene flow. Gene flow is how well genes in DNA are transferred throughout a population. This is the only reason why the Regional Continuity Model could even be viable, because there would be no way that ancient humans across the world would have continued being so similar after being separated so severely geographically and environmentally. Gene flow must have still been happening enough to keep differences from getting large enough for speciation throughout the Old World. An argument against the replacement model is that Australian aborigines share key skeletal and dental traits with pre-modern people who inhabited Indonesia at least 100 thousand years ago. The point is that there was no replacement by modern humans from Africa ~60 thousand years ago, but this doesn't rule out the fact that it could have been gene flow from African populations before or after.

So all in all, neither model completely represents all the available fossil and genetic data. Unfortunately for us Anthropologists we cannot scry into the past, and we have limited information on the ever changing planet. There's one more model that tries to account for all the data more accurately, and it's called the Assimilation Model, but I won't go into depth as that is outside the scope of this paper. If I were to believe one of the models, it would be the assimilation model. It simply incorporates both the

replacement model and regional continuity model where the first modern humans certainly started in Africa, but as they migrated away they didn't just replace the other early humans. They interbred and mixed their genes.

Cann RL, Stoneking M, Wilson AC (1987). "Mitochondrial DNA and human evolution". *Nature* 325 (6099): 31–36.

Lauren C. Denton (2011). "SHOVEL-SHAPED INCISORS AND THE MORPHOLOGY OF THE ENAMEL" Colorado State University

Wolpoff, M. H.; J. N. Spuhler, F. H. Smith, J. Radovcic, G. Pope, D. W. Frayer, R. Eckhardt and G. Clark (1988). "Modern Human Origins" *Science* 241 (4867) 772–4