

We Are All African!

Can scientific proof of our commonality save us?

Christopher diCarlo

Regardless of who you are or where you came from—despite ethnic differences, political distinctions, and racial tensions—we are all African. With these four words we can understand the truth of our human ancestry and in so doing learn a great deal about ourselves and our place on this planet. With these four words there is hope for humanity.

In his introduction of *The Descent of Man* (1871), Charles Darwin noted that “the conclusion that man is the co-descendant with other species of some ancient, lower, and extinct form, is not in any degree new.” Today, it is still not easy for some to accept this truth. In Gallup polls between 1982 and 2004, almost 50 percent of Americans polled maintained that “God created man pretty much in his present form at one time within the last 10 thousand years.” There is no doubt that religious and political beliefs can stand in the way of accepting scientific information about human origins, but perhaps if we look at the positive inferences that follow from understanding the origin of our species, we might come to see a greater commonality among us all. This could reduce the divisive nature of organized religions, which tend to foster belief in a special status among their chosen followers and “true believers.”

Toward this end, this essay has two purposes. First, I wish to present some of the most recent evidence supporting the claim that all human lineages descended from a small group of ancestors in Africa around 60,000 years ago; second, I shall consider some of the important political, philosophical, and moral implications that result from such an understanding of human origins.

The Evidence

In *The Descent of Man*, Charles Darwin said: “It is somewhat more probable that our early progenitors lived on the African continent than elsewhere.” This claim was “somewhat more probable” in the late 1800s; today, it is scientifically demonstrable.

Scientists in various fields have compiled evidence in support of our African ancestry from fossils, climatological records, geological trends, migration patterns, artifacts, tool use, and more. But what appears to be the most compelling evidence today does not come from bones, skulls, radiometric dating, or even tools. It comes from us. Molecular anthropologists and geneticists have been able to examine DNA samples of living humans and identify specific genetic markers that indicate when and where mutations arose in our distant past. In other words, we all carry time

machines in our DNA. By examining where and how these mutations converge, they have been able to demonstrate a common lineage of all humans alive today. It points directly to central-eastern Africa.

Fossils and hominin lineage. One of the things to keep in mind about fossil evidence is that fossilized remains of our ancestors are very rare and difficult to discover. Finding them requires an enormous amount of planning, money, and luck. As difficult as it is to discover primary evidence, scientists do keep finding more bones and skulls. The picture of the puzzle of human origins prior to genetic anthropology still maintains an “out of Africa” migration pattern. But hominin fossils can tell us what genetics cannot: what our ancestors looked like.

What’s a Hominin?

Most readers will be familiar with the term *hominid*, which means any member of the great apes (a category that includes humans). The term *hominin* refers more strictly to human ancestry, denoting species that exhibit true bipedalism. So *Australopithecus*, *Ardipithecus*, *Kenyanthropus*, and *Homo* all fall into the classification (tribe) of hominin.

Even though fossilization is quite rare, archaeologists have amassed enough evidence to paint a fairly accurate picture of not only our own ancestors but the ancestors of species of humans who did not survive as long as *Homo sapiens*. We must not forget that throughout much of our ancestral time, we were not alone. To date, the fossil record indicates that as recently as 30,000 years ago, at least four different types of hominins lived on this planet: *Homo erectus*, *Homo neanderthalis*, *Homo floresiensis*, and *Homo sapiens*. Think about this for a minute: aside from ourselves, there were at least three other distinct species of humans. Would this fact alone not give one pause to question how anyone could imagine that we (that is, *Homo sapiens*) had been specially created if three other types of humans lived alongside our own ancestors?

Although much of the fossil record is incomplete prior to 4 million years ago, paleoanthropologists have pieced together some compelling evidence for the first types of hominins to stand upright in Africa. The most famous of these ancestral beings is named “Lucy,” after the Beatles song “Lucy in the Sky with Diamonds.”

Lucy represents a species prior to *Homo* called *Australopithecus afarensis*; she lived approximately 3.5 million years ago and was discovered by Don Johansen in 1974 in the Afar region of Ethiopia. Through radiometric dating (as well as other dating techniques), bone physiology, dentition, and the like, Johansen and his team estimated her height to be around three and half feet and her weight at approximately sixty pounds. Lucy is, so far, the oldest and most complete upright-walking human ancestor.

Since Lucy, many other fossilized remains have been found that demonstrate an ancestral hominid/hominin “bush” of diverging species, dating back 6 million years with *Sahelanthropus tchadensis*, marking the point when our ancestors and chimpanzee ancestors split from a common lineage. Although many of the connections and relations between species are still unclear, the latest model from the Smithsonian’s Human Origins Program connects the lineage of Lucy to *Homo habilis*, then to *Homo ergaster*, then to *Homo heidelbergensis*, and finally a split to *Homo neanderthalis* and *Homo sapiens*.

A fairly recent technique that further corroborates the “Out of Africa” model was carried out by population biologist Andrea Manica of Cambridge University. Manica and her team analyzed 4,666 male and 1,579 female skulls from 105 worldwide populations. *Homo sapiens* appeared in Africa about 200,000 years ago and eventually became the only surviving hominin species, which migrated out of Africa approximately 60,000 years ago. Genetic studies corroborate the “Out of Africa” model because genetic diversity is greatest in Africa and decreases steadily the farther populations move from the continent. Using techniques based on thirty-seven measurements, Manica’s team found that skull shapes of humans around the world closely match the genetic data: that is to say, the diversity of skull shapes within a given population changes consistently the farther they are from Africa.

Climatology/meteorology/migration/artifacts. Changing landscapes and weather conditions also contributed to the evolutionary constraints on our ancestors. Some close relatives left Africa long before our ancestors. Around 2.5 million years ago, we find evidence of the first ice age. Africa’s climate had gone through radical changes, from a vegetative forest to savannah grasslands; it had become much warmer and drier while Asia and Europe became much colder and drier. Some *australopithecines* (like *A. robustus*) were specialists in diet. They maintained a diet of roots and leaves and could chew with massive molars several times the size of our own. Other *australopithecines* became generalists and turned to a meat-based diet. This caused their digestive tracts to

shorten and their brain sizes to increase. By 1.8 million years ago, *Homo erectus* was lean and slender—an adaptation for reducing heat—and also had a brain size about half of ours today. *Erectus* was making stone tools prodigiously.

There would be at least three more ice ages, some lasting 90,000 years, with the last one ending about 10,000 years ago. By 200,000 years ago, *Homo heidelbergensis* had evolved into *Homo neanderthalensis* and *Homo sapiens*. Other hominins, including the Neanderthals, had moved out of Africa long before our ancestors. They were in Europe by about 300,000 years ago. Our ancestors would not leave Africa until about 60,000 years ago.



An artist's life-sized model of Lucy, based on the 3.2 million-year-old *Australopithecus afarensis*, is part of an exhibit at the Houston Museum of Natural Science in Houston. (AP Photo / Michael Stravato)

By this time, they may have been traveling in rather small numbers. Paul Mellars, a Cambridge University archaeologist, has made recent discoveries of artifacts supporting the “Out of Africa” migration theory. He discovered ostrich eggs, perforated beads, finely shaped arrowheads, and crisscross art styles 3,000 miles apart in Africa and Asia, suggesting that similar patterns of behavior existed among the same people across generations. Most of the African artifacts are between 50,000 and 70,000 years old, while the Indian artifacts are about 35,000 years old. The artifacts found at Jwalapuram in southeast India and Batadomba-lena in Sri Lanka are strikingly similar to those found in eastern and southern Africa. This tends to support a singular migration route that would perhaps have split at a later stage.

The genetic evidence. The history of molecular anthropology is fairly recent. Among the first contributors was Allan Wilson, a New Zealander and scholar at the University of California, Berkeley. In 1967, he co-published a paper in the journal *Science* with doctor-

al student Vince Sarich titled "Immunological Time-Scale for Human Evolution." Wilson believed that the origins of the human species could be seen through a "molecular clock," that is, by dating the genetic mutations of humans that had accumulated since we parted from a common ancestor. The roster of "heroes" at the Web site nzedge.com presents one of the more concise statements of Wilson and Sarich's achievement, from which I quote: "When Wilson and Sarich analysed and compared genetic material from humans with chimpanzees they found the material to be 99 percent identical. From this, using the 'molecular clock' reasoning (bigger differences equate to greater time since their last common ancestor) they deduced that the earliest proto-hominids evolved only five million years [ago]. This was fifteen million years younger than stated by conventional anthropology."

So whenever you read or hear someone say, "You know, our DNA and a chimp's DNA is about 99 percent identical," you can thank Wilson and his team for figuring this out. Due to academic

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politics and the difficulty involved in changing accepted norms, Wilson's work remained on the fringes of the anthropological community for twenty years. Nonetheless, Wilson appeared to enjoy his status as a cutting-edge dweller. He attracted some of the best students in the world to work with him at his Berkeley lab. By the early 1980s, his findings were starting to become more widely accepted.

One of Wilson's brightest students, Rebecca Cann, applied his techniques to a number of specimens taken from people whose ancestry originated from different parts of the world. By examining the differences in mutations that had accumulated since their mitochondrial DNA (mtDNA) shared a common ancestry, she constructed a matriline (or matritree) connecting them. As Geoffery Carr put it in an article in *The Economist*, "The result was a revelation. Whichever way you drew the tree . . . its root was in Africa. *Homo sapiens* was thus unveiled as an African species. . . . [Cann] and Wilson did some matridendrochronology. The results suggest that all the lines converge on the ovaries of a single woman who lived some 150 thousand years ago."

Though the media sometimes refer to a matriarchal African "Eve," the same mtDNA mutation would have been possessed by some 2,000 to 10,000 women. However, if anything had happened

to all of these individuals, we might not be here today. When you consider the evidence carefully, our ancestors' trek out of Africa is filled with staggering odds and amazing consequences. From a time when our ancestors were living in trees, to climatological events that triggered a radical change in flora and fauna throughout Africa, to descending from the trees to the African savannah some 5 to 6 million years ago, walking upright, developing smaller guts and bigger brains, inventing stone tools, and utilizing fire, it is indeed an epic story. Today, we have evolved to the point where we can actually make sense of our origins. We no longer need to simply philosophize about who we are or where we came from. We no longer need to contrive mythological or religiously motivated stories; we have evolved to the point where we can accurately look back in history within the time machines of our own DNA.

The Genographic Project. Sponsored by the National Geographic Society and IBM, the Genographic Project is a worldwide effort to establish a large (200,000 sample) database of human DNA in an effort to chart the migration history of our ancestors. But what is DNA? How can it tell us anything about our ancestry? Cells in our bodies are given instructions on how to produce proteins in order for specific cells to grow and function in particular ways. If the instructions are interrupted or interfered with, say by mutation, then cells may function in ways that may be harmful or, on rare occasions, beneficial to the organism.

There are two ways in which molecular anthropologists can study such mutations: (1) analysis of mtDNA, which is passed from mother to offspring, thereby allowing scientists to trace the female line of descent; and (2) analysis of the Y chromosome, which is passed from father to son. Many mutations are repaired or eliminated at birth and not passed down to subsequent generations. However, some mutations, known as "germline mutations," are passed down to offspring without serious medical consequences (more than 1,000 such mutations are known). "Founder mutations" are a subcategory of germ-line mutations that get passed down intact over generations without change. All people possessing founder mutations have a damaged section of DNA identical to that of the original founder. This shared region of DNA is called a "haplotype." If you share a haplotype, you share an ancestor all the way back to the original founder. The age of founder mutations can be determined by examining the length of the haplotype: the shorter the length, the older the mutation.

Between 50,000 and 55,000 years ago, our ancestors migrated to India and Australia. Around 45,000 years ago, the African descendants reached the Middle East; as the second-to-last ice age waned (about 40,000 years ago), they moved into the open

steppes of Central Asia. As Spencer Wells, director of the Genographic Project, puts it so aptly: "If Africa is the cradle of humanity, Central Asia served as its nursery." From Central Asia we find *Homo sapiens* reaching Europe around 35,000 years ago. By 20,000 years ago, a separate group of Central Asians moved north into Siberia and the Arctic Circle. Eventually, there were at least two separate migrations to the Americas. The first appears to have come from Western Europe, where we now see evidence of migrations along the glaciers of the last ice age, which stretched from Western Europe to North America. The second appears to have come over a land bridge from Siberia to what is now Alaska.

Although molecular anthropologists such as Wilson, Cann, and Wells have given us our greatest discovery about ourselves, geneticists still wish to track markers more comprehensively throughout all human populations and create an even more detailed map of our ancestors' journey across the globe. Anyone can now participate in the Genographic Project. Priced at around US\$100, the Genographic kit allows anyone to track the movement of their ancestors out of Africa. My family and I purchased a kit, and we decided to send in a DNA sample of our youngest son, Matthew. His lineage was traced out of Africa, through what is now Saudi Arabia, into the Fertile Crescent (or Iraq/Iran), and into Western Europe.

Some Inferences and Implications

Given this information about our origins, let us seriously consider some of the broader inferences and implications for our species if we are to honestly and humbly accept the discovery that we are all African.

We are all African. With these four words, we see a genetic coalescence of the entire human population. We now know that we descended from inhabitants of Africa who began migrating out of Africa around 60,000 years ago. In this way, it is impossible for us to not all be, in some ways, related. Think of it as the past union of all (six) degrees of separation. In *Mapping Human History*, Steve Olson has traced the history of our species over the last 100,000 years. With the aid of a computer scientist, a statistician, and a supercomputer, Olson has calculated that we have to go back in time only 2,000 to 5,000 years to find someone who could count every person on Earth today as a direct descendant. If we go back just a little further, 5,000 to 7,000 years, every person is a direct ancestor to the over 6 billion people alive today (unless their line of descendancy died out).

When you walk through an exhibit of Ancient Egyptian art from the time of the pyramids, everything there was very likely created by one of your ancestors—every statue, every hieroglyph, every gold necklace. If there is a mummy lying in the center of the room, that person was almost certainly your ancestor, too. It

means when Muslims, Jews, or Christians claim to be children of Abraham, they are all bound to be right. "No matter the languages we speak or the color of our skin, we share ancestors who planted rice on the Yangtze, who first domesticated horses on the steppes of the Ukraine, who hunted giant sloths in the forests of North and South America, and who labored to build the Great Pyramid of Khufu," Olsen and his colleagues wrote in the journal *Nature* (2006).

With these four words, we cannot turn a blind eye to how this discovery was made. And in so doing, we see an immediate appeal to the many wondrous evolutionary sciences that individually support the findings of our African lineage and collectively make this discovery so highly warranted. It is intrinsically valuable whenever any scientific discoveries are made. They tell us something we previously did not know, and in so doing they enrich our lives with the reward of discovery and enlightenment. So we must accept that evolutionary theory about human origins is a responsible means for

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establishing the scientific facts about who we are and where we came from. We may add to our already vastly large accumulation of information about our ancestry. We may make new discoveries that challenge current views. But this is the very spirit of science itself. It is a self-building and self-correcting process. It is by no means perfect, but that has never been one of its claims. At the end of the day, there are simply more and less responsible means for attaining and disseminating information about the cause and effect relationships that undergird the natural world. And our current sciences aspire to be the most responsible in providing us with information about our ancestry. To our religious or spiritually minded brothers and sisters: Be not afraid to embrace science and incorporate it into your current metaphysical beliefs. Do not be unjustly biased against scientific discoveries about our ancestry and be open to their insights.

With these four words, we are all humbled. One obstacle to a reasonable humility may come from the belief that one's in-group is somehow more privileged than, or in some way chosen over, other out-groups. Because we are connected in lineage by common ancestry, all human life is equally valuable. Sickness, suffer-

ing, and death in Africa are no less tragic than anywhere else in the world. When and where possible, it seems imperative to try to reduce the amount of suffering in the world.

With these four words, we are equal, for we have been liberated from any self-imposed ideas of importance or special designation. We are all exactly the same. We no longer need to segregate and distinguish ourselves through the use of artificial inventions of importance whether politically, philosophically, or religiously motivated. We now know, without doubt, that we are all profoundly, foundationally, *exactly* the same. This egalitarian realization liberates us from any delusions of self-imposed importance. In-groups must transcend their self-conceived notions of special or privileged status. This will be extremely difficult for in-groups maintaining strict dogmas of special status, even though we have discovered that all humans share the most level of all

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playing fields. This is about as politically correct as it gets but in a consistently transparent manner. Perceived privilege among our species is largely manufactured by culture and does not reflect biological descendancy. Artificial rather than natural status is perceived to be attained and given privilege. Were there not so many diverse cultures, we might be acting quite differently toward one another as members of different in-groups and out-groups.

With these four words, we see that racism is a human invention. It is a social construct with lingering natural biases—leftover baggage from our mammalian xenophobic tendencies. Yes, it is true that by nature most species—especially mammals—are intrinsically xenophobic: that is, they are wary of species different from themselves. But this is simply a hardwired response to the possibility of threat and danger. However, once there is evidence of an absence of threat and the potential for increased security and resource acquisition through cooperation, there is no further need to fear foreignness. Dr. Robert Kurzban has referred to this hardwired xenophobic response as an “otherness detector” that exists in us because of its use in judging the trustworthiness of strangers. He believes that humans have traditionally used skin color as a sign of uniqueness and a way to make comparisons. But he says other factors can have the same effect—including unusual accents, colored T-shirts at athletic competitions, flags of different countries, gang colors, and the like. Today, we know that skin color has a specific evolutionary function. In Carr’s words: “This balances the need

to protect the skin from damage by ultra-violet light (which requires melanin, the pigment that makes skin dark) and the need to make vitamin D (which results from the action of sunlight on a chemical in the skin). This explains the dark, opaque skins in the tropics and the light, transparent ones nearer the poles.”

It may be just wishful thinking, but if all peoples on this planet were to accept that we are all African, there might be less racial hatred, violence, and bloodshed. William Hamilton has demonstrated that we tend to care more for our kin and less for strangers. This kin selection appears to be a hardwired trait. Perhaps it is possible to transcend our biological constraints and, with the help of science and reasoned tolerance, recognize that we have the ability to treat each other as sharing an extended kinship. With our knowledge of genetic coalescence, we can see that if we turn the evolutionary clock backward just a few thousand years, all Jews

and Arabs are brothers and sisters—as are Turks and Greeks, Japanese and Chinese, Hutus and Tutsis. If we turn back the clock further, we all coalesce into a common ancestry: “Each of us,” says Dennis Drayna, “bears biochemical witness to the fact that all humans are indeed members of a single family, bound together by the shared inheritance of our genome.” Once these tendencies are transcended through reason and science, it is possible to reduce one’s fear of the other. Shared values become more

important than the less relevant characteristics that distinguish in-group members from out-group members. More thought and energy can be devoted to searching for a commonality of ideas and values between different groups. If there is to be anything like a Universal Charter of Rights, we must first determine those values that are most common to the populations of the world.

These represent only a few of the inferences and implications that can be derived from an honest and responsible understanding of our origins.

Conclusion

A century and a half ago, Charles Darwin forever changed the way in which we understand ourselves. It is through his work and the work of those who have stood on his shoulders that we can see as far as we can today and will see further tomorrow. That every person on this planet, today, has ancestry leading back to Africa is not only an important inference of Darwin’s legacy to humankind, it is a responsible declaration of honesty, equality, and humility. It is in such an understanding of ourselves that our hope for the future lies. 

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