Newsweek

The DNA of Abraham's Children

Analysis of Jewish genomes refutes the Khazar claim.

by Sharon BegleyJune 03, 2010

Menahem Kahana / AFP-Getty

Ultra-Orthodox Jewish men in front of the Tomb of the Patriarch, where Old Testament prophet Abraham and his son Isaac are thought to be buried.

Jews have historically considered themselves "people of the book" (*am hasefer* in Hebrew), referring to sacred tomes, but the phrase is turning out to have an equally powerful, if unintended, meaning: scientists are able to read Jewish genomes like a history book. The latest DNA volume weighs in on the controversial, centuries-old (and now revived in a 2008 book) claim that European Jews are all the descendants of Khazars, a Turkic group of the north Caucasus who converted to Judaism in the late eighth and early ninth century. The DNA has spoken: no.

In the wake of studies in the 1990s that supported biblically based notions of a priestly caste descended from Aaron, brother of Moses, an ambitious new project to analyze genomes collected from Jewish volunteers has yielded its first discoveries. In a paper with the kind of catchy title you rarely see in science journals—"Abraham's Children in the Genome Era"—scientists report that the Jews of the Diaspora share a set of telltale genetic markers, supporting the traditional belief that Jews scattered around the world have a common ancestry. But various Diaspora populations have their own distinct genetic signatures, shedding light on their origins and history. In addition to the age-old question of whether Jews are simply people who share a religion or are a distinct population, the scientific verdict is settling on the latter.

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Although the origin of the Jews has been traced, archeologically, to the Middle East in the second millennium B.C.E., what happened next has been more opaque. To sort it out, researchers collected DNA from Iranian, Iraqi, Syrian, and Ashkenazi Jews around New York City; Turkish Sephardic Jews in Seattle; Greek Sephardic Jews in Thessaloniki and Athens; and Italian Jews in Rome as part of the Jewish HapMap Project. (All four grandparents of each participant had to have come from the same community.) As the scientists will report in the next issue of the *American Journal of Human Genetics,* the analysis shows that "each of the Jewish populations formed its own distinctive cluster, indicating the shared ancestry and relative genetic isolation of the members of each of those groups."

Jewish populations, that is, have retained their genetic coherence just as they have retained their cultural and religious traditions, despite migrations from the Middle East into Europe, North Africa, and beyond over the centuries, says geneticist Harry Ostrer of NYU Langone Medical Center, who led the study. Each Diaspora group has distinctive genetic features "representative of each group's genetic history," he says, but each also "shares a set of common genetic threads" dating back to their common origin in the Middle East. "Each of the Jewish populations formed its own distinctive cluster, indicating the shared ancestry and relative genetic isolation of the members of each of those groups."

The various Jewish groups were more related to each other than to non-Jews, as well. Within every Jewish group, individuals shared as much of their genome as two fourth or fifth cousins, with Italian, Syrian, Iranian, and Iraqi Jews the most inbred, in the sense that they married within the small, close-knit community. In general, the genetic similarity of any two groups was larger the closer they lived to one another, but there was an exception: Turkish and Italian Jews were most closely related genetically, but are quite separated geographically.

Historical records suggest that Iranian and Iraqi Jews date from communities that formed in Persia and Babylon, respectively, in the fourth to sixth centuries B.C.E., and the DNA confirms that. The genetic signatures of these groups show that they remained relatively isolated—inbred—for some 3,000 years. The DNA also reveals that these Middle Eastern Jews diverged from the ancestors of today's European Jews about 100 to 150 generations ago, or sometime during the first millennium B.C.E.

That's when the Jewish communities in Italy, the Balkans, and North Africa originated, from Jews who migrated or were expelled from Palestine and from people who converted to Judaism during Hellenic times. During that period Jews proselytized with an effectiveness that would put today's Mormons to shame: at the height of the Roman Empire, as the Roman historian Josephus chronicled, mass conversions produced 6 million practicing Jews, or 10 percent of the population of the Roman Empire. The conversions brought in DNA that had not been part of the original gene pool in the land of Abraham.

The DNA analysis undermines the claim that most of today's Jews, particularly the Ashkenazi, are the direct lineal descendants of converted Khazars—which has angered many in the Jewish community as an implicit attack on the Jews' claim to the land of Israel, since it implies that today's Jews have no blood ties to the original Jews of the Middle East. Instead, find the scientists, at most there was "limited admixture with local populations, including Khazars and Slavs ... during the 1,000-year (second millennium) history of the European Jews."

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the Iranian, Iraqi, and Syrian Jews. That is evidence of “a shared genetic history of related Middle Eastern and non-Semitic Mediterranean ancestors who chose different religious and tribal affiliations.” Adds Ostrer, “the study supports the idea of a Jewish people linked by a shared genetic history. Yet the admixture with European people explains why so many European and Syrian Jews have blue eyes and blond hair.”

Southern Europeans were the closest genetic cousins of Ashkenazi, Sephardic, and Italian Jews, reflecting the large-scale conversion of these Southern European populations to Judaism some 2,000 years ago, when European Jewry was forming. The Sephardic groups share genetic makers with North Africans, probably a result of marriages between Moors and Jews in Spain from 711 to 1492.

Several details of the Ashkenazi genome imply that centuries ago, the population experienced a severe bottleneck, in which the size of a group plummets, followed by a rapid expansion. That jibes with the historical record showing that the Jewish population in Western and Eastern Europe bottomed out at about 50,000 in the Middle Ages and then soared to 500,000 by the 19th century, growing at twice the rate of non-Jews—something called “the demographic miracle.”

Analysis of Jewish genomes has been yielding fascinating findings for more than a decade. A pioneer in this field, Michael Hammer of the University of Arizona, made the first big splash when he discovered that genetics supports the biblical account of a priestly family, the Cohanim, descended from Aaron, the brother of Moses: one specific genetic marker on the Y chromosome (which is passed on from father to son, as membership in the priestly family would be) is found in 98.5 percent of people who self-identify as Cohanim, he and colleagues reported in a 1997 paper in *Nature* (the PBS science series Nova did a nice segment on that work, summarized here). The Cohanim DNA has been found in both Ashkenazi and Sephardic Jews, evidence that it predates the time when the two groups diverged, about 1,000 years ago. DNA can also be used to infer when particular genetic markers appeared, and suggests that the Cohanim emerged about 106 generations ago, making it fall during what is thought to be the period of the exodus from Egypt, and thus Aaron’s lifetime.

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