

Published online 3 June 2010 | Nature | doi:10.1038/news.2010.277

News

## Jews worldwide share genetic ties

**But analysis also reveals close links to Palestinians and Italians.**

Alla Katsnelson

Different communities of Jews around the world share more than just religious or cultural practices — they also have strong genetic commonalities, according to the largest genetic analysis of Jewish people to date.

But the study also found strong genetic ties to non-Jewish groups, with the closest genetic neighbours on the European side being Italians, and on the Middle Eastern side the Druze, Bedouin and Palestinians.

Researchers in New York and Tel Aviv conducted a genome-wide analysis on 237 individuals from seven well-established Jewish communities around the world, hailing from Iran, Iraq, Italy, Greece, Turkey, Syria and eastern Europe. The team then compared these genetic profiles to those of non-Jews in the same geographic regions based on data from the Human Genome Diversity Project, a database of genomic information for individuals from populations worldwide. Each group of Jews is genetically distinct, but similarities between the groups weave them together with what the researchers describe as "genetic thread".

"There has been this back and forth discussion over the course of a century or more — are these a people? Is this in the genome?" says Harry Ostrer, a geneticist at New York University, the study's lead author. The new findings, he says, show that there "does seem to be a genetic basis to Jewishness".

Several studies in the past decade have looked at the genetics of Jewish populations, using smaller numbers of individuals, or focusing on markers in mitochondrial DNA — which is passed down maternally — or on the Y chromosome, inherited paternally. The genetic ties identified in the present study, published in the June issue of the *American Journal of Human Genetics*<sup>1</sup>, are consistent with the results of previous work, says Sarah Tishkoff, a human geneticist at the University of Pennsylvania in Philadelphia, "but this is, I would say, the first study to put everything together into a big picture by looking at a large number of sites in the nuclear genome".

### Close neighbours

The researchers analysed single-letter differences in the genome called single nucleotide polymorphisms, longer segments of DNA shared between different Jewish groups, as well as deleted or duplicated stretches of DNA called copy-number variants. Although the groups had strong genetic commonalities, the results also showed a varying degree of genetic mixing with nearby non-Jewish populations. The most genetically distinct Jewish communities, compared both to other Jewish groups and to nearby non-Jews, were those from Iran and Iraq.

“We really see the

The study provides a genetic basis for confirming or debunking theories of Jewish origin and history, says Ostrer. For example, one theory proposes that Ashkenazi



A common 'genetic thread' runs through Jewish populations scattered across the globe.

*Shmulitk / iStockphoto*

**events of the Jewish diaspora in the genomes of Jewish people."**

Jews (of eastern European origin) are largely descended from Khazars in eastern Europe who converted to Judaism, but the genetic closeness between Ashkenazi Jews and other non-European Jews does not support this idea.

The study also highlights how genetics can reflect history, Ostrer says, including evidence of the dispersal of Jewish populations throughout the Middle East and Europe. "We really see the events of the Jewish diaspora in the genomes of Jewish people."

Using a computer simulation, the researchers estimate that the genetic split between Middle Eastern and European Jews occurred about 100–150 generations ago, or 2,500 years ago — when Jewish communities are thought to have become established in Persia and Babylon. They also trace a high level of genetic mixing between Ashkenazi Jews and nearby non-Jews to more recent times, corresponding to a period between the beginning of the fifteen century and the start of the nineteenth century when the Jewish population in Europe swelled from about 50,000 to 5 million.

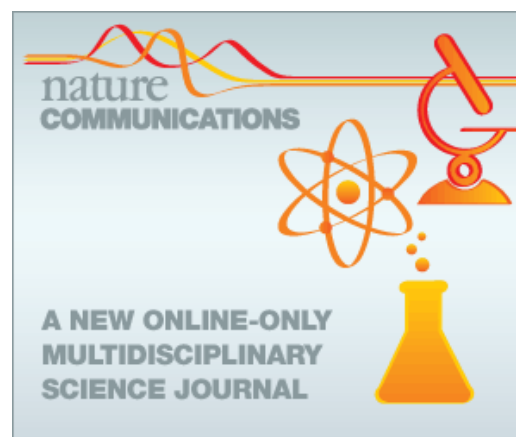
### Timing question

But constructing a timeline on the basis of genetic analysis is tricky, say others. "There are too many assumptions you have to make," says David Goldstein, a geneticist at Duke University in Durham, North Carolina. "I don't think we have the resolution right now in the genetics to time the events."

Another tantalizing question that the study doesn't address, he says, is the historical explanation for the shared genetics between the Jewish groups. Although the data point to a common ancestral origin in the Middle East, further details — such as when and how much different populations intermixed — are impossible to glean. "That level of resolution is just not there," he says.

Ostrer says that the researchers are extending their analysis to more Jewish populations. They also hope to apply the findings to medical research by focusing on some of the longer shared genetic markers that have been identified. The group is now studying the genetic susceptibility to breast and prostate cancers among Ashkenazi Jews, he says, and other groups are using genetic mapping techniques to study conditions such as Crohn's disease and Parkinson's disease.

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### References

1. Atzmon, G. *et al.* *Am. J. Hum. Genet.* [doi:10.1016/j.ajhg.2010.04.015](https://doi.org/10.1016/j.ajhg.2010.04.015) (2010).

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#108

The finding could be used to study the diseases related to common type of genome organization. The related ness of the genomes with other community may be a reason that all people related to that area may be migrated from same place a later they changed their community.

Ranjeet Singh Mahla

CCMB India 919533079818 mahlaranjeet@gmail.co

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Posted by: **Ranjeet Singh Mahla** | 2010-06-05 05:37:52 A

#109

so what ?

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Posted by: **colin morantz** | 2010-06-05 07:19:39 I

#109

It is really interesting article, I agree that it can also be used to treat diseases.

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Posted by: **A. MM** | 2010-06-06 08:12:28 A

#109

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Posted by: **Dovie Eisner** | 2010-06-06 06:00:52 I

#109

The Biblical account of the descendants of Abraham is as follows:

Abraham had two sons: Ishmael from Hagar, and Isaac from Sarah.

1. Ishmael is considered the progenitor of the Arab peoples. This includes the Palestinian Arabs, the Bedouins, and the Druze, among others.
2. Isaac had two sons from Rebekah: Esau (or **Edom**) and Israel (nÃ© **Jacob**).
  - o Esau fathered several nations, among them the nation of *Edom*. This nation, according to the Talmud, is ancient Rome. Being that Rome sits within Italy, it does not seem far fetche to assume that the modern Italian populace has some Roman blood.
  - o Israel/Jacob is considered by all Abrahamic faiths to be the ancestor of the Jews.

I find this study quite interesting. Corroboration of the Bible, perhaps?

Of course, being religious myself, \_I\_ have no problem believing that. Others might find it more difficult.

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Posted by: **Dovie Eisner** | 2010-06-06 06:52:38 I

#109

Common sense and a careful look at the physical appearance of these populations makes this finding no surprise.

Can this make a difference in the core issues blocking peace? The Right of Return, and the ancient ownership (perceive right by the religious right in Israel)?

Of course a rational criteria for entry to the Jewish State does not address the Holocaust which was not about the true genetic relationship among people but rather the willingness of modern states to identify weak minorities and target them for repression or large scale murder. None the less, flipped on its purpose in this study the genetic criteria broadened to include Ashkenaz would no doubt include most Palestinians, narrowed to exclude Palestinians most Israeli's and all Ashkenaz would be excluded.

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Posted by: **Vic Kley** | 2010-06-08 10:38:57 A

#109

How does this square with the 'black jews' of Northern Africa?

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Posted by: **Robert Stonjek** | 2010-06-08 11:05:11 F

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Vic,

Hardly. Including Ashkenazim would not include Palestinian Arabs.

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Posted by: **Dovie Eisner** | 2010-06-09 08:24:08 F

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