FONDAZIONE BRUNO KESSLER
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DNA DOE PROJECT: genetic genealogy and the search for identities

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Genetic genealogy has, over the years, acquired an actually crucial role in the investigative and forensic fields for solving murders, identifying murderers and exonerating innocents. But this particular strand of genetics can serve an additional noble purpose: giving peace and justice to the many "John and Jane Doe's" left without history or identity.

Just as in TV detective series, in real life too genetic tests make it possible to solve complicated murder cases: several cold cases have been solved in the United States thanks to these new analysis techniques, including the identification of the notorious Golden State Killer, whose DNA has been linked to 13 murders and multiple sex crimes committed between the 1970s and 1980s. We have an example of this in Italy as well: in order to find a compatibility with the unknown DNA trace found on Yara Gambirasio's lingerie, biological samples were collected from the people living and visiting the area surrounding the discovery of the body, effectively reconstructing the genealogy of the killer and leading to the framing of Massimo Bossetti.

But genetic genealogy may also have an additional function: the identification of unrecognized corpses, those whom Americans conventionally refer to by the fictitious names John and Jane Doe. In fact, in 2017 the DNA Doe Project (DDP), a nonprofit organization that set out to identify unnamed bodies and bring peace to the victims' families, was created in California. More than 60 volunteer experts collaborate on the project, the brainchild of Margaret Press and forensic genealogist Colleen Fitzpatrick, and by the end of 2021 they could count more than 65 successfully solved cases.

DDP uses GEDmatch, HYPERLINK "https://www.gedmatch.com/" a platform that receives data from companies that sell DNA tests and a whole series of useful tools to rebuild your family tree, such as Ancestry, 23&Me and MyHeritage.In particular, GEDmatch is interested in autosomal DNA tests, which allow one to verify each individual's family relationships and provide an estimate about his or her ethnic origins. Many more DNA segments are tracked for this than for a regular sample, so that it is possible to find out how many degrees of kinship there are between two or more individuals of the same ancestry.

GEDmatch boasts a large database thanks to which those who add their genetic profile can find more or less distant relatives who have already managed to reconstruct their origins thanks to the site.

And all of this is of paramount importance to DDP volunteers: once obtained, the DNA sample of the unknown individual being researched is entered on GEDmatch and the results are submitted to researchers for review. The goal is to find a match with the decedent's DNA, i.e. segments in common. Generally, a minimum of seven centimorgans (an industry-specific unit of measurement) of shared genetic material is required for a match to be considered valid, but, for the best chance of success, DDP experts do not work with less than twenty shared centimorgans. Such matches involve, in most cases, very distant cousins whose ancestors match those of the unknown person from the nineteenth century or even earlier, making it difficult to obtain reliable records for family tree reconstruction.

In the best case scenario, researchers already find the family tree of a relative of the corpse recorded on the GEDmatch site and, at that point, they can begin investigating the available material. Often, however, even when a blood relative of the body with no identity has been found, there is no way to see his or her ancestry: in these situations it is the job of genetic genealogists to investigate the family of the hypothetical relative. The weapons at DDP's disposal are many and not hard to find: web search, social networks, newspaper articles, birth records, and obituaries.

A practical example of what can be discovered through this kind of research is the first case solved by Press and Fitzpatrick in 2018. In 2002, seventy-six-year-old Joseph Newton Chandler III committed suicide in his Cleveland apartment. During the investigation, it emerges that the name by which he was known to authorities and his birth certificate actually belonged to a child who died in a car accident in 1945. Sixteen years after the incident, the researchers were able to obtain a DNA sample of the man, and by entering the results into the GEDmatch database they were able to match Alpha and Silas Nichols. Of the four children the Indiana-born couple had, three are now deceased, while there appear to be no death certificates for the fourth: Robert Ivan Nichols. One of the latter's sons recognized his father in the photo of the man who died in Cleveland, and it was thus possible to reconstruct his story. Robert Ivan was a World War II veteran who was deeply scarred by the experience of combat. Once he returned home, he married and had three children, but abandoned them in 1964 without explanation.

This is just one of many cases in which, thanks to these kinds of innovative techniques, it has been possible to give answers to the families of the John and Jane Doe, allowing them to put an end to their ordeal and prevent their stories from being lost forever. Of course, the search work is not always without hiccups: the DNA sample may be unavailable, severely damaged, or insufficient to make matches. Besides that, some populations are poorly represented in databases of genetic material, as is the case with African Americans, Asian Americans, and Native Americans. Finally, the histories of the families whose ancestry is being reconstructed are not always linear, and one may, therefore, run into obstacles that lengthen the time of the investigation and increase its difficulty coefficient.

Nevertheless, however potentially fraught with pitfalls and in its infancy, this branch of research is certainly a valuable tool not only for scientific and forensic research, but also for an entirely human aspect: making sure that no identity and no history falls into oblivion.

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AUTHORS

- Nina Fresia