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Portraits by Deoxyribonucleic Acid (DNA)

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Heather Dewey-Hagborg, a graduate student and "information artist" from Brooklyn, creates three-dimensional portraits of strangers based on the DNA she finds in public places. Isolating nucleic acid from cigarette butts, pieces of hair, nails and gum, Heather tries using genetic analysis to restore the appearance of a person, and then prints the resulting portrait on a 3D printer.

Looking at these portrait sculptures, one may involuntarily think about how much information about ourselves we leave around. Every day DNA is more and more like a personal diary, which can be looked into not only by a doctor, but also by an absolute stranger.

The art project "images of strangers" began with a single hair stuck in a glass crack on the reproduction [1].

Thinking about how he got there and who he belonged to, Heather realized that this information is not lost and can be restored, because it is stored in the DNA of the hair.

Heather conducts the procedure for DNA isolation from the biomaterial in a homemade laboratory Genspace in Brooklyn. The artist amplifies nucleic acid fragments using polymerase chain reaction, choosing those areas that are involved in the formation of facial features [2].

Heather receives personal information about strangers in the form of single – nucleotide polymorphisms (SNP) – DNA sites that differ in different people by only one "letter". The

objective part of the work ends here, since the restoration based on SNP facial features is already a matter of interpretation [1].

Heather does not say that her sculptures directly correspond to the appearance of the owners of DNA [2].

These are rather generalized portraits of the relatives of those people, whose biological material came to hand to the artist [2].

According to Heather, there is correspondence of gender, race, skin color, eyes and hair, as well as the presence or absence of freckles, in her appearance portraits of DNA owners. In addition, the correct width of the nose, eye distance and “some other features” are observed to some extent [1].

If today there is a significant inaccuracy in such portraits, then year by year their similarity with the prototypes will only increase. So, just six months ago, in the course of a large-scale study, scientists discovered five genes, whose SNP indicates the proportions between different points of the face.

During the study, where more than 10 thousand volunteers took part, scientists analyzed how the proportions between the control points on the face correlate with the diversity of existing polymorphisms [2].

Within the work published in PLoS Genetics, scientists experimentally confirmed the generally accepted opinion that facial features are determined by the joint action of hundreds, if not thousands of different genes. The five genes found – PRDM16, PAX3, TP63, C5orf50 and COL17A1 – are simply the most important [1].

Creating portraits, Heather does not paint, but prints them colored at once. For this purpose the artist uses the Zcorp printer which works on sandlike coloured plastic and glue.

Heather puts the biomaterials from which DNA was isolated next to the resulting sculpture.

The proven technology of appearance restoration based on the analysis of the genome does not exist yet. The portraits

which Heather Dewey-Hagborg creates are just an artistic interpretation of the data of genetics, made, however, according to the latest science [2].

It is easy to see that in many ways the artistic effect of Heather's works is based on the fact that we cannot compare her portraits with the originals. There can be no doubt that if such a comparison was possible, the incompleteness of the existing data on the genetics of appearance would be too obvious [1].

References:

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