

Windows to our future health

DENA LIFE SCIENCE'S genetic testing service, MYCODE, wants to help people understand their potential disease risks and for its online community to contribute to health research.

Genetic insights may help shift healthcare from treatment-based to prevention-focused.

"As the saying goes 'know your enemy and know yourself,'" says Jun Oi, president and CEO of DeNA Life Science Inc. "It's important to understand yourself in order to prevent disease."

The flagship product of his company, an offshoot of internet company DeNA, is the genetic testing service 'MYCODE'. The test was released in 2014 after development in collaboration with The Institute of Medical Science at The University of Tokyo (IMSUT).

Using a saliva sample, MYCODE analyses users' genotypes to identify predispositions to certain diseases and other physical characteristics. Genetic results are compared with data from hundreds of academic papers in a genome database that DeNA and IMSUT jointly created.

Test kits can simply be bought online or from a retailer. Users then register on the website and send away a saliva sample to be analysed. The results are delivered to an online page, including

information on relative disease risk and recommended lifestyle changes to prevent disease onset.

Currently, the test offers more than 280 testing items, including 38 types of cancers, 17 lifestyle related diseases and 130 physical predispositions, ranging from diabetes to the likelihood that alcohol consumption will cause facial redness.

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"We developed MYCODE hoping that it would allow people to discover their own illness risks, increase their awareness of their own health and make changes to their lifestyles," Oi says.

MYCODE's initial development benefitted from government funds earmarked for big data innovation. It has since also had some endorsement from local governments. For example, Kanagawa prefecture —

Saliva samples are analysed in a lab to tell users about their genetic predispositions.



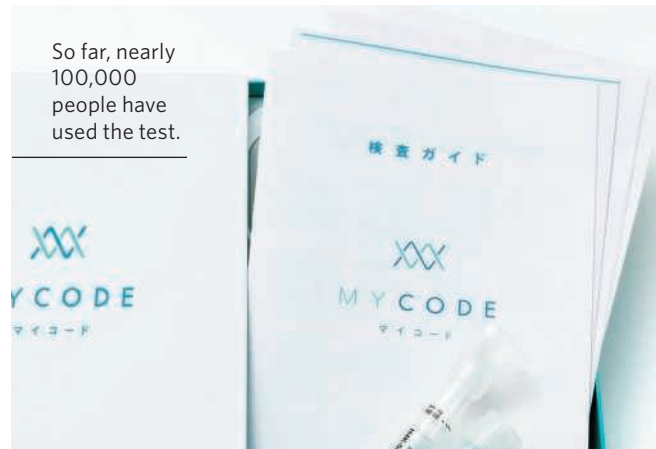
Japan's second most populous — has a programme that promotes illness prevention based on a concept from advocates of Eastern medicine called 'ME-BYO'. The idea encourages taking a holistic and continually proactive approach to health. In 2016, Kanagawa identified the MYCODE test as a 'ME-BYO Brand'. Sanjo City in Niigata Prefecture on Japan's northern coastline has also supplemented the cost of the test for locals who wanted to try MYCODE as part of their public health examination.

"Healthy people might not be so keen on healthcare. But by learning the risks you are born with, we hope it creates an opportunity to increase your health awareness," says Oi.

Genomic research data

So far, nearly 100,000 people have used the test and nearly 90% consented to become participants in genome project 'MYCODE Research', for which DeNA has collaborated with a number of other organizations.

This collaboration uses MYCODE members' anonymised DNA sequences to look for genetic patterns indicative of diseases or physical predispositions. The more genetic data there is, the more accurate the predictions. By collecting and analysing health big data, the collaboration aims to build an even more detailed prediction model for disease risks specific to the Japanese population.



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Genetic testing service

Motivate positive changes in users' health behaviours



Research

User-driven research platform
Make scientific and medical discoveries

The recent emergence of genetic testing services has increased demand for strict protection of data privacy, says Oi.

The need to protect people from discrimination based on genetic data was highlighted by researchers involved in the Ethical, Legal, and Social Implications (ELSI) Research Program — put together in 1990 by the Human Genome Project.

To address these issues, the company has its own ethics review committee. MYCODE is also approved by Japan's Council for Protection of Individual Genetic Information (CPIGI).

"We believe that for genetic analysis, the ELSI's recommendations need to be given more weight than with other types of services, as a

full understanding of genetic testing has not yet been developed," Oi says.

Online communities contributing to research

Provided that members give consent, basic health information and genomic data gathered for MYCODE can be used for research projects. Because of its digital status, it can, for example, be combined with data from MYCODE collaborators, such as blood samples or gut microbiota, to produce datasets for analysis.

"Through MYCODE, we hope to create a new movement towards 'community-derived science', where communities contribute to new scientific developments," Oi says.

Working with MYCODE members, researchers, nutritionists and medical doctors, DeNA Life Science now manage genetic research projects. This can involve planning and research as well as analysis and publication.

The group has already begun work on a project with researchers from Ajinomoto Co., Inc. that looks broadly into how health is related to behavioural changes, such as exercise. This work combines MYCODE data and a testing method Ajinomoto pioneered that gives a measure of health based on amino acid concentrations in the blood.

Another cohort supplied DeNA and Morinaga Milk Industry Co., Ltd. with samples for a feasibility study for a new test for gut microbiomes. This

service can estimate intestinal age and motivate users to change their health-related behaviours. It took just four days to collect the consent of almost 2000 MYCODE users.

"We have realised a unique research platform that is web-based, instant and interactive. We believe this is one of the first of its kind in Japan," Oi says.

"We hope that communities, like the people gathered under the MYCODE research platform will play a role in an important new era of 'community-derived science'." ■

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