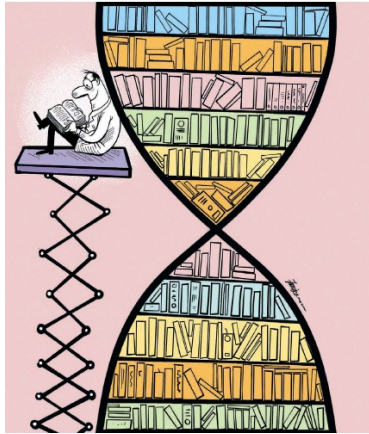


- Genetics

How useful are home genetic tests? |

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Want to know if you are at risk of cancer or if your child is a musical genius? Direct-to-consumer genetic test kits are big business, but experts say you should not take them too seriously



Whatever your burning question is, there is a consumer genetic test kit for it. And you do not have to see a doctor to get answers. Want to know if you are at risk of Alzheimer's disease or breast cancer? Or why all that cardio exercise is not helping you lose weight? Could your child have difficulty in reading and spelling or is he or she likely to be a maths whizz? Which skincare products work better for you? Are you predisposed to infidelity? The consumer genomics industry has evolved from just giving lineage information to offering insights into wellness, lifestyle and even parenting. Besides global industry leaders like 23andMe and Ancestry, Singapore-based players like Imagen Labs, e-beauty, Insight DNA and BluMaiden Biosciences have also sprung up. Some extend beyond testing and offer customers skincare and supplements tailored to their profile. Last year, the global direct-to-consumer genetic testing market surpassed US\$1.4 billion (S\$1.9 billion). It is expected to hit at least US\$4.2 billion by 2028, according to Global Market Insights, a global market research and management consulting company. However, medical experts warn that such tests are limited in their usefulness and may cause unnecessary alarm among unwary consumers.

TEST, DISCOVER, ACT

Imagen Labs, which has been offering consumer genetic testing since 2017, saw "robust year-on-year growth" before the pandemic, says Dr David Klinzing, its chief technology officer and general manager.

Ori (www.AskOri.com) is its direct-to-consumer brand with kits starting at \$305, while mySNP is its business-to-business brand. Covid-19 affected Imagen's operations slightly as some of its partners closed because of lockdowns, but it also made consumers more aware of their health and scientific concepts like DNA or deoxyribonucleic acid, which carries genetic information.

"So it may have removed some of the stigma behind doing some testing on yourself and helped grow interest in consumer tests like ours," Dr Klinzing adds.

Most of its customers are in their mid-20s to mid-40s, with an even split of genders.

What sets it apart from its competitors is that it provides an "end-to-end service" with recommendations to optimise wellness as well as personalised supplements and skincare, he says.

E-beauty's (www.e-beautyglobal.com) co-founder Thomas Chan says it has "hundreds of customers", mainly women aged 30 to 60, after launching just over six months ago.

Its entry-level product, Beautify Me, costs \$198 and provides 14 reports on skin traits from sensitivity to photoageing tendencies. As it is a commercial platform, reports that include disease risks and drug responses are provided by its China-based affiliate as Singa. Last year, the global direct-to-consumer genetic testing market surpassed US\$1.4 billion (S\$1.9 billion). It is expected to hit at least US\$4.2 billion by 2028, according to Global Market Insights, a global market research and management consulting company.

Singapore's Ministry of Health (MOH) allows only doctors to prescribe genetic tests, Mr Chan says. MOH's online guidance document on non-clinical genetic testing states that providers here must be licensed under the Private Hospitals and Medical Clinics Act.

This regulatory framework does not apply to overseas direct-to-consumer tests such as CircleDNA.

Like Imagene, e-beauty also offers customised skincare and supplements.

Both companies claim to have genetic databases that are more relevant to local customers, compared with other international players. Imagene's ancestry-based genetic risk scoring bioinformatics system is patented, while e-beauty uses the Asian Screening Array genomic tool.

Another home-grown player, BluMaiden Biosciences, does not do DNA tests. Its upcoming Babypass (babypass.health) kit gives you insights into your microbiome, the community of microbes that live on and in your body, and which influence your health.

The microbiome can be passed from parent to baby and, unlike DNA, it evolves according to your diet and lifestyle.

Instead of saliva samples, its customers – typically parents or couples planning to start a family – provide stool or breast milk samples. These yield biomarkers on more than 100 diseases and health conditions, says Dr Damien Keogh, its chief executive and director.

"We want you to use it as an added value to that doctor's consultation, not to replace his diagnosis or prescription," he says.

For example, gestational diabetes affects one in five pregnancies here and mums-to-be are usually tested at 24 to 28 weeks by their doctors.

A pregnant mother could do a Babypass test at 12 weeks, find out she is at risk of developing the condition and alert her doctor earlier to take preventative steps, says Dr Keogh.

He adds that it is "more than just a microbiome test". A unique feature is its app, which is pitched as a "family tech solution" where parents can be part of a community, learn about parenting topics, and seek help from wellness practitioners such as nutritionists and health coaches.

The company is also recruiting mothers-to-be for a clinical study on functional changes in the gut microbiome during pregnancy, as its ultimate aim is to "cure diseases", he says.

Search for genetic test kits online and a Web page from MOH almost always ranks high in the results, warning consumers of the risks.

Dr Koh Ai Ling, a consultant from the Genetics Service at the Department of Paediatrics in KK Women's and Children's Hospital (KKH), says doctors offer genetic testing to patients to diagnose and help them manage their conditions.

Those with a significant family history of certain conditions can also undergo predictive tests.

Direct-to-consumer (DTC) genetic testing, in contrast, is "not medical grade" and therefore "not recommended for use in medical advice to individuals", Dr Koh stresses.

"The increased 'health risk' indicated via DTC genetic tests may not mean that the individual will develop the medical condition. At the same time, 'reassuring' results may not truly rule out the risk of developing the medical condition in question."

Ms Breana Cham, principal genetic counsellor in the same department at KKH, adds: "Be wary of claims that may be exaggerated or have limited scientific evidence to support them."

Dr Koh has seen patients who use such kits because they want to take charge of their health. "However, due to inadequate or even absent pre- and post-test counselling, patients often may misinterpret the DTC genetic test results, creating unnecessary worry and anxiety, especially if the results show concerns for an increased 'health risk'."

A healthcare worker in her 40s, who declined to be named, spent more than \$1,600 on consumer genetic kits for her family in 2020 after seeing advertisements on social media. She and her husband were curious about their ancestry as they are of mixed heritage, and she was concerned about her two-year-old son, whom she had at a late age.

She was happy to hear that her daughter, 14, and son were both musically inclined. But she was shocked to learn that she may have a mutation for hearing deficiency and wondered if this was the cause of her toddler's speech delay.

She raised this at his development check-up and was referred to a genetic specialist in KKH.

"The doctor advised that this is just a superficial test, it doesn't give a good in-depth analysis," she recounts. Her son is undergoing further tests in the ear, nose and throat department.

She says in hindsight that while the lineage data and some lifestyle recommendations were useful, markers for genetic tendencies were not, because you need to do "a rigorous test to validate that you are having this issue. If not, it's really unnecessary alarm and anxiety".

Ms Cham also cautions against blindly following nutritional and wellness recommendations from such DTC reports. For instance, people may lose out on essential nutrients when they limit certain food groups, or may over-supplement instead of eating whole foods. “There is no direct correlation between the current state of genetics knowledge and the personalised effects on nutrition and fitness. A limited set of genetic markers leads to limited evidence for proper recommendations, which can lead to advice that could be considered extreme and pose dangers to one’s health in the long run,” she says.

Consumers are often unaware of what happens to their genetic data after submitting their samples.

The DTC test companies interviewed say they have strict protocols to safeguard privacy, but Dr Koh says “some of the genomic data that is claimed to be deidentified by the companies may be provided to different researchers without the explicit consent of the patients”.

Ms Cham adds that protecting your genetic data is no different from safeguarding personal data like identification card numbers.

“As part of the scientific community, we are supportive of data sharing. However, we also are conscious of the potential for discrimination, misuse and privacy loss.

“Do inquire about what happens to your information if the provider ceases operations, and find out if there are options to withdraw consent from data that was shared and stored.”