Researchers shed light on high myopia

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Researchers in Singapore have for the first time discovered genes associated with super high myopia that afflicts one in seven young people.

They hope to have fine-tuned, in a few years’ time, a test to identify such sufferers for early treatment – before they become severely myopic and at risk of going blind.

“The idea is to produce a test for several significant genes and combine it with behavioural traits, so we can single out which child will become myopic early and suffer a rapid progression of the condition,” said Professor Saw Seang Mel, vice-dean of research at the National University of Singapore’s (NUS) Yong Loo Lin School of Medicine.

Special eye drops, contact lenses or spectacles could then be used to retard the progress.

“We have solved most of the puzzle,” said Prof Saw, who is also with the university’s Saw Swee Hock School of Public Health.

She was involved in the massive research effort to uncover the genetic basis of myopia, together with scientists from institutions such as the Singapore Eye Research Institute, the Genome Institute of Singapore and the Duke-NUS Graduate Medical School.

The project combined the results of three large studies on 5,000 myopic adults and children here, comparing their genetic make-up to those without the condition.

It has identified several particular locations in a person’s DNA associated with high myopia of 600 degrees and above, and future tests will home in on these genetic variations.

When someone has myopia or short-sightedness, he sees near objects clearly but distant objects appear blurred. This is because the focal point of a visual image falls in front of the retina instead of directly on it, and the eyeball may be too long from front to back.

One of the leading causes of visual impairment and blindness, myopia poses a significant public health burden in the region.

Asia is experiencing a myopia epidemic, particularly in its big cities. Rates of the visual defect have been rising over the past two decades.

In Singapore, the myopia capital of the world, eight in 10 people are short-sighted by the time they are 18.

Short-sightedness, typically caused by an elongated eyeball, is the result of both genes and the environment.

Children here are more likely to spend their time reading or using the computer instead of going outdoors and being exposed to sunlight, which encourages the body to produce the chemical dopamine, which can prevent the eyeball from becoming elongated.

“With a predictive tool that combines gene tests with environmental factors, we can recommend the treatment for those who need it the most,” said Prof Saw.

The latest work, a combined effort of 15 local and international groups, was published in the journal PLoS Genetics last month.

By the end of next year, the team expects to have a blueprint of the main genetic variants linked to myopia, after including data from the Consortium of Refractive Error and Myopia, an international consortium of 40 studies.

The team expects to have a pilot test for high myopia ready in two to three years.

Associate Professor Teo Yik Ying, head of the public health school’s biostatistics domain, said: “We are in a good position to be among the leaders in developing such tools because we have the technology and population diversity to do so.

“With our ethnic diversity, our population represents half the world.”

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