A step forward in defeating ‘Godzilla-like’ cancer

Lin Yangchen

It infiltrates your body like a terrorist, and if you do not get rid of it fast it will wreak havoc in your lungs like Godzilla, according to one nose cancer doctor.

Nose cancer may be relatively uncommon here, but it is debilitating and difficult to treat in its later stages. Early detection may offer the best hope, and researchers are developing a cutting-edge technique that does so by measuring the vibration of molecules in cancerous tissues when a laser is shone on them.

Nose cancer is especially common in China’s Guangdong province, where preservatives in salted fish are thought to be a contributing factor. For Chinese here, particularly the Cantonese, it may also be due to a diet featuring salted fish, and cured and preserved meats that are high in salt and cancer-causing nitrates. The cancer’s geographic range may be limited, as it is not as common in the West, but when it strikes, it does so with a vengeance.

Unusually it is caused by a virus, in this case the Epstein-Barr virus – a member of the herpesvirus family.

And it mainly inflicts men aged from 35 to 55 – researchers still do not really know why.

Dr Toh Han Chong, senior consultant and deputy director of education at the National Cancer Centre Singapore, said that because the virus stays in the tissue without making copies of itself, the immune system cannot pick it up.

So the virus persists in the nose for a long time, causing cancerous multiplication of the nose cells although it does not itself replicate.

"It’s this growing monster that breaks down blood vessels and tears down ‘buildings’ (body tissues)," he said.

In the late stages it breaks down blood vessels and invades the lungs. By then, the patient has an average of about 18 more months to live, said Dr Toh.

At this point, even the body’s biological "commandos", otherwise known as T-lymphocytes, have trouble fighting it, he said. T-lymphocytes are among the various types of white blood cells that protect the body against viral infection.

Patients have a fair better chance of recovery if nose cancer is detected early. And this was the vision of a team of researchers at the National University of Singapore (NUS) who envisaged the services of Raman spectroscopy.

In Raman spectroscopy, molecules are bombarded with lasers. The molecules absorb light of one colour and emit light of other colours, depending on their type and relative concentrations. The technique is able to produce a detailed biochemical “fingerprint” of the tissue, to tell apart normal and cancerous tissues, even if both look the same to the naked eye.

Associate Professor Huang Zhiwei at the NUS Faculty of Engineering teamed up with Dr Lim Chwee Ming at the National University Cancer Institute, Singapore, to fine-tune this technique for detecting nose cancer.

They studied the effectiveness of the method in detecting recurrences of cancerous tissue in people who had nose cancer before.

Prof Huang said the gold standard for nose cancer screening today relies on the endoscope – a flexible tube with a light and camera attached to allow doctors to look inside the nose. “Observation is based on the naked eye, and really depends on the clinician’s experience – it’s very subjective.”

Using Raman spectroscopy however, the team aims to detect cancerous signals 10 to 15 per cent sooner, when the problem is much smaller and easier to remove surgically. This would translate to a higher survival rate and faster recovery.

“The beauty of this is that it can detect tissue signals even before it (the cancerous growth) is visible,” said Dr Lim.

The researchers do this by tapering the tip of the optic fibre bundle delivering the laser, to focus the light just below the surface of the nose lining, where cancerous growth starts. The wavelengths of light emitted back by the molecules are recorded as graphs called Raman spectra. Data has been collected from 79 patients so far.

It is hard to tell the difference between cancerous and non-cancerous states just by looking at the data, but clear differences show up when it is analysed statistically. The researchers have reported a diagnostic accuracy of more than 90 per cent.

They aim to finish their pilot study by 2017, continue to refine the procedure and eventually compile a Raman spectrum database as a reference for cancer screening.

So the future looks hopeful in the fight against nose cancer. Said Dr Toh: “Many Asian centres lead the way in providing state-of-the-art care for nose cancer... It is a cancer which we can call our own.”

linyc@sph.com.sg