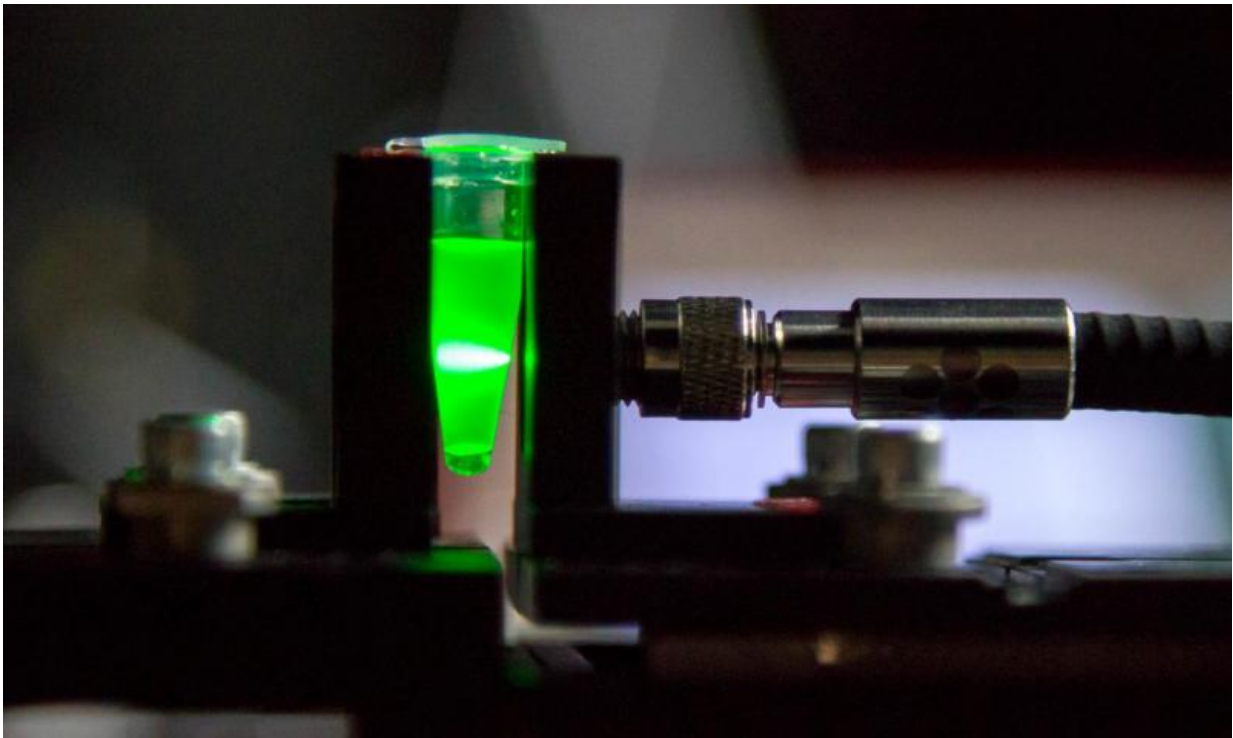


Bomb detecting technology can be used for early dementia diagnosis

October 17 2016, by Caleb Radford



Laser shining through blood sample to make vitamin B12 molecules vibrate.
Credit: The Lead

A technique for detecting Improvised Explosive Devices (IEDs) is being used to identify vitamins in the bloodstream linked to dementia.

Researchers from the University of Adelaide in South Australia

developed the Improvised Explosive Device (IED) detection method in 2014, which used light intensity to determine [the presence of explosive residue](#).

The same method is now being used to highlight vitamin B12 in diluted human blood, with the potential to mature into a diagnosis tool for dementia or Alzheimer's disease.

Lead investigator Georgios Tsiminis said the technique was still being modified for commercial use but could also be used to detect a range of different molecules useful in identifying other diseases.

"We shine a light onto a blood sample that gives us a measurement of the amount of vitamin B12, which is linked to dementia," Dr Tsiminis said.

"It's a more efficient and cost-effective alternative to normal methods that could be applied to diagnosis of Alzheimer's disease.

"Our sensor is an early first step towards a point-of-care solution for measuring and tracking B12 in healthy ageing adults. This would allow doctors to monitor B12 levels and intervene as soon as B12 deficiency was detected."

The new detection technique uses [optical fibre](#) and a laser to collect the signature of certain molecules.

Light shines through a vial of diluted blood, which causes vitamin B12 molecules to vibrate.

The optical fibre collects a signature from the molecule vibrations that make up the sample and delivers it to a spectrometer.

This device then carefully analyses the signature and allows researchers

to identify the molecule it corresponds to.

Dr Tsiminis said the optical measurement only took about 30 seconds after blood preparation but normal vitamin B12 detection methods took almost two days.

Vitamin B12 is a highly complicated vitamin, which is vital in the functioning and health of nerve tissue, brain function, and [red blood cells](#).

The National Institute of Health in the United States claims people older than 14 years-of-age should consume about 2.4 micrograms (mcg) of vitamin B12 a day, pregnant women 2.6 mcg and lactating women 2.8 mcg.

Vitamin B12 can be found in most animal products but is not typically found in plant foods.

According to the World Health Organisation there are more than 47.5 million people in the world with dementia and Alzheimer's disease contributes to about 60-70 per cent of cases.

"The next step has to do with showing that the sensitivity limit can be reduced but we need a wider scale study, across different blood types, to show that down the line this is something that can be applied to a wider population," Dr Tsiminis said.

"Time and cost limitations currently mean that regular and frequent B12 measurements are not being carried out.

"When you go to the doctor or the nurse, amongst the other results you get for blood, vitamin B12 could one day be included."

The research is being presented today at the inaugural [SPIE BioPhotonics Australasia Conference](#) in South Australia's capital Adelaide.

The conference explores photonics for diagnostics and treatment using interactions between light and biological systems, and the latest advances in biomedicine and advanced imaging.

Provided by The Lead

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