Vortex device makes for better cancer treatments

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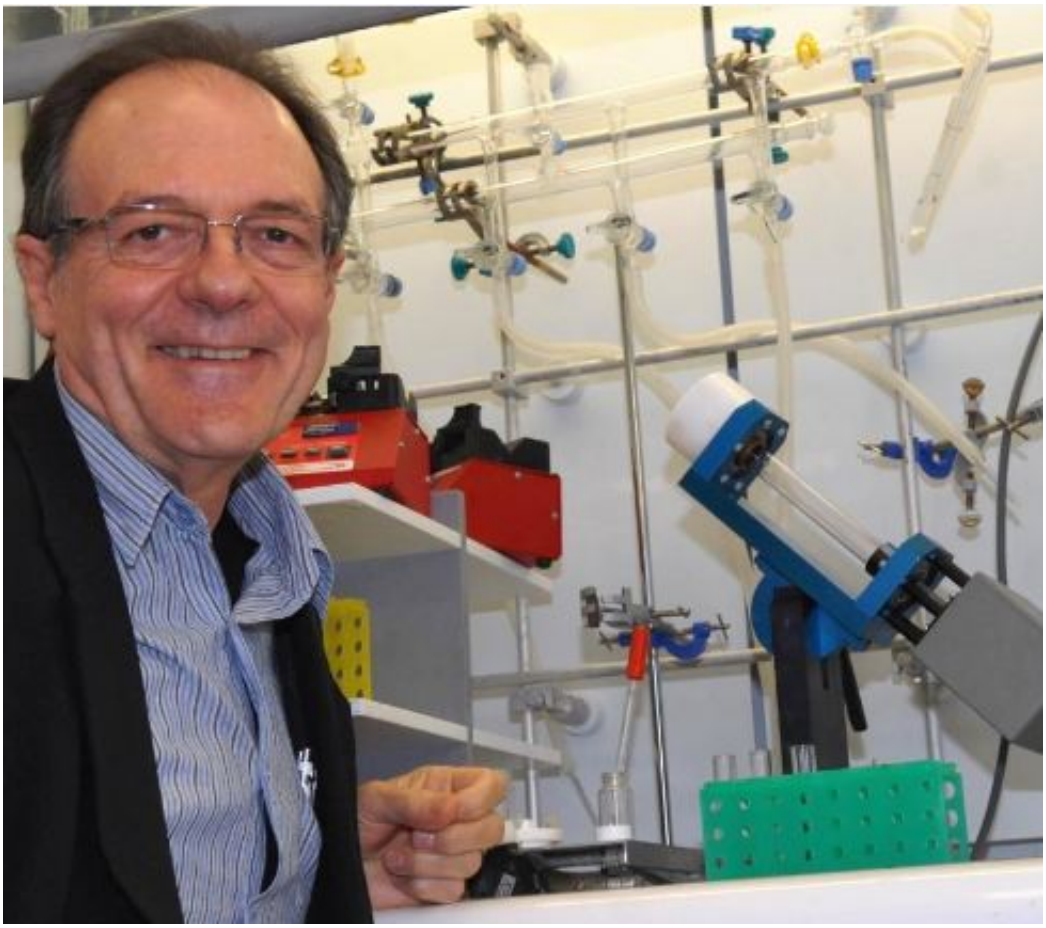

A South Australian invention, responsible for unboiling an egg, has been used to produce a four-fold increase in efficacy of carboplatin, a

commonly used drug for ovarian, lung and other cancer.

The latest research, published today in the journal *Scientific Reports*, is just one in a growing number of important applications for the vortex fluidic device (VFD) invented by the South Australian Premier's Professorial Research Fellow in Clean Technology, Flinders University Professor Colin Raston (pictured).

The ground-breaking device is being manufactured at Flinders University and will soon be available to research organisations around the world.

Professor Raston said the high-tech, yet simple device can be used in medical and pharmaceutical research along with a range of industries – all with a focus on cleaner, greener and cheaper production.

"This device creates a unique way to develop more sustainable and cost-effective products, services and technologies which can accelerate innovation in a range of industries, from drug manufacturing to food and biodiesel production," he said.

The device's unique ability to control chemical processes already has enabled scientists to 'unfold' proteins to their natural state, in a process likened to 'unboiling an egg', which could be used in protein-based drug research.

The machine has the potential to revolutionise the delivery and manufacture of a wide range of pharmaceutical processes and products by "streamlining the loading of drugs into nano-packages" for better results and less waste, Professor Raston said.

"With ovarian cancer, we found that this technology can increase the loading of second generation anti-cancer carboplatin drugs into delivery

vehicles from 17 per cent to 75 per cent," he said.

"This not only would have a direct benefit of reducing the negative side-effects which affect patient health, but of being able to use less of the drug."

Using more effective drugs would also reduce manufacturing waste, with up to half a tonne of waste generated from the production of just 1kg of anti-cancer and other drugs.

"Much of the drugs end up in sewerage systems and possibly create superbugs in our environment," Professor Raston added.

Cancer kills about eight million people a year worldwide.

The start of VFD sales will escalate the application of this new scientific research work, Professor Raston said.

"Our VFD will enable the pharmaceutical and many other industries to innovate – including further improvements in the chemical delivery of a range of existing approved drugs, as well as development of new improved drugs."

The device's development has been funded by the National Health and Medical Research Council, Australian Research Council and the Government of South Australia.

Contributing authors on the latest proof-of-concept report, entitled Shear induced carboplatin binding within the cavity of a phospholipid mimic for increased anticancer efficacy, are Dr Jingxin Mo, Professor Lee Yong Lim and Muhammad Rizwan Hussain Ahamed (University of Western Australia), Dr Thomas Becker (Curtin University, WA) and Dr Paul Eggers, Dr Xianjue Chen and Professor Raston (Flinders

University).

Details of the latest research have been published in the free, open access *Scientific Reports* journal on the international Nature Publishing Company website.

Provided by Flinders University