Potential cancer treatment found in high blood pressure medication

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A Te Herenga Waka–Victoria University of Wellington Ph.D. graduate who was based at the Gillies McIndoe Research Institute (GMRI) has found a potential new source of help for colon cancer

patients—medications used to treat hypertension, or high blood pressure.

Dr. Matthew Munro, who graduated last year from the University with a Ph.D. in Biological Sciences, has spent the last four years investigating whether existing medications could be used to target colon cancer stem cells.

"Cancer stem cells can cause cancer development, spread, and recurrence," Dr. Munro says. "Alongside my supervisors, Dr. Lifeng Peng from the University, Dr. Swee Tan at the GMRI, and Dr. Susrutha Wickremesekera from Wellington Regional Hospital, I have been studying existing medications to see if they could help mitigate cancer stem cells."

Dr. Munro's research focused on medications currently used to treat high blood pressure: beta-blockers, ACE inhibitors, and angiotensin receptor blockers. Other research groups have previously reported lower incidence and improved survival of a range of cancers in patients who are already taking anti-hypertensive medications, but the possible reason for these observations remains under investigation.

Using cancer tissues donated by consenting patients at Hutt Hospital and Wakefield Hospital, Dr. Munro was able to isolate cancer cells with the same function as stem cells. After studying these cells, Dr. Munro could see that the cells had elevated levels of certain renin-angiotensin system (RAS) components, parts of a cell that are normally targeted by anti-hypertensive medications.

"Some of the anti-hypertensive medications, particularly beta-blockers, impaired the function of these cells and reduced the levels of stem cell markers," he says. "Different types of cells have different active genes, and we looked at genes ('markers') that identify stem cells. The genes were less active after treatment than before treatment, possibly

indicating that the stem cells are specifically affected by the medications, although more research is still needed to confirm this."

If further research does confirm this, Dr. Munro's research could eventually lead to a new treatment approach for colon cancer that affects cancer stem cells through targeting the RAS, using off-patent, low-cost, and commonly available oral medications with very low side effects.

As with a lot of other research, Dr. Munro's discoveries were made challenging by the global COVID-19 pandemic.

"It was difficult performing this research because many colon cancer operations were postponed or canceled, which meant consenting patients couldn't donate the tissues as needed. Shipping times for the other laboratory materials we needed were delayed up to nine months in some cases, which required a lot of flexibility on our part."

Dr. Munro is currently working as a postdoctoral research fellow at GMRI, developing colon organoids—miniature models of a colon grown in the lab—to further investigate colon cancer.

Provided by Victoria University of Wellington