Medical Xpress

Cannibalistic cancer eats itself to survive treatment

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Stubborn cancer cells play a cunning trick when faced with treatments designed to kill them—they eat themselves to survive. But SAHMRI researchers have found a way to starve the cancer cells, making them more susceptible to cancer therapy.

As researchers develop more personalised cancer therapies that target cancer cells, they are also seeing an increase in resistance to treatment, where patients relapse or no longer respond to treatment.

One way that cancer resists treatment is by undergoing a process where the cancer cells eat themselves to maintain energy levels during times of stress—a process that helps them survive cancer treatments that would otherwise starve them.

Lisa Schafranek, a University of Adelaide PhD student working a SAHMRI, and her colleagues have used a clinically available drug to stop leukaemia cells from eating themselves to survive cancer therapy.

"We've managed to block the self-eating process at a stage where the cell would normally break down its food into energy," says Lisa. "The cell still eats itself, but it can't transform that food into anything useful. So in the end, the cell essentially starves by eating itself to death.

"By preventing the cancer cells from self-eating, we're cutting off their escape route and forcing them to face the cancer therapy."

Their treatment uses a clinically available drug, which was originally developed as an antibiotic to treat lung infections.

"Italian researchers first noticed in 2012 that leukaemia patients being treated with the antibiotic responded much better to the cancer therapy than they had before," explains Lisa. "So we've taken that observation and gone further to understand more about how it actually works on a cellular level."

As a result of these findings, a small-scale human trial of combined antibiotic–cancer therapy has recently begun in Italy.

"Right now, we're focussing on finding effective treatment options for people suffering from leukaemia, but this research is also likely to have applications for other types of cancers such as breast or colon cancer," says Professor Timothy Hughes, Head of Translational Leukaemia Research at SAHMRI.

This work provides a way of making current cancer treatments more effective and less likely to leave behind surviving cancer cells that might re-grow and cause a patient to relapse, or force the patient to stay on cancer treatments for the rest of their life.

Lisa Schafranek was an Australian national finalist of FameLab—a global science communication competition for early-career scientists.

More information: Schafranek L, Leclercq TM, White DL and Hughes TP. "Overcoming resistance to tyrosine kinase inhibitors in chronic myeloid leukaemia by blocking autophagy with clarithromycin." Medical Staff Society Research Prize, May, 2013

Schafranek L, Leclercq TM, White DL, Hughes TP. "Macrolide Antibiotic Clarythromycin targets TKI-induced autophagy in CML

cells." HAA Annual Scientific Meeting Oct, 2012

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