Survival protein a potential new target for many cancers

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Researchers from the Walter and Eliza Hall Institute in Melbourne, Australia, have discovered a promising strategy for treating cancers that are caused by one of the most common cancer-causing changes in cells. Credit: Walter and Eliza Hall Institute of Medical Research

Walter and Eliza Hall Institute researchers have discovered a promising strategy for treating cancers that are caused by one of the most common cancer-causing changes in cells.

The discovery offers hope for treating many types of cancer that are driven to grow and spread through the actions of a cancer-causing protein called MYC.

Up to 70 per cent of human cancers, including many leukaemias and lymphomas, have unusually high levels of MYC, which causes cancerous changes in cells by forcing them into abnormally rapid growth.

Dr Gemma Kelly, Dr Marco Herold and Professor Andreas Strasser from the Walter and Eliza Hall Institute in Melbourne, Australia, led a research team investigating how cells with high levels of MYC stay alive and grow. They discovered that lymphomas that have high levels of MYC cannot survive long-term without a protein called MCL-1 which makes cells long-lived. Their research is published this week in the journal *Genes & Development*.

Dr Kelly said the research built on more than three decades of work at the institute into how MYC drives cancer development and how the survival of normal and cancerous cells is regulated. "For many years we have known that proteins from the BCL-2 protein family enhance cell survival and cooperate with MYC to accelerate the development of cancer," she said. "Until now, it was not known which specific BCL-2 family protein was most important for the survival and growth of MYC-driven cancers.

"We discovered that lymphoma cells with high levels of MYC can be killed by disabling a protein called MCL-1. Excitingly, when compared with healthy cells, the lymphoma cells were considerably more sensitive to a reduction in MCL-1 function. This suggests that in the future medicines that block MCL-1 could be effective in treating cancers expressing high levels of MYC with tolerable side-effects on the body's normal cells," she said.

Professor Strasser said the finding was exciting as there was hope that MCL-1 inhibitors may soon be available for clinical use. "MCL-1 is found at high levels in a number of blood cancers and also many solid tumours, so there has been a strong drive to develop potential anti-cancer compounds that target MCL-1," he said.

"Anti-cancer agents that target the protein BCL-2, which is closely related to MCL-1, are already showing promise in clinical trials, including some held in Melbourne. We are hopeful that inhibitors of MCL-1 will soon become available for clinical testing. We will be very interested in determining whether these compounds could be used to treat MYC-driven cancers," Professor Strasser said.

Provided by Walter and Eliza Hall Institute