'Dark-horse' molecule is a potential new anti-cancer target

August 12 2013

Associate Professor Matthias Ernst and Dr. Tracy Putoczki, Walter and Eliza Hall Institute, have identified a molecule called interleukin-11 as a potential new target for anti-cancer therapies. Credit: Walter and Eliza Hall Institute, Australia

Australian researchers have identified a molecule called interleukin-11 as a potential new target for anti-cancer therapies.

Until now, the importance of interleukin-11 in cancer development has been underestimated, but researchers have recently identified this

molecule as a 'dark horse' for the development of cancer. Their discovery suggests blocking interleukin-11 signalling could ultimately provide an exciting new approach to the treatment of bowel and stomach cancer, which are two of the most common cancers worldwide.

When a tumour develops, the normal (non-cancerous) tissues around it can become inflamed, and produce many different molecules, including the two related proteins interleukin-11 and interleukin-6. These hormone-like signalling molecules, referred to as cytokines, are thought to promote the growth and spread of cancer cells, but interleukin-11 was thought to have only a minor, if any, role during cancer development.

However Dr Tracy Putoczki and Associate Professor Matthias Ernst from the Walter and Eliza Hall Institute's Cell Signalling and Cell Death division have now shown that interleukin-11 is one of the most important cytokines that stimulate the growth and spread of cancers. Working with scientists at the Melbourne-based pharmaceutical company CSL Ltd, they discovered that blocking interleukin-11 in models of stomach and bowel cancer stopped tumour growth and could lead to tumour shrinkage, making this cytokine a promising potential new target for treating many types of solid cancers.

Dr Putoczki and Associate Professor Ernst made most of their discoveries while working at the Melbourne-Parkville Branch of the Ludwig Institute for Cancer Research, where Associate Professor Ernst is an institute member. Their findings are published online today in the journal *Cancer Cell*.

Dr Putoczki said the team was stunned to discover that interleukin-11 was much more potent in promoting cancer development than interleukin-6. "When considering which cytokines drive cancer development, interleukin-6 has always been in the spotlight," she said. "Despite being very similar to interleukin-6, interleukin-11 has often

been overlooked by cancer researchers. Our new research now shows that it might in fact be very important."

Associate Professor Ernst said the team had begun to explore how the discovery could be applied to potential new anti-cancer therapies. "Treating cancers with agents that block cytokine signalling is an exciting new approach that potentially has advantages over current treatment strategies," he said. "Drugs that block the action of cytokines have previously been developed for both inflammatory disease and cancer and, in the case of interleukin-11, our work does not suggest the likelihood of undesirable side-effects. Moreover, agents that inhibit interleukin-6 signalling are already in clinical trials for ovarian, kidney, prostate and breast cancer. Our discovery paves the way for trials of agents that stifle interleukin-11."

Dr Andrew Nash, senior vice president for research at CSL, agreed that the research had identified a potentially important role for interleukin-11 in stomach and bowel cancer. "We have developed a number of potential drug candidates that target the interleukin-11 receptor and this data provides preclinical evidence supporting progression into clinical studies," Dr Nash said.

Provided by Ludwig Institute for Cancer Research