Simple test predicts response to chemotherapy in lung cancer patients

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November is Lung Cancer Awareness Month, highlighting the number one cause of cancer-related death in North America. While prognosis for the most common form, adenocarcinoma, has remained poor, new research has shown a link between the absence of a specific protein and improved patient outcomes.

Scientists at Lawson Health Research Institute have found that patients who undergo chemotherapy and surgery experience significantly improved survival rates when their tumor is lacking the retinoblastoma tumor suppressor protein (pRB). This new information is very useful as it may predict which patients will respond best to chemotherapy.

The RB protein is traditionally understood to help regulate cell division, preventing the growth of abnormal cells. However, recent studies have had conflicting results. Dr. Matthew Cecchini, a Pathology Resident at London Health Sciences Centre (LHSC), wanted to see if there was a correlation between the small percentage of adenocarcinoma patients who do not have the protein and long-term survivors.

Under the leadership of Lawson's Dr. Fred Dick, Cecchini and a collaborative team of researchers performed a study on 91 lung cancer patients who underwent chemotherapy and surgery. The study, which appears in *Human Pathology*, found pRB was not detected in 15% of patients. These patients experienced an improved survival rate of 92% at 5 years. This is in comparison to an average survival rate of 49% for those patients who expressed the protein.

"These results are surprising because pRB has traditionally been understood to be a suppressor of tumor growth," says Dr. Dick. "This study illustrates that the absence of pRB actually results in improved outcomes for those adenocarcinoma patients who undergo chemotherapy and surgery."

Given the harsh effects chemotherapy has on the human body, it is important to understand which patients respond best to the treatment. This research indicates that pRB can be used as a marker to determine if an adenocarcinoma patient will respond positively. Testing can therefore be used to determine the best treatment plan for individual patients. In addition, the research may provide rationale for developing agents that target pRB in order to make all adenocarcinoma cases more sensitive to chemotherapy.

"The next phase in the study is to test our findings in a larger patient cohort," said Dr. Dick. "We will also be looking at the underlying mechanisms of pRB to understand what makes these patients more responsive to chemotherapy. This will help us to further improve treatment and outcomes."

  More information: Matthew J. Cecchini et al. Loss of the retinoblastoma tumor suppressor correlates with improved outcome in patients with lung adenocarcinoma treated with surgery and chemotherapy, *Human Pathology* (2015). DOI: 10.1016/j.humpath.2015.08.010

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