MedicalXpress

Lung cancers in some African-Americans and European-Americans may have biological differences

December 1 2017

Differences in the genes expressed in non-small cell lung cancers (NSCLCs) from some African-Americans and European-Americans suggest that there are racial differences in the biology of NSCLC, which could have clinical relevance.

The study is published in *Clinical Cancer Research*, a journal of the American Association for Cancer Research, by Bríd M. Ryan, PhD, MPH, an NIH Stadtman Investigator in the Laboratory of Human Carcinogenesis at the National Cancer Institute's Center for Cancer Research in Bethesda, Maryland.

"We are entering the age of 'precision medicine' in which diagnosis and therapy decisions for each cancer patient will be based on detailed molecular and chemical fingerprints," said Ryan. "Much of the revolutionary work that underpins precision medicine has been conducted on populations of European descent, with limited work in minority populations."

"But we want to make sure that all populations can benefit from this approach," se continued. "Studying the biology of lung cancer in African-Americans is one step toward that goal."

Khadijah A. Mitchell, PhD, a postdoctoral research fellow in Ryan's laboratory, and colleagues analyzed normal and NSCLC tissue obtained

from 64 African-Americans and 74 European- Americans during surgery to remove their lung tumors. Tissue from 22 African-Americans and 19 European-Americans was analyzed for mRNA expression, which provides information about gene expression, and tissue from the remaining patients was analyzed for microRNA expression. These two different kinds of RNA have related, but different, roles inside the cell.

The researchers found that expression of 2,210 genes was more than two-fold increased or decreased in NSCLC from African-Americans compared with matched normal tissue. For European-American samples, 2,921 genes were differentially expressed by more than two-fold. Many of the genes were differentially expressed between NSCLC and normal tissue in both African-Americans and European-Americans, but 637 and 1,844 were differentially expressed only in African-Americans and European-Americans, respectively.

The genes differentially expressed only in the African-American NSCLC samples were enriched for those involved in stem cell biology and invasive behavior. The genes differentially expressed only in European-Americans were enriched for those involved in cell cycle, mitosis, and proliferation.

In addition, the genes differentially expressed only in African-Americans or European- Americans were analyzed using a drug-response prediction model called the Connectivity Map. The two gene subsets predicted similar resistance/sensitivity for NSCLC from African- Americans and European-Americans to some drugs. For other drugs, the predictions varied by race, with NSCLC from African-Americans predicted to be resistant to 53 drugs to which NSCLC from European-Americans was sensitive. Among these drugs was irinotecan, which is a cytotoxic chemotherapeutic used for treating certain types of cancer.

"This study helps close a gap in our knowledge of which genes are expressed in lung cancers from African-Americans, revealing clear differences in lung cancer biology between African- Americans and European-Americans," said Mitchell. "By understanding these racial differences in gene expression, we can account for how they may contribute to disease progression and treatment response and, ultimately, help reduce some health outcome disparities."

According to Ryan, these data are first-of-a-kind for lung cancer and, therefore, they need to be replicated in larger cohorts of patients. Another limitation that she noted was that the data from the drug-response prediction model are just predictions and that additional detailed work, both in the laboratory and within the clinical trial setting, will be needed to verify the predictions. However, the work is a step forward for precision medicine analyses of lung cancer in minority populations, she said.

Provided by American Association for Cancer Research