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ASIA EDITION

Gene variations make Asian women susceptible to lung cancer

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Singapore: An international group of scientists has identified three genetic regions that predispose Asian women who have never smoked to lung cancer. The finding provides further evidence that risk of lung cancer among never-smokers, especially Asian women, may be associated with certain unique inherited genetic characteristics that distinguishes it from lung cancer in smokers.

Lung cancer in never-smokers is the seventh leading cause of cancer deaths worldwide, and the majority of lung cancers diagnosed historically among women in Eastern Asia have been in women who never smoked. The specific genetic variations found in this study had not been associated with lung cancer risk in other populations.

Although environmental factors, such as secondhand smoke (also known as environmental tobacco smoke) or exhaust from indoor cooking are likely account for some cases of lung cancer among Asian women who have never smoked, they explain only a small proportion of the disease. To gain a better understanding of lung cancer in Asian female never-smokers, researchers from the National Cancer Institute (NCI), part of the National Institutes of Health, partnered with researchers from several other countries to create the Female Lung Cancer Consortium in Asia to conduct one of the largest genome-wide association studies (GWAS) in female never-smokers to date. The study compares DNA markers across the genome between people with a disease or trait to people without the disease or trait. The work was supported by NCI's Division of Cancer Epidemiology and Genetics.

"This study is the first large-scale genome-wide association study of lung cancer among never-smoking females anywhere in the world," said Dr Qing Lan, a senior investigator in NCI's Division of Cancer Epidemiology and Genetics, and the leader of the study.

The consortium, whose findings were reported online in Nature Genetics, conducted a study that combined data from 14 studies that included a total of approximately 14,000 Asian women (6,600 with lung cancer and 7,500 without lung cancer). The studies included data on environmental factors, including exposure to secondhand smoke.

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The consortium found that variations at three locations in the genome - two on chromosome 6 and one on chromosome 10 - were associated with lung cancer in Asian female never-smokers. The discovery on chromosome 10 was particularly significant because it has not been found in any other GWAS of lung cancer in white or Asian populations.

"Our study provides strong evidence that common inherited genetic variants contribute to an increased risk of lung cancer among Asian women who have never smoked," said Dr Nathaniel Rothman, a senior investigator in NCI's Division of Cancer Epidemiology and Genetics and coauthor of the study. "These variants may also increase lung cancer risk associated with environmental factors, such as environmental tobacco smoke."

The researchers did not detect an association with variations at a location on chromosome 15 that has been associated with lung cancer risk in many previous GWAS of lung cancer in smokers. The absence of this association provides further support for the suggestion that the genetic variation on chromosome 15 may be smoking-related.

The researchers found some evidence that Asian women with one of the newly identified genetic variants may be more susceptible to the effects of environmental tobacco smoke. However, the authors note that more research is needed to draw definitive conclusions from this observation.

"This study is an example of how genome-wide association susceptibility studies can evaluate inherited genetic risk in populations with unique characteristics or environmental exposures," said Dr Stephen J Chanock, acting co-director of NCI's Center for Cancer Genomics and a co-author of the study. "We will continue to develop better, smarter applications of this technique and apply them to populations where we have detailed information on environmental factors to further our understanding of how inherited genetic factors modify risk from environmental exposures."