

New mutation identified, associated with better survival in lung cancer patients

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Japanese researchers have identified a mutation associated with a higher incidence of lung cancer in Japanese women who do not smoke, but better survival in lung cancer patients. In a study published today in the journal *PLOS ONE*, the team from the RIKEN Center for Life Science Technologies shows that a single nucleotide polymorphism (SNP) in a gene that protects cells from oxidative stress is found four times more frequently in women than in men.

Lung cancer is the leading cause of cancer-related deaths in many industrialized countries. Most deaths are due to long-term exposure to [cigarette smoke](#), but non-smokers account for 10—15% of cases.

Dr. Toshihisa Ishikawa and his team analyzed the DNA of patients with primary lung cancer and found that non-smoking Japanese women with two copies of the SNP (-617A) in the NRF2 gene had a markedly higher incidence of adenocarcinoma of the lung, as compared with non-smoking, homozygous males.

Furthermore, they find that both male and female lung cancer patients homozygous for the same SNP in the NRF2 gene survive lung cancer much better.

Nuclear factor erythroid-derived 2 (NF-E2)-related factor (NRF2) controls cellular adaptation to oxidants and electrophiles by inducing antioxidation and detoxification genes, and protects normal cells from external toxic challenges and oxidative stress.

Their study also suggests that lung cancer patients harboring a SNP (-617A) allele in the NRF2 gene in combination with the wild-type allele of the MDM2 gene have better prognosis.

"This is the first report providing clinical evidence that homozygous alleles for the SNP (-617A), one

of the intrinsic [genetic polymorphisms](#) in the NRF2 gene, are associated with the overall survival of [lung cancer patients](#)," explains Dr. Ishikawa.

"The study strongly suggests that the presence of homozygous alleles for this SNP is a good prognostic biomarker for the assessment of the overall survival chances of patients with adenocarcinoma, as well as a practical tool for personalized cancer therapy," he concludes.

More information: "SNP (-617C>A) in ARE-like loci of the NRF2 gene: A new biomarker for prognosis of lung adenocarcinoma in Japanese non-smoking women" Okano et al. *PLOS ONE*, 2013, DOI: [10.1371/journal.pone.0073794](https://doi.org/10.1371/journal.pone.0073794)

Provided by RIKEN

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