

## High levels of estrogen in lung tissue related to lung cancer in postmenopausal women

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## Medical





Liquid chromatography-tandem mass spectrometry analysis of Estrone and Estradiol tissue concentrations (pg/g) in the noncancerous peripheral lung of patients with single tumor lung cancer (control) and synchronous multiple lung adenocarcinoma (SMLA). Credit: Assistant Professor Koei Ikeda

Thanks to advances in medical imaging, the detection rate for synchronous multiple lung adenocarcinoma (SMLA) has been on the rise. Cases of SMLA in Japanese women have been on the rise despite having a national smoking rate of less than 10% in recent years. This suggests that SMLA is influenced by something other than smoking and, indeed, several studies have found that estrogen is involved in lung cancer carcinogenesis.

A research team from Kumamoto University set out to determine if there was a relationship between the concentration of estrogen in lung tissue and multiple primary lung cancers in postmenopausal women. To do this, they compared estrogen concentrations in non-cancerous peripheral lung tissue of postmenopausal women who were diagnosed with SMLA to the concentrations found in women with single tumor lung adenocarcinoma (AD). The experiment consisted of two groups, 30 SMLA patients and 79 AD patients, with similar clinical characteristics.

Researchers measured estrone (E1), the main form of estrogen in postmenopausal females, and estradiol (E2), the primary female sex hormone during reproductive years, in the non-cancerous lung tissues of each group and found both forms of estrogen were higher in SMLA patients than in AD patients. Furthermore, neither estrogens in either experimental group were found to be associated with the confounding factors of age, smoking status, cancer stage, family cancer history or



mutation in the epidermal growth factor receptor (EGFR).

"We were also able to ascertain that an allele of the single nucleotide polymorphism (SNP) rs3764221 in the CYP19A1 gene was associated with a risk for SMLA, which was consistent with our previous research," said Assistant Professor Koei Ikeda, who led the project. "The locally elevated expression of this gene in the peripheral lung was also correlated to the concentration of estrogen in the same area. An SNP in CYP19A1 could be causing the increased estrogen increase. Perhaps, with further research, we will be able to develop a gene therapy that would reduce the estrogen concentration caused by the SNP."

**More information:** Koei Ikeda et al, Synchronous Multiple Lung Adenocarcinomas: Estrogen Concentration in Peripheral Lung, *PLOS ONE* (2016). DOI: 10.1371/journal.pone.0160910

## Provided by Kumamoto University

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