

# Gene Therapy for Reducing Lung Cancer Progression

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## Technology description

### Reduces Cancer Cell Growth and Survival by Targeting and Inhibiting lncRNAs

This gene targeting approach can reduce the progression of lung cancer that contains inactive signaling of the tumor suppressor gene LKB1 [Liver Kinase B1, also known as Serine/Threonine Kinase 11 (STK11)]. Lung cancer is the leading cause of cancer deaths in both men and women in the United States and worldwide. The tumor suppressor gene LKB1 is mutated in about 20 to 30 percent of non-small cell lung cancer (NSCLC). Loss of LKB1 is associated with lung cancer progression and differential treatment responses in preclinical studies. However, specific targeted therapies for lung cancer with LKB1 inactivation are not available. Researchers at the University of Florida have discovered a long noncoding RNA (lncRNA LINC00473) as a robust biomarker, prognostic marker and therapeutic target for LKB1-inactivated cancer. In addition to reducing the growth and spread of lung cancer, the therapy is applicable to other cancers that have or mimic LKB1 signaling loss such as ovarian and cervical cancers, head-and-neck cancers, and melanoma.

## Technology

This gene therapy targets lncRNA LINC00473, which has elevated expression in tumors with inactivated LKB1 function and its high expression is associated with poor prognosis. Researchers at the University of Florida have discovered a long noncoding RNA (lncRNA LINC00473) as a robust biomarker, prognostic marker and therapeutic target for LKB1-inactivated cancer. Specifically, they demonstrated that (1) elevated expression of LINC00473 is a robust biomarker for tumor LKB1 functional status; (2) LINC00473 expression has a prognostic value as elevated expression of LINC00473 was associated with poor patient prognosis; and (3) LINC00473 is a therapeutic target as LKB1-inactivated lung cancer cells depend on sustained lnc473 expression for growth and survival. The gene therapy determines the subject's lncRNA levels, identifies tumors with LKB1 loss resulting from the lncRNA levels, and administers an lncRNA inhibitor to decrease lncRNA levels. In early mouse tumor models, targeting and inhibiting lncRNA appears to reduce the proliferation of lung cancer cells and their survival.

## Application area

Gene therapy that targets and decreases lncRNA LINC00473 level, reducing cancer progression

## Advantages

Targets and decreases lncRNA levels, reducing the progression of cancerous cells

Targets and identifies lncRNAs, serving as a biomarker for LKB1-inactivated cancers

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