Scientists show that a microRNA can reduce lung cancer growth

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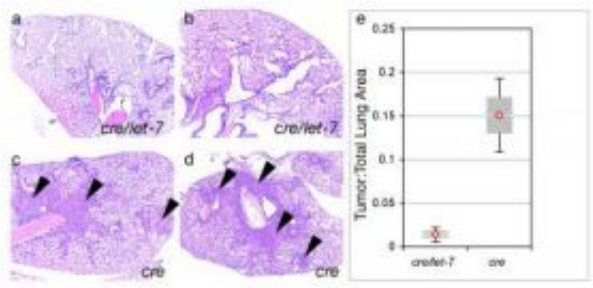

Sections from lungs of mice with tumors that were untreated (c, d) or treated (a, b) with intranasal dosing of let-7 miRNA. Points indicate tumor mass. Statistic show mice treated with let-7 had substantially reduced tumor load. Credit: Kerscher-Slack/Yale

A small RNA molecule, known as let-7 microRNA (miRNA), substantially reduced cancer growth in multiple mouse models of lung cancer, according to work by researchers at Yale University and Asuragen, Inc., published in the journal *Cell Cycle*.

Cancer afflicts 1.5 million people a year in the United States alone, and lung cancer is the most common and deadly form of cancer worldwide. This study indicates a direct role for a miRNA in cancer progression and introduces a new paradigm of using miRNAs as effective therapeutic agents to treat human cancer.

“We believe this is the first report of a miRNA being used to a beneficial effect on any cancer, let alone lung cancers, the deadliest of all cancers worldwide,” said senior author Frank Slack, associate professor of molecular, cellular and developmental biology at Yale.

Slack’s research group initially discovered the let-7 miRNA in C. elegans, a tiny worm used as a model system for studying how organisms develop, grow and age. They went on to show that in humans, let-7 negatively regulates a well-known determinant of human lung cancers, the RAS oncogene.

In collaboration with scientists at Asuragen, the Slack lab has studied the tumor suppressor activity of this small RNA. Their work revealed that let-7 is commonly present at substantially reduced levels in lung tumors — and that reduced levels of let-7 likely contribute to the development of the tumors. These discoveries focused public attention and research efforts to understand the potential use of naturally occurring microRNAs like let-7 to combat cancer.

This new work demonstrates that let-7 inhibits the growth of lung cancer cells in culture and in lung tumors in mice. They also showed that let-7 can be applied as an intranasal drug to reduce tumor formation in a RAS mouse model lung cancer.

“We believe that our studies provide the first direct evidence in mammals, that let-7 functions as a tumor suppressor gene,” said Slack. “Because multiple cell lines and mouse models of lung cancer were used, it appears that therapeutic application of let-7 may provide benefits to a broad group of lung cancer patients.”

“This has been a very productive industry-academic collaboration between Yale and Asuragen scientists” commented Matt Winkler CEO of Asuragen. “This work provides further evidence of the importance of miRNAs in the development of cancer and provides additional support for miRNA replacement therapy as an important component of effective cancer treatment regimens of the future.”

Source: Yale University