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Researchers discover microRNA role in brain metastasis

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Conducting genetic profiles using microRNA can help doctors predict which lung cancer patients are likely to also develop brain metastasis (BM), according to a study published today by Scottsdale Healthcare and the Translational Genomics Research Institute (TGen).

The study identified microRNA-328 as a potential therapeutic target because of its association with the spread of cancer to the brain in patients with non-small cell lung cancer (NSCLC). NSCLC makes up 88 percent of the 222,000 annual U.S. cases of lung cancer, which is by far the most common of all cancers among Americans.

"This is one of the first studies using microRNA to identify lung cancer patients at risk for developing or likely to have brain metastasis," said Dr. Glen Weiss, the paper's senior author and Director of Thoracic Oncology at TGen Clinical Research Services at Scottsdale Healthcare. TCRS is a partnership between TGen and Scottsdale Healthcare that helps bring new therapies quickly to patients at the Virginia G. Piper Cancer Center in Scottsdale.

The paper, MicroRNA-328 is associated with non-small cell lung cancer (NSCLC) brain metastasis and mediates NSCLC migration, was published online today (March 31, 2011) by the *International Journal of Cancer*.

MicroRNAs are single-stranded RNA molecules that regulate how genes and proteins control cellular development. Because microRNAs are so

resilient, they are relatively easy to detect in tumor tissue and blood, which is often a limitation for other biomarkers. In addition, one microRNA can regulate hundreds of genes.

"Previous efforts to characterize patients that will develop brain metastasis have been fairly disappointing," said Dr. Weiss. BM can cause neurologic, cognitive and emotional difficulties. "The ability to identify patients at risk for developing brain metastasis may lead to new prophylactic intervention that may mitigate morbidity and mortality."

Brain metastasis can cause severe side effects. Currently, brain metastasis is often identified on imaging scans when a lung cancer patient develops unexplained neurological symptoms. Then treatment often includes either surgery and/or radiation. There are no measures in place today to minimize risk. By using microRNA-328 as a biomarker, physicians might one day be able to identify patients most likely to benefit from earlier treatments such as prophylactic cranial irradiation, a strategy used in another type of lung cancer called small cell lung cancer.

The study used tumor specimens from Scottsdale Healthcare and University of Iowa Hospitals and Clinics. Over-expression of microRNA-328 resulted in an increase in cancer cell migration, the study said.

"The elevated expression of microRNA-328 in both thoracic and brain NSCLC samples suggests this microRNA may be involved in 'brain-seeking' metastatic potential," said Dr. Shilpi Arora, staff scientist at TGen and the paper's first author.

Provided by The Translational Genomics Research Institute