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Sylvester Genetics Researcher Receives Prestigious NIH Pioneer Award

A Sylvester Comprehensive Cancer Center genetics researcher was honored today with the prestigious “Pioneer Award” and a five-year $5+ million grant from the National Institutes of Health (NIH). The grant will support Ramin Shiekhattar, Ph.D., professor of human genetics at the University of Miami Miller School of Medicine, in pursuing a novel line of research on “Enhancer RNA Therapy” that could lead to potential treatments for deadly pancreatic cancer, melanomas and other types of diseases.

Ramin Shiekhattar, Ph.D.

“The Pioneer Award is for an out-of-the-box idea for groundbreaking, high-impact research,” said Shiekhattar, who is director of the Cancer Epigenetics Research Program at Sylvester, chief of the Division of Cancer Genomics, and the Dr. John T. Macdonald Foundation Department of Human Genetics Professor. It is one of four “High-Risk, High-Reward” national

awards supported by the NIH Common Fund and administered by the National Cancer Institute (NCI), which focuses on major opportunities and gaps in biomedical research that require novel approaches to succeed.

Several years ago, the Shiekhattar laboratory identified a new type of RNA known as enhancer RNA (eRNA) that is critical for tissue-specific expression of genes.

“Enhancers regulate genes from a distance, like a switch that turns a light bulb on and off,” Shiekhattar said. “In some cases, an enhancer that is active in a normal cell is silenced by cancer, while in other cases, cancer can activate the enhancer in an abnormal manner. Being able to target the eRNA ‘switches’ on a gene that drives the development or progression of cancer cells could potentially have a huge clinical impact.”

In his laboratory at the Sylvester, Shiekhattar will use the NCI grant to explore the eRNA approach to treating pancreatic and skin cancers. A similar approach could be used to treat pathogenic gene expression in other diseases such as Parkinson’s disease, Alzheimer’s disease and amyotrophic lateral sclerosis (ALS), which are driven by aberrant gene expression.

To target the eRNA “switches,” Shiekhattar will work with small molecules called anti-sense oligonucleotides (ASOs) being developed by Ionis Pharmaceuticals that can inhibit the expression of pathological genes. He added that the enhancers activated by cancer in adults are very tissue-specific, and offer precise targets for potential cancer therapies that would not affect the surrounding healthy tissue.

“Like a surgeon who removes a cancerous tumor, we should be able to use ASOs to affect only the gene expression in the tumor,” he said. “This would be a remarkable advance in precision medicine, and because different cancer patients display different eRNA profiles, we could potentially develop personalized treatments for individuals.”

In addition, this line of research into eRNA profiles could possibly lead to the development of biomarkers to detect pancreatic cancer and melanomas at an earlier stage of their development.

“The NIH recognizes that this is truly a high-risk, high-reward strategy,” Shiekhattar said. “It is risky because this approach has never been tried before, but eRNA treatments have tremendous potential for clinical rewards.”