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Scientists ID a protein that splices and dices genes

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A novel finding, described today on the *Science Express* Web site by teams from the National Cancer Institute, The University of Texas Health Science Center at San Antonio and the University of Toronto, offers a clue as to how genes can have what you might call multiple personalities.

Genes are long strings of DNA letters, but they can be cut and spliced to make different proteins, something like the word "Saskatchewan" can have its middle cut out to leave the word "Swan," its front, middle and end deleted to leave the word "skate," or its front and back chopped off to make the word "chew."

Today's discovery reveals that the protein MRG15, which previously had been known to affect cell growth and aging, also directs the gene-splicing machinery. Olivia Pereira-Smith, Ph.D., a professor in the Department of Cellular and Structural Biology and the Sam and Ann Barshop Institute for Longevity and Aging Studies at the UT Health Science Center San Antonio, has studied the function of MRG15 for more than 10 years.

As people or animals age, this gene-splicing machinery can go awry, producing nonsense proteins ("Sskt" instead of "Swan," for instance) rather than the proper ones. These aberrant proteins can damage cells, possibly leading to cancer or other diseases of aging. Today's finding thus has potential implications for therapies to treat both cancer and aging, a Texas researcher said.

The Science paper's lead author is Reini F. Luco, Ph.D., a fellow in the laboratory of senior author Dr. Tom Misteli, Ph.D., at the National Cancer Institute (NCI). Other co-authors include Kaoru Tominaga, Ph.D., from the UT Health Science Center, and Benjamin J. Benclowe, Ph.D., and Qun S. Pan, Ph.D., from the University of Toronto.

"We've known for three or four years, from other analyses, that this protein was also involved in splicing, but we needed the expertise of Dr. Misteli's lab," Dr. Smith said. "Dr. Luco led the splicing studies on this project."

Dr. Tominaga, a faculty member of the Department of Cellular and Structural Biology and the Barshop Institute in San Antonio, said it may be possible to design cancer drugs to regulate MRG15's activity.

Provided by University of Texas Health Science Center at San Antonio