UT SOUTHWESTERN MEDICAL CENTER NEWS

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Tiny molecule slows progression of Lou Gehrig's disease in mice, UT Southwestern researchers find

DALLAS – Dec. 10, 2009 – Researchers at UT Southwestern Medical Center have found that a molecule produced naturally by muscles in response to nerve damage can reduce symptoms and prolong life in a mouse model of amyotrophic lateral sclerosis (ALS).

"We believe we can apply this research toward drug development," said Dr. Eric Olson, chairman of molecular biology at UT Southwestern and senior author of the study, which appears in the Dec. 11 issue of *Science.*

ALS, also known as Lou Gehrig's disease, damages motor nerve cells that control muscles, leading to muscle weakness, paralysis and death. There is no treatment that can slow it, and no cure.

As ALS kills nerves, the muscles they control begin to wither. The damaged muscles, however, can "re-innervate" themselves by prompting healthy nerves to send new branches their way, like limbs in a damaged hedge filling in a gap.

Dr. Olson said skeletal muscles produce a molecule called microRNA-206 (miR-206) to serve as a chemical signal to steer the new nerve endings and maintain their interactions with muscles. But the research suggests that miR-206 can only work for so long. As nerves continue to die, there comes a point where the surviving nerves can no longer carry the load, and symptoms like muscle weakness appear.

"While miR-206 initially prompts nearby surviving nerves to send new branches to the muscles, it only delays the inevitable," Dr. Olson said. "Our findings correlate with the observation in ALS patients that the disease is nearly asymptomatic until a large fraction of motor neurons has died, at which point the few remaining ones can't compensate sufficiently. These results provide a new perspective on the mechanisms of ALS," he said. "MiR-206 seems to sense nerve injury and promote regeneration.

"Because miR-206 only exists in skeletal muscle, a drug based on it might not affect other tissues. That limits its risk of side effects and is a key part of its appeal as a potential therapy."

In collaboration with a company he co-founded, called miRagen Therapeutics, Dr. Olson is developing potential drugs based on miR-206.

Dr. Olson is director of the Nancy B. and Jake L. Hamon Center for Basic Research in Cancer

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and the Nearburg Family Center for Basic and Clinical Research in Pediatric Oncology.

Other UT Southwestern researchers taking part in the study included co-lead author Andrew Williams, graduate student; Dr. Viviana Moresi, postdoctoral researcher in molecular biology; Xiaoxia Qi, senior research scientist in molecular biology; John McAnally, research associate in molecular biology; Dr. Jeffrey Elliott, professor of neurology; and Dr. Rhonda Bassel-Duby, professor of molecular biology. Researchers from Harvard University also participated in the study.

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