MedicalXpress

MG53 protein shown to be useful for treating traumatic tissue damage

June 21 2012

Throughout the lifecycle, injury to the body's cells occurs naturally, as well as through trauma. Cells have the ability to repair and regenerate themselves, but a defect in the repair process can lead to cardiovascular, neurological, muscular or pulmonary diseases. Recent discoveries of key genes that control cell repair have advanced the often painstaking search for ways to enhance the repair process.

A new study by researchers from the University of Medicine and Dentistry of New Jersey (UMDNJ)-Robert Wood Johnson Medical School reports that the protein MG53, previously shown to be the key initiator in the cell membrane repair process, has the potential to be used directly as a therapeutic approach to treating traumatic tissue damage. The research, published today, is featured on the cover of *Science Translational Medicine*.

"We studied the use of MG53 in treating muscular dystrophy by targeting the protein directly to the damaged muscle. The direct application of MG53 slowed the development of the disease by repairing damaged muscle membranes," said Noah Weisleder, PhD, assistant professor of physiology and biophysics and corresponding author of the study. "Our findings also suggest that MG53 could be used in regenerative medicine to treat other human diseases in which traumatic cell injury occurs."

The study established methods to produce MG53 protein for use as a drug in different formulations that were effective when applied both

inside and outside of damaged cells. Evidence showed that MG53 initiated repair to cell membranes in striated muscles, where it occurs naturally, but also initiated repair mechanisms outside of the muscle cells, providing protection to the tissue and slowing progression of disease. Additional research as part of this study found that the application of the protein as a therapy is safe.

MG53 was discovered in 2008 by Jianjie Ma, PhD, professor and acting chair of physiology and biophysics at UMDNJ-Robert Wood Johnson Medical School, who was the first to specifically pinpoint that the protein was responsible for promoting cell repair.

“We believe this new research could translate into therapeutic treatment for a broad range of diseases, including heart attack, lung injury and kidney disease, as well as muscular dystrophy,” said Dr. Ma, who oversaw this study. “Before clinical trials can begin, we must complete the pre-clinical studies that include additional safety tests and production of MG53 protein that can be used in human patients as a therapeutic drug.”

The study was conducted in conjunction with TRIM-edicine, a privately held biotechnology company spun-off from UMDNJ and created to commercialize the development of novel biopharmaceutical products in which Dr. Ma and Dr. Weisleder hold an interest. The research was funded by grants from the National Institutes of Health (NIH), an NIH Small Business Research Grant, and the Jain Foundation.

Provided by University of Medicine and Dentistry of New Jersey