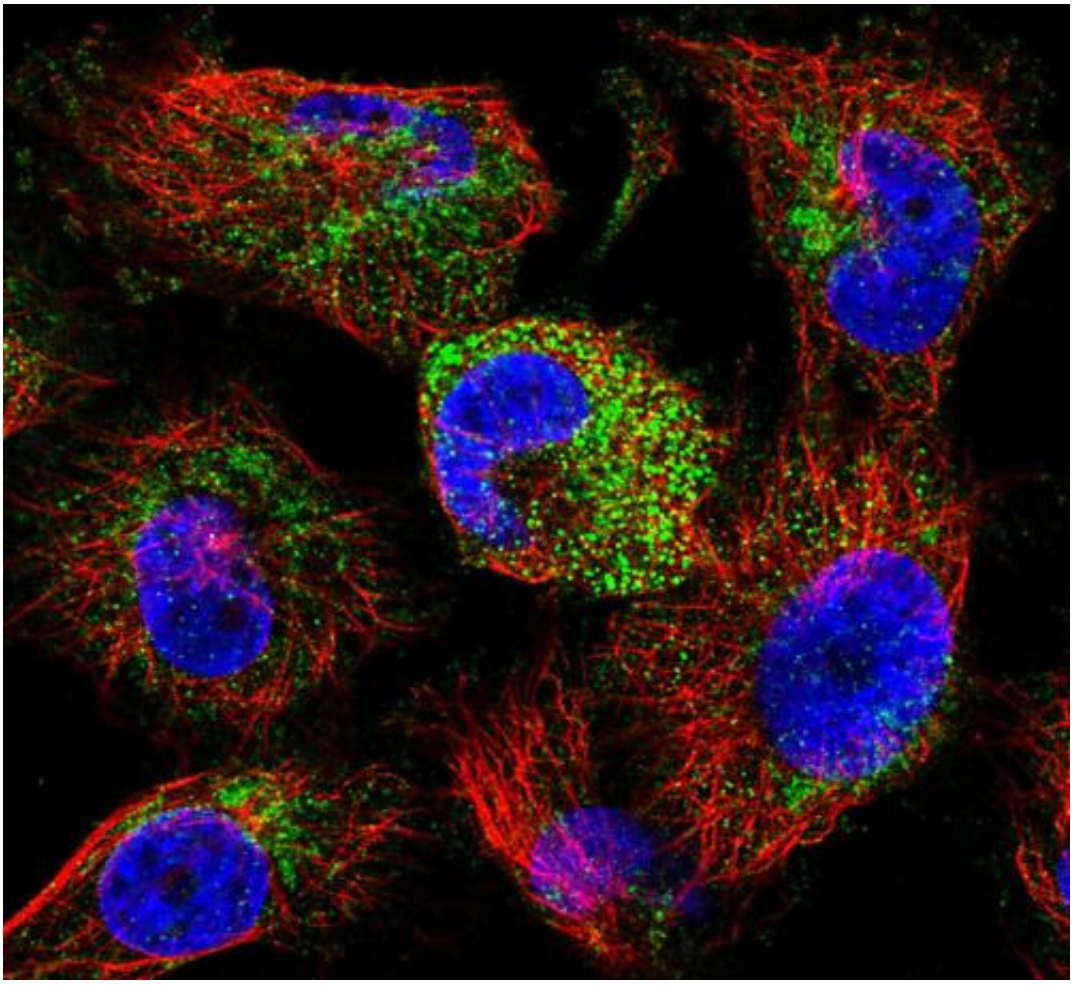
MedicalXpress

Potential for ALS treatment found in three proteins

March 24 2015



A closeup image of the SLC25A20 protein, which shows staining of the mitochondria as green dots. Credit: proteinatlas.org

Where ALS comes from and how it progresses are mysteries that continue to vex medical science. But recent research at Sweden's KTH Royal Institute of Technology has found three proteins that could shed some light on the mechanisms behind this deadly disease.

Anna Häggmark, a researcher in affinity proteomics at KTH and Science for Life Laboratory, says the three proteins were identified in what is one of the most extensive plasma profiling studies performed in this field of research.

In the search for treatments and earlier diagnoses of ALS, scientists are focused on biomarkers, or biological characteristics that reflect a physiological change in the body during or after an illness. A typical example of a biomarker is troponin, which is secreted into the blood when a heart muscle is damaged following a heart attack.

"This is a really nice clue," Häggmark says. "The three proteins we have found seem to represent different aspects of this disease's pathogenesis. After further evaluation of their role within ALS, they can perhaps help to support diagnostics or even serve as a drug targets for those stricken with the disease."

There are currently no reliable markers for ALS, or amyotrophic lateral sclerosis, a progressive neurodegenerative disease that destroys the nerve cells that control muscle movement, causing muscles to become weak and then paralyzed. ALS affects all skeletal muscles, including those used for breathing and swallowing.

Häggmark explains that one protein, NEFM, is a structural component of neurons in the central and peripheral nervous system. If found in blood plasma, it could indicate nerve fiber death as a result of ALS.

RGS18, on the other hand, is a cell signaling protein. The increase of this

protein may reflect its leakage from the degenerated muscles in these patients, the study states.

The third protein, SLC25A20, is a mitochondrial protein thereby representing a cellular structure that that has previously been shown as linked to ALS.

The team's partners at the Medical University of Warsaw provided plasma samples from 367 Polish ALS patients and 101 controls. The initial protein profiles were obtained by using 352 antibodies from the Human Protein Atlas, targeting 278 proteins.

"As far as we know it's the most extensive plasma profiling study published within ALS, in terms of numbers of patients included," Häggmark says.

The researchers will work further with the verification of their results, using an expanded collection of plasma samples from Sweden, Poland and Germany as well as cerebrospinal fluid from ALS patients. "We'll look at these proteins in additional sample materials and see if we can confirm our findings," she says.

Häggmark says the ongoing study will include examining "disease specificity" of the markers, that is, whether what they find in ALS is also relevant for other neurological degenerative diseases, such as multiple sclerosis.

More information: "Plasma profiling reveals three proteins associated to amyotrophic lateral sclerosis," *Annals of Clinical and Translational Neurology* Volume 1, Issue 8, pages 544–553, August 2014 DOI: 10.1002/acn3.83