**Temple researchers receive grants to develop ALS therapy, EEG software**

by Preston M. Moretz

Temple researchers have been awarded two proof-of-concept grants from the University City Science Center for the development of a novel therapy for the treatment of amyotrophic lateral sclerosis (ALS) and creating a software program that will enhance a physician’s ability to read and diagnose electroencephalography or EEGs.

The grants are part of the Science Center’s QED Proof-of-Concept Program, which aims to bridge the funding gap between research grants and commercial seed investment by providing funds for life sciences and digital health technologies with high potential in the healthcare industry.

Ben Blass, an assistant professor of medicinal chemistry in the Moulder Center for Drug Discovery Research in Temple’s School of Pharmacy, will be the principal investigator on the grant that is funding the development of the treatment for ALS or “Lou Gehrig’s disease.”

Moulder researchers have developed a compound that has demonstrated ability to up regulate the expression of the protein glutamate transporter 1 (GLT-1) in the brain.

“Seventy-five percent of ALS patients have a significant down regulation of the GLT-1 protein,” said Blass, who came to Temple from Wyeth Pharmaceuticals. “If you down regulate it, you end up with cytotoxic levels of glutamate that kills brains cells, motonerurons and other things which eventually lead to the symptoms associated with ALS. So we believe that up regulation of GLT-1 is a viable path forward for the treatment of ALS.”

Blass said preliminary short studies in the SOD1 mouse model, the only accepted mouse model for ALS, have shown positive results. The QED grant will now allow the Moulder researchers to conduct more comprehensive studies using the difficult and expensive SOD1 mouse model.

“The SOD1 mouse model study is the only study that you can use for efficacy, which will then allow you to go to the Food and Drug Administration and say you have something that you believe will work in humans and would like to move it into clinical trials,” he said. “If it works, it will be a huge win, especially for ALS patients because there is a huge need for a therapy like this.”

The second QED grant is awarded to Professor Joseph Picone and Assistant Professor Iyad Obeid, both in Temple’s electrical and computer engineering department. The researchers are proposing to develop computer software that would automatically read EEGs, which are multi-surface brain scans used in the diagnosis of epilepsy, brain and sleep disorders, tumors, comas and brain death.

“EEGs generate a pretty intense amount of data,” said Obeid. “Right now, the state-of-the-art method for reading an EEG is that a physician scans through them manually on a computer.”

Obeid said for years, researchers have attempted to develop software that would skim through these giant, multi-channel data sets and flag key events for the physicians. But, he said, they would attempt to do this by creating heuristic software, in which they would attempt to hard code a set rules for the software to follow.

“They have had some sort of reasonable success with this method, but doctors have never found them reliable enough to depend on,” said Obeid.

Picone and Obeid propose to use a new class of computer learning algorithms called “machine learning,” which do not follow a set of rules but are essentially pattern matchers. “It is believed that these algorithms are a lot more powerful at finding trends and patterns than you could get if you attempted to concoct a list of ad hoc rules for the software to follow,” said Obeid.

The researchers will be using a giant bank of 22,000 archival EEGs and diagnoses provided by Temple University Hospital to develop their algorithms.

“People have been using ‘machine learning’ for a long time, but it has never been used before with this medical EEG data because you can only train these systems with giant amounts of data” said Obeid. “And up until now, no’s had that.”

Obeid added that they not trying to replace a physician but enhance his ability to isolate relevant events on the EEG and make a proper diagnosis.

Blass and his colleagues at Moulder will receive $200,000 through the QED ($100,000 from both the Science Center and Temple), while Picone and Obeid will receive $110,000 ($50,000 from the Science Center and $60,000 from the university).

The grants are two of four QED Proof-of-Concepts grants awarded by the Science Center, with researchers from Drexel and Rutgers universities receiving the other two. A total of 65 proposals were originally submitted for consideration, with 14 making finals, including all four Temple submissions.

Temple has received one previous grant through the QED program.

In 2011, George Tuszynski, now emeritus professor of neuroscience in Temple’s School of Medicine, was awarded a QED grant for Angiocidin, a novel tumor-inhibiting protein that has shown effectiveness against acute myeloid leukemia. Temple has spun Angiocidin out to a startup company, Diffregen LLC, which was recently awarded a small business innovation research Phase 1 grant by the National Cancer Institute to advance Angiocidin to the doorstep of human clinical trials.