An ALS-associated gene controls neuronal growth and branching

A new research article published in the journal “Scientific Reports” describes recent results from the work funded by the Blazeman Foundation at Brandeis University. This work is a collaborative effort between Mugdha Deshpande, Blazeman Foundation post-doctoral fellow in Avital Rodal’s lab and Josiah Herzog, a graduate student from Suzanne Paradis’ lab. They sought to understand how TDP-43, a gene closely linked to ALS, alters the growth and branching of mammalian neurons grown in a dish (see image below). This is important because growth and branching is essential for neurons to reach their partner neurons in brain circuits, and defects in growth and branching have been found in ALS patients and in animal models of ALS. Neurons cultured in a dish offer a simplified experimental model for understanding how ALS genes cause defects in growth and branching, allowing the identification of cellular pathways that might be points of therapeutic intervention in patients.

Previous work has shown that both reduced and excess TDP-43 protein levels can cause ALS-like effects in animal models, and the Brandeis researchers found that either too little or too much TDP-43 resulted in reduced growth of neurons. TDP-43 controls the levels of many cellular proteins by affecting expression of their genes, and the researchers found that this function of TDP-43 is crucial for neuronal growth defects. In the future, the Blazeman Foundation-supported researchers will use this new experimental model for ALS-associated defects to further investigate which specific gene targets of TDP-43 might be critical in bringing about changes in neuronal growth and branching.

The paper can be found at:

http://rdcu.be/yvX4

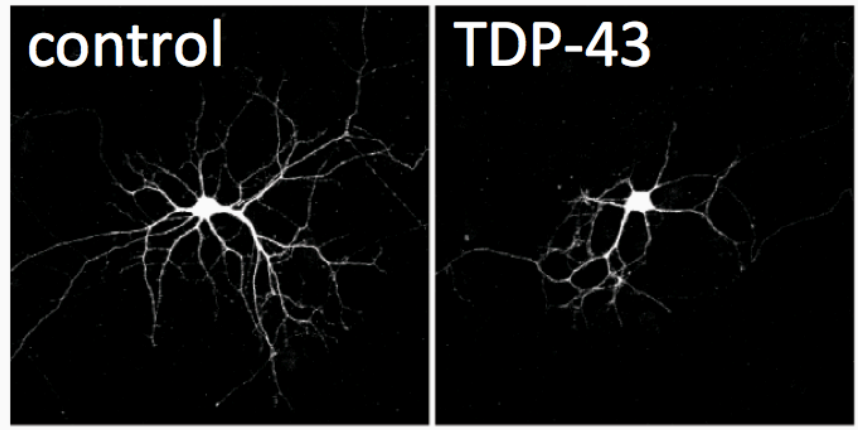

Image: Mammalian neurons show reduced growth and branching when TDP-43 is altered