

## NSHRF PROJECT FACT SHEET

### **New research transforms embryonic stem cells into axial motor neurons**

Motoneurons, which originate in the spinal cord or brain stem, help muscles contract. This unique property means they can innervate and activate muscle. But how are motoneurons created? That question is being explored in novel research conducted by Prabakaran Soundararajan, a doctoral candidate under the supervision of Dr. Victor Rafuse in the Department of Anatomy and Neurobiology at Dalhousie University. His findings have now been published in the prestigious *Journal of Neuroscience*.

Mr. Soundararajan took embryonic stem cells from mice and transformed them into motoneurons using two compounds called sonic hedgehog and retinoic acid. "Basic science studies have found that these two compounds are important to changing a stem cell into a motoneuron in the development stage," he notes.

In Mr. Soundararajan's study, the stem cells became axial motor neurons, which activate muscles along the vertebral column. These treated stem cells were then transplanted into the developing spinal cord of two-day-old chicks. After one week, they had activated muscle.

The implications for this research are significant. Ultimately, such an approach could serve as a treatment for various spinal cord disorders. "We now have a recipe that enables us to make axial motoneurons," says Mr. Soundararajan. "However, for human experiments to succeed, we need to answer a number of basic science questions. There is a lot more research that needs to be done."

Currently, the Dalhousie PhD student, whose research was funded by the Nova Scotia Health Research Foundation, is exploring two new avenues. He is investigating whether the transplanted stem cells become part of the neural circuitry of the spinal cord. He is also looking at whether embryonic stem cells could become limb motor neurons.

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