Study identifies diverse spectrum of neurons that govern movement

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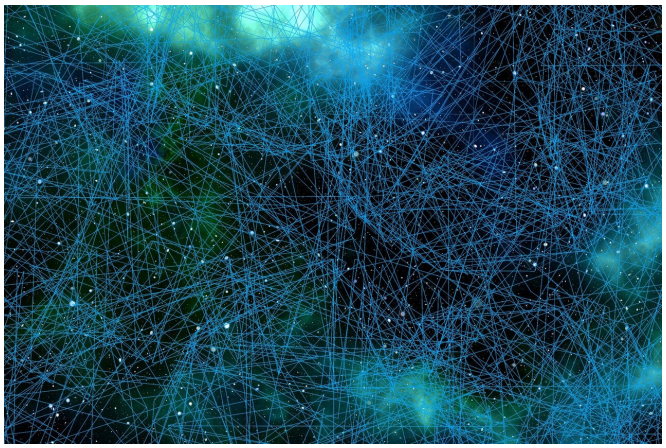

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In a mouse study, National Institutes of Health researchers have identified and mapped a diverse spectrum of motor neurons along the spinal cord. These neurons, which send and receive messages throughout the body, include a subset that is susceptible to neurodegenerative diseases. Created with a genetic sequencing technique, the atlas reveals 21 subtypes of neurons in discrete areas throughout the spinal cord and offers insight into how these neurons control movement, how they contribute to the functioning of organ systems and why some are disproportionately affected in neurodegenerative diseases.

The study was led by Claire Le Pichon, Ph.D., head of the Unit on the Development of Neurodegeneration at NIH's Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD). It appears in *Nature Communications*.

Spinal cord neurons are responsible for all types of movement in the body, ranging from voluntary movements like walking to the involuntary constriction and relaxation of the stomach as it processes its contents. Traditionally, scientists categorize these neurons into three main types: skeletal motor neurons, visceral motor neurons and interneurons. Previous research suggests there are additional subtypes within these three categories and that some of these subtypes may be more vulnerable to neurodegenerative diseases than others. For example, diseases like spinal muscular atrophy and amyotrophic lateral sclerosis, or ALS, affect only certain types of skeletal muscle neurons.

In the current study, the team used a technique called single nucleus RNA sequencing to identify 21 subtypes of spinal cord neurons in mice. The findings reveal highly distinct subtypes, especially among motor neurons that control the glands and internal organs. The team also discovered that visceral motor neurons extend higher up along the spinal column than previously known. The authors believe these motor neurons may be newly discovered subtypes with unknown functions.

More information: Alkaslasi MR, Piccus ZE, Hareendran S, Silberberg H, Chen L, Zhang Y, Petros TJ, and Le Pichon CE. Single nucleus RNA-sequencing defines unexpected diversity of cholinergic neuron types in the adult mouse spinal cord. *Nature Communications*, DOI: 10.1038/s41467-021-22691-2

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