Medical Xpress

Allen Cell types database launched

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The Allen Institute for Brain Science announced today that it is taking the first major scientific step to create a searchable standards database for the brain with the launch of the Allen Cell Types Database. This first release includes information on the location, electrical activity and shape of more than 240 neurons.

"To make progress in brain research, we need established standards for all neuroscientists worldwide to share," says Allan Jones, Ph.D., CEO of the Allen Institute. "These cell types may end up playing the same role in neuroscience as the periodic table does in chemistry."

The publicly accessible database represents the first fruit of the Allen Institute's ten-year plan to understand how activity in the brain leads to perception, decision-making and action. Understanding cell types—the brain's building blocks—is fundamental to making sense of both how the healthy brain functions and what goes wrong in diseases such as autism, Alzheimer's and Parkinson's.

"Identifying neuronal cell types is essential to unraveling the mystery of how the brain processes information and gives rise to perception, memory and consciousness," says Christof Koch, Ph.D., President and Chief Scientific Officer of the Allen Institute for Brain Science. "This is the first resource of its kind to bring together multiple types of data—shape, position in the brain and electrical activity—in a single searchable database anywhere on the planet."

The Allen Cell Types Database contains detailed information on

individual neurons from the mouse visual cortex. Their electrical activity in response to stimulation applied to their cell bodies was recorded with tiny electrodes before their shapes were captured in high resolution by a light microscope. Digitally reconstructed morphologies for a subset of cells in the release as well as different types of computer models that faithfully simulate the electrical behavior of these cells will also be made available.

Included in the release is the Allen Software Development Kit (SDK): a companion source code repository containing neuronal models of the cells. This tool allows scientists to download the models and run their own virtual experiments.

"Each cell in the database has an associated model of its electrical activity, which can be downloaded as part of the Allen SDK," says Chinh Dang, Chief Technology Officer of the Allen Institute for Brain Science. "The models allow interested scientists to not just observe the patterns of individual cells, but to make quantitative and analytical comparisons that will ultimately help differentiate between cell types."

Future data releases on this product will include cells from the human cortex and information about gene expression in individual cells.

An additional component of the data release is the Allen Institute's newest Science Vignette: a dynamic animation that guides users through a classification of cell types of the mouse visual cortex based on analyzing the thousands of genes that are expressed in single neurons. The gene expression data for the approximately 1,600 cells in the animation will also be made available. Both resources showcase the kind of future insights that can be gleaned from combining morphological, electrical and transcriptional analyses.

"By making a database like this available right now to the public, we are

building a fundamental framework, allowing us to speak the same language and helping the larger community answer future questions in neuroscience," says Jones.

More information: www.brain-map.org/

Provided by Allen Institute for Brain Science