



ABOUT THE ALLEN DEVELOPING MOUSE BRAIN ATLAS

The [Allen™ Developing Mouse Brain Atlas](#) fulfills a longstanding request from the scientific community for a detailed map of how genes change during the development of the brain. Building upon the foundation established by the inaugural Allen Mouse Brain Atlas for the adult mouse, the resulting developmental atlas provides a framework to explore both when and where genes are activated in the mouse brain during multiple stages of development, from embryo through old age.

As a result, the 4D Atlas has the potential to advance understanding of neurodevelopmental disorders, such as autism, and adult-onset disorders with developmental roots, such as schizophrenia. The Atlas data and integrated tools are publicly available for free online.

“The developing brain atlas provides a molecular narrative of how the genetic map of the brain unfolds in space and time. The atlas **will be invaluable in gaining insight into the origins of certain behavioral disorders, such as schizophrenia and autism**, which are increasingly thought to result from abnormalities of brain development.”

- David Anderson, Ph.D., Professor of Biology and Howard Hughes Medical Institute Investigator at the California Institute of Technology

IMPLICATIONS

Prior to this project there was no atlas of how genes change during the development of the brain. The extraordinary complexity of the brain presents significant challenges for understanding its functions, as well as the causes of various neurological disorders. Mature brains are shaped by biological events occurring early in development. Key aspects of brain development and maintenance are influenced or controlled by gene activity. Understanding changes in gene activity across brain development, from the embryo through adulthood and aging, can therefore provide valuable insight into the biological toolkit used to build, strengthen, and maintain a healthy brain, as well as how biological missteps lead to disease in the brain.

The Allen Developing Mouse Brain Atlas has the potential to uncover new opportunities for therapeutic intervention, as genes important for healthy brain development may be leveraged to slow the progression of degenerative diseases, prevent life-changing secondary brain damage from stroke, or repair brain tissue already damaged by injury or disease.

SCIENTIFIC MODEL

Allen Institute employs a high-throughput model, collecting data using an assembly line approach. The combination of laboratory robots, automated imaging devices and high-powered computational systems enables the generation of data on an unprecedented scale. The Allen Developing Mouse Brain Atlas relies on a process called *in situ* hybridization, which pinpoints and stains specific areas where a gene is expressed or “turned on”. By analyzing series of thin tissue sections through the mouse brain at several stages of development, this process allows scientists to view gene activity throughout the developing brain, down to the level of individual cells. Digital photographs were obtained using automated microscopes and incorporated into free, Web-based viewing applications.

KEY ATLAS FEATURES

- Free, public online access with no registration requirement.
- Image-based data for several thousand genes, surveyed across the entire brain.
- 4D microscopic resolution down to the cellular level.
- Coverage of multiple stages of development, from birth through old age.
- Navigation and analysis tools to facilitate data access and mining.
- Detailed anatomic reference atlases of the adult developing mouse brain that can be viewed with the data.

PROJECT ADVISORY COUNCIL

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WEB SITES

To learn more about the Allen Institute, visit www.alleninstitute.org. To access the Allen Developing Mouse Brain Atlas and other public resources from the Allen Institute, visit www.brain-map.org.

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