Team identifies process producing neuronal diversity in fruit flies' visual system

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New York University biologists have identified a mechanism that helps explain how the diversity of neurons that make up the visual system is generated.

"Our research uncovers a process that dictates both timing and cell survival in order to engender the heterogeneity of neurons used for vision," explains NYU Biology Professor Claude Desplan, the study's senior author.

The study's other co-authors were: Claire Bertet, Xin Li, Ted Erclik, Matthieu Cavey, and Brent Wells—all postdoctoral fellows at NYU.

Their work, which appears in the latest issue of the journal *Cell*, centers on neurogenesis—the process by which neurons are created.

A central challenge in developmental neurobiology is to understand how progenitors—stem cells that differentiate to form one or more kinds of cells—produce the vast diversity of neurons, glia, and non-neuronal cells found in the adult Central Nervous System (CNS). Temporal patterning is one of the core mechanisms generating this diversity in both invertebrates and vertebrates. This process relies on the sequential expression of transcription factors into progenitors, each specifying the production of a distinct neural cell type.

In the *Cell* paper, the researchers studied the formation of the visual system of the fruit fly Drosophila. Their findings revealed that this process, which relies on temporal patterning of neural progenitors, is more complex than previously thought.

They demonstrate that in addition to specifying the production of distinct neural cell type over time, temporal factors also determine the survival or death of these cells as well as the mode of division of progenitors. Thus, temporal patterning of neural progenitors generates cell diversity in the adult visual system by specifying the identity, the survival, and the number of each unique neural cell type.

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