

Sequentially expressed genes in neural progenitors create neural diversity

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A team of New York University biologists has found that a series of genes sequentially expressed in brain stem cells control the generation of neural diversity in visual system of fruit flies. Their results are reported in the latest issue of the journal *Nature*.

In order for the brain to properly develop and function, a vast array of different types of neurons and glia must be generated from a small number of [progenitor cells](#). By better understanding the details of this process, scientists can develop ways to recognize and remedy a range of neural afflictions such as microcephaly or neurodegeneration.

The research, conducted in the laboratory of NYU Biology Professor Claude Desplan, examined this process by studying the neurons in the visual centers of the fruit fly *Drosophila*. *Drosophila* is a powerful model for studying neural diversity because of its relative simplicity, although the studied [brain structure](#), termed the medulla, contains approximately 40,000 neurons, belonging to more than 70 cell types.

Specifically, they examined the genes expressed in neuroblasts—dividing [neural stem cells](#) that generate neurons—in the medulla and how and when they are expressed. Their findings revealed that five genes encoding five different transcription factors—proteins that bind to specific [DNA sequences](#)—are expressed in a specified order in each of the medulla neuroblasts as they age. The five genes form a temporal cascade: one gene can activate the next gene and repress the previous gene, thus ensuring the progression of the temporal sequence.

It is this process, the researchers found, that controls the sequential generation of different neural types in the *Drosophila* medulla. These results, together with other studies in the field, suggest that a similar mechanism is utilized to generate neural diversity in the brains of humans and other mammals.

More information: [dx.doi.org/10.1038/nature12319](https://doi.org/10.1038/nature12319) ,
[dx.doi.org/10.1038/nature12266](https://doi.org/10.1038/nature12266)

Provided by New York University

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