

## **Cell lineages in the vertebrate brain: lessons from *Drosophila***

Garcia-Marques, Jorge

*Janelia Research Campus, Howard Hughes Medical Institute, Ashburn VA, USA*

Current address: *National Center for Biotechnology - CSIC, Madrid, Spain*

The brain contains an extensive catalog of distinct neuronal types. Such diversity emerges through cell specification processes in which progenitors proliferate while navigating a labyrinth of cell fate decisions. Cell lineage plays a pivotal role in neuronal specification, with sibling neurons exhibiting common traits. Decoding the relation between cell lineage and neuronal identity allows for the dissection of the exact progenitor cell and timing in which cell fate decisions occur.

In *Drosophila*, fate-restricted progenitors change over the course of development to produce distinct neuronal cohorts. Our understanding of neuronal specification in vertebrates remains limited, mainly due to the lack of tools to consistently trace and manipulate specific lineages by targeting the same progenitor type in multiple experiments. Recently, we have developed CaSSA and CLADES, new tools based on CRISPR/Cas9 to trace and manipulate neuronal lineages. Here I will discuss how this technology helped us to understand neuronal specification in fly, and how this knowledge could guide us on how to tackle the problem in vertebrates.