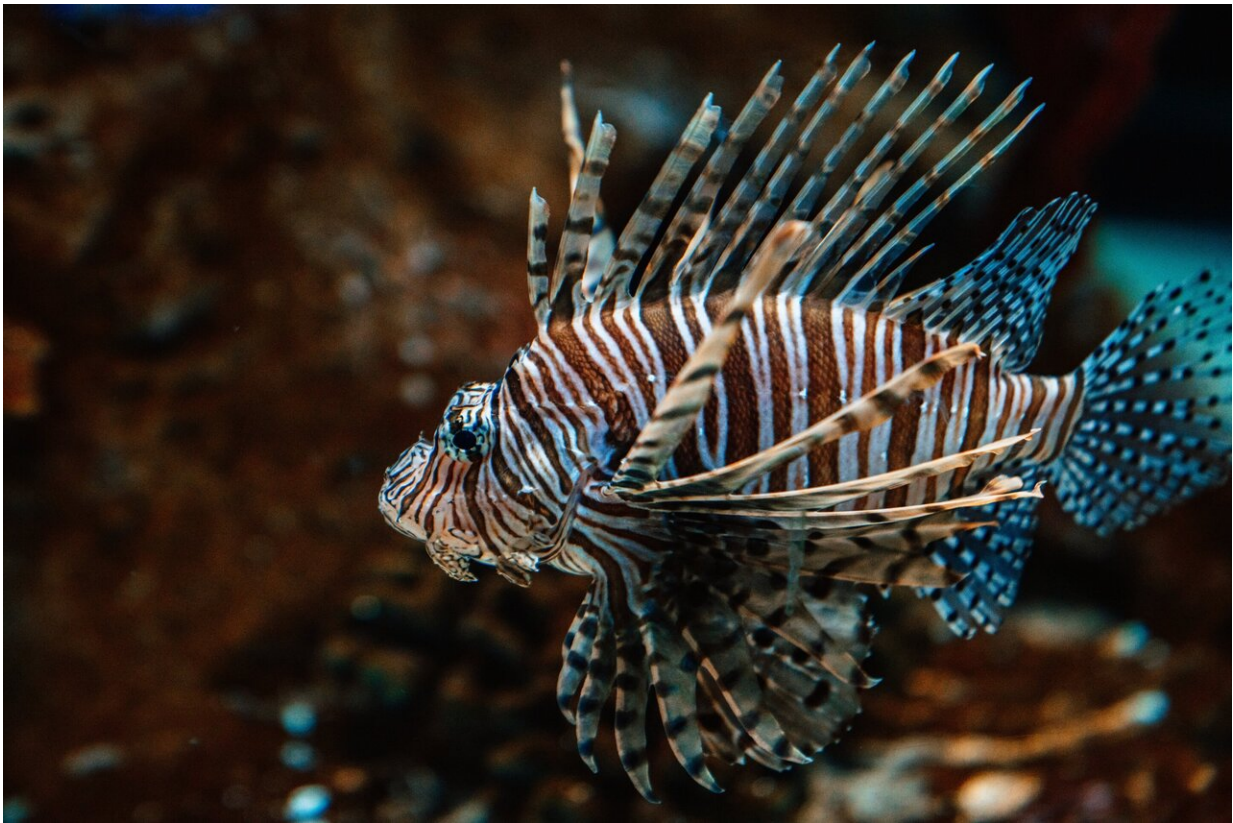


Researchers reveal lineage logics of retinal neurogenesis and reprogramming

July 23 2020, by Liu Jia



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In a study published online in the *Journal of Cell Biology* on July 23, the researchers from Dr. He Jie's Lab at the Institute of Neuroscience, Center for Excellence in Brain Science and Intelligence Technology of

the Chinese Academy of Sciences systematically analyzed the lineage progression in the zebrafish retina and provided a proof-of-concept method to get specific neuron types through lineage-dependent reprogramming.

Neurons are derived from stereotyped lineages in invertebrate species like *C. elegans* and *Drosophila*. However, it has been controversial for about 30 years whether neurogenesis is lineage-dependent in vertebrate species.

Taking advantage of transparency in the early zebrafish embryo, the researchers analyzed about 1000 [cell lineages](#) in the zebrafish retina in vivo and revealed the six major neurogenic lineages responsible for all the five neuron types in the retina (retina ganglion cells, [amacrine cells](#), bipolar cells, horizontal cells and [photoreceptor cells](#)).

Using single-cell RNA sequencing, they then defined molecular characteristics of lineage-specific retinal progenitor cells (RPCs). These results showed evidence in vertebrates that neurogenesis was mostly dependent on cell lineage.

Interestingly, RPCs could be efficiently reprogrammed into specific neuron types through overexpression of a single transcription factor in vivo, and the reprogramming result was lineage-dependent.

The findings in this study proved that lineage-dependent reprogramming might be a useful way to regenerate specific neuron for disease treatment, such as glaucoma (a loss of retina ganglion cells) and macular degeneration (a loss of photoreceptor cells).

More information: Mei Wang et al. Different lineage contexts direct common pro-neural factors to specify distinct retinal cell subtypes, *Journal of Cell Biology* (2020). [DOI: 10.1083/jcb.202003026](https://doi.org/10.1083/jcb.202003026)

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