

Astrocytes contribute to the **development** and **regulation** of the higher-level **brain functions**, the critical targets of **evolution**. However, how astrocytes evolve in **primates** is unsettled. Ciuba et al. obtained **human**, **chimpanzee**, and **macaque** induced **pluripotent stem cell-derived astrocytes** (iAstrocytes). Human iAstrocytes are bigger and more complex than the non-human primate iAstrocytes. They identified new loci contributing to the increased human **astrocyte**. They showed that **genes** and **pathways** implicated in long-range intercellular **signalling** are activated in the human iAstrocytes and partake in controlling iAstrocyte complexity. Genes downregulated in human iAstrocytes frequently relate to neurological **disorders** and were decreased in adult brain samples. Through **regulome** analysis and **machine learning**, they uncover that **functional activation** of enhancers coincides with a previously unappreciated, pervasive gain of “stripe” **transcription factor** binding sites. Altogether, they revealed the **transcriptomic signature** of primate astrocyte **evolution** and a **mechanism** driving the acquisition of the regulatory potential of enhancers ¹⁾

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Ciuba K, Piotrowska A, Chaudhury D, Dehingia B, Duński E, Behr R, Soroczyńska K, Czystowska-Kuźmich M, Abbas M, Bulanda E, Gawlik-Zawiślak S, Pietrzak S, Figiel I, Włodarczyk J, Verkhatsky A, Niedbała M, Kaspera W, Wypych T, Wilczyński B, Pękowska A. **Molecular signature of primate astrocytes** reveals **pathways** and regulatory changes contributing to **human brain evolution**. Cell Stem Cell. 2025 Jan 29:S1934-5909(24)00458-2. doi: 10.1016/j.stem.2024.12.011. Epub ahead of print. PMID: 39909043.

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