

Building the Human Neocortex: Molecular Logic of Neural Circuit Formation and Evolution

October 13

Tuesday, 12:30 pm

Live Webinar
via Zoom Conference



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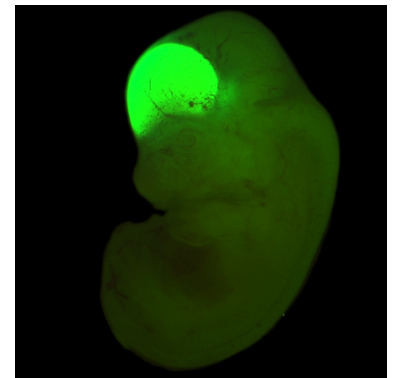
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Abstract

The question of what makes human beings unique has fascinated humankind throughout modern history. Today, we view the brain as the core component of human identity, and an understanding of this organ is consequently essential for answering why we as a species are what we are. What distinguishes humans from other species is largely thought to reside in the unique features of brain development, especially in the wiring of the immensely complex neural circuits that underlie our cognitive and motor abilities.

In my presentation, I will describe some of our recent efforts to understand the molecular and cellular basis of how neurons acquire distinct identities and form proper connections in the cerebral cortex, the outside part of the mammalian brain that processes our senses, commands motor activity, and helps us perform higher-order cognitive functions like language. I will also present evidence on how these complex developmental processes were modified during human evolution and may become compromised in neuropsychiatric disorders.



1. Kaur N, Han W, Li Z, Madrigal MP, Shim S, Pochareddy S, Gulden FO, Li M, Xu X, Xing X, Takeo Y, Li Z, Lu K, Imamura Kawasaki Y, Ballester-Lurbe B, Moreno-Bravo JA, Chédotal A, Terrado J, Pérez-Roger I, Koleske AJ, Sestan N (2020) Neural stem cells direct axon guidance via their radial fiber scaffold. *Neuron* 107: 1197-1211. PMID: 32707082.
2. Li M, Santpere G, Imamura Kawasaki Y, Evgrafov OV, Gulden FO, Pochareddy S, Sunkin SM, Li Z, Shin Y, Zhu Y, Sousa AMM, Werling DM, Kitchen RR, Kang HJ, Pletikos M, Choi J, Muchnik S, Xu X, Wang D, Lorente-Galdos B, Liu S, Giusti-Rodríguez P, Won H, de Leeuw CA, Pardiñas AF, BrainSpan Consortium, PsychENCODE Consortium; PsychENCODE Developmental Subgroup, Hu M, Jin F, Li Y, Owen MJ, O'Donovan MC, Walters JTR, Posthuma D, Reimers MA, Levitt P, Weinberger DR, Hyde TM, Kleinman JE, Geschwind DH, Hawrylycz MJ, State MW, Sanders SJ, Sullivan PF, Gerstein MB, Lein ES, Knowles JA, Sestan N (2018) Integrative functional genomic analysis of human brain development and neuropsychiatric risks. *Science* 362 (6420). pii: eaat7615. PMID: 30545854
3. Zhu Y, Sousa AMM, Gao T, Skarica M, Li M, Santpere G, Esteller-Cucala P, Juan D, Ferrández-Peral L, Gulden FO, Yang M, Miller DJ, Marques-Bonet T, Imamura Kawasaki Y, Zhao H, Sestan N (2018) Spatiotemporal transcriptomic divergence across human and macaque brain development. *Science* 362 (6420). pii: eaat8077. PMID: 30545855.

