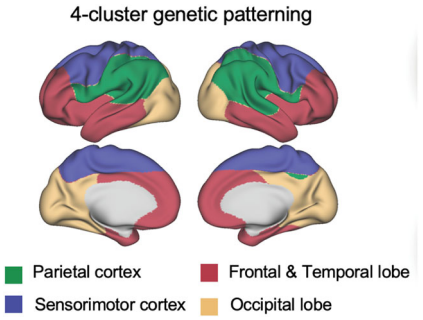
This Week in The Journal

Genes Determine Cortical Connectivity Heterogeneity

Deying Li, Yufan Wang, Liang Ma, Yaping Wang, Luqi Cheng et al.

(see article e1510242024)

Genetic information guides how the neural tube develops into heterogeneous cortical areas. But, until now, how genetic information and cortical wiring together shape the spatial makeup of the cortex was unclear to researchers. In this issue, Li and colleagues leveraged vertex-wise tractography in diffusion-weighted MRI to analyze genetic profiles and assess whether a more complex relationship exists between genetics, cortical wiring, and the spatial layout of the cortex. The authors indexed the organizing principles of connectivity heterogeneity and discovered three dominant topographic patterns. They revealed that these topographic patterns converge to the gradients of a genetic correlation matrix on the phenotype of cortical morphology and spatiomolecular gradients across the cortex. Li et al. also identified the genes that scaffold these connectopies and discovered that the cell types in which these genes are enriched differ before and after birth. This study suggests that the heterogeneity of cortical connectivity is genetically determined, which is informative for researchers in the field.



Shown is the overlap between four modules derived from hierarchical clustering and genetic patterning of cortical thickness. See Li et al. for more information.

Attentional States Helps Tune Sensory Perception

Laurie Galas, Ian Donovan, and Laura Dugué

(see article e1616242024)

In this issue, Galas and colleagues explored how rhythmic, dynamic attentional states sculpt the way humans perceive sensory information. Male and female study participants performed an intensive task while the researchers manipulated their attention to be either sustained or exploratory at various time delays. Galas et al. discovered that sustained and exploratory attention have different neural computations that differentially impact sensory perception. More specifically, sustained attention suppresses features of distracting stimuli at alpha frequencies while exploratory attention enhances perception of task-relevant features at theta frequencies. This study provides new insight into how rhythmic attentional states influence sensory perception.

This Week in The Journal was written by Paige McKeon
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