This Week in The Journal

Early-Life Maturation of Motion-Responsive Visual Brain Areas

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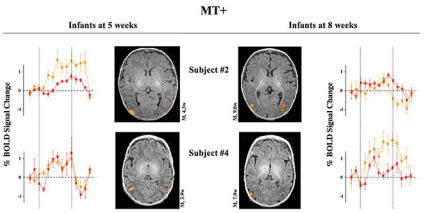
(see pages 3825–3837)

Research has shown that the human visual system develops rapidly in the first few months of life, with a highly developed retinotopic map in place by 5 months. But data using functional magnetic resonance imaging from babies in the first few weeks of life, when major cortical organization is happening, is sparse. Now, Biagi et al. compare their recent findings in 8-week-old children to a new cohort of eight 5-week-old infants. Anatomical and resting-state scans were collected while babies slept in the scanner, and responses to visual stimuli—either coherent flow or random motion of dots presented in goggles—were measured during wakefulness. The researchers measured the change in blood oxygen-dependent level (BOLD) responses to motion. BOLD signals were comparable between the 5- and 8-week-old participants in the middle temporal complex, known as area MT+, and in a vestibular cortical area in the posterior part of the insular sulcus, known as PIVC.



Responses of MT+ to coherent versus random motion in the same analysis of two longitudinal recordings.

In a cuneus area corresponding to adult V6, however, BOLD responses were greater and more widespread in the older subjects, suggesting a significant maturation of the area over the 4 week interval, and other cuneus regions showed no response to coherent versus random motion in the younger subjects. In occipital cortex, too, responses were smaller and noisier in younger infants. Scans from sleeping infants showed a different functional connectivity between area V1 and areas MT+ and PVIC, whereas interhemispheric connectivity was similar to that seen in adults. The authors conclude that the maturation of areas MT+ and PVIC is relatively complete by 5 weeks of age—despite rudimentary behavioral responses to motion at the younger age—but that other areas including V1 and V6 undergo rapid maturation.

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