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6 Distinct cerebellar contributions to intrinsic connectivity networks.

Habas C, Kamdar N, Nguyen D, Prater K, Beckmann CF, Menon V, Greicius MD
J Neurosci. 2009 Jul 1; 29(26):8586-94

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Although many functional magnetic resonance imaging (fMRI) studies report activation in the human cerebellum during task performance, its role in higher cognition is currently unknown. In this elegant imaging study, resting-state functional connectivity analysis revealed distinct cerebellar contributions to intrinsic networks involved in executive control, working memory and sensorimotor function. The results suggest that the most phylogenetically recent parts of the cerebellum contribute to executive control, salience detection, and episodic memory.

Fifteen subjects from Paris and 22 subjects from Stanford were scanned with their eyes closed, and independent component analysis was used to identify the following resting-state networks in their brains: the default network (DMN), implicated in episodic memory retrieval, self-reflection, mental imagery, and stream of consciousness processing; the executive control network (ECN), involved in the selection and maintenance in working memory of relevant information required for action preparation; the salience network, which integrates and filters relevant interoceptive, autonomic and emotional information; and the sensorimotor network. In each intrinsic network, the distinct cerebellar contribution was revealed, with participation of the neocerebellum in the ECN (crus I and II), DMN (lobule IX), and the salience network (lobule VI). Interestingly, these regions did not overlap with the sensorimotor cerebellum (lobules V-VII), suggesting a functional role for the cerebellum beyond motor control. Such anatomic parcellation could be used to further characterize the functional role of distinct cerebellar regions in healthy subjects and in patients with cognitive and emotional deficits.

Competing interests: None declared

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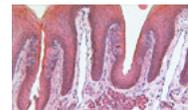
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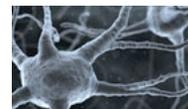
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