

Encoding asymmetry within neural circuits

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Genetic and environmental factors control morphological and functional differences between the two sides of the nervous system. Neural asymmetries are proposed to have important roles in circuit physiology, cognition and species-specific behaviours. We propose two fundamentally different mechanisms for encoding left-right asymmetry in neural circuits. In the first, asymmetric circuits share common components; in the second, there are unique unilateral structures. Research in both vertebrates and invertebrates is helping to reveal the mechanisms underlying the development of neural lateralization, but less is known about the function of circuit asymmetries. Technical advances in the coming years are likely to revolutionize our understanding of left-right asymmetry in the nervous system. © 2012 Macmillan Publishers Limited. All rights reserved.