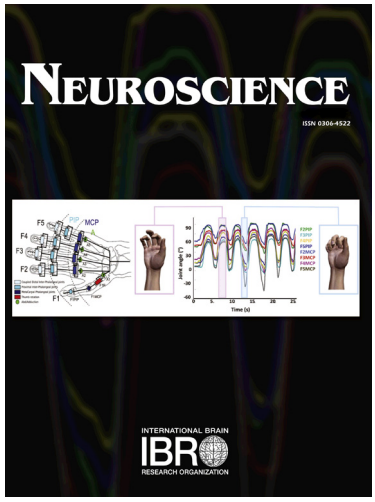

The development of the nociceptive brain

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The development of the nociceptive brain

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Abstract

This review addresses the fundamental question of how we first experience pain, at the beginning of our lives. The brain is activated by peripheral tissue damaging stimulation from birth, but unlike other sensory systems, the pain system in healthy individuals cannot rely upon a prolonged activity dependent shaping through repeated noxious stimulation. Considering the importance of pain, remarkably little is known about when and how the nociceptive cortical network activity characteristic of the mature adult brain develops. We begin this review by considering the underlying framework of connections in the infant brain. Since this developing brain connectome is necessary, if not sufficient, for pain experience, we discuss the structural and functional development of cortical and subcortical networks that contribute to this network. We then review specific information on the development of nociceptive processing in the infant brain, considering evidence from neurophysiological and haemodynamic measures separately, as the two are not always consistent. Finally we highlight areas that require further research and discuss how information gained from laboratory animal models will greatly increase our understanding in this area.