

Maternal psychological distress associates with alterations in resting-state low-frequency fluctuations and distal functional connectivity of the neonate medial prefrontal cortex

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Abstract

Prenatal stress exposure (PSE) has been observed to exert a programming effect on the developing infant brain, possibly with long-lasting consequences on temperament, cognitive functions and the risk for developing psychiatric disorders. Several prior studies have revealed that PSE associates with alterations in neonate functional connectivity in the prefrontal regions and amygdala. In this study, we explored whether maternal psychological symptoms measured during the 24th gestational week had associations with neonate resting-state network metrics. 21 neonates (9 female) underwent resting-state fMRI scanning (mean gestation-corrected age at scan 26.95 days) to assess fractional amplitude of low-frequency fluctuation (fALFF) and regional homogeneity (ReHo). The ReHo/fALFF maps were used in multiple regression analysis to investigate whether maternal self-reported anxiety and/or depressive symptoms associate with neonate functional brain features. Maternal psychological distress (composite score of depressive and anxiety symptoms) was positively associated with fALFF in the neonate medial prefrontal cortex (mPFC). Anxiety and depressive symptoms, assessed separately, exhibited similar but weaker associations. Post hoc seed-based connectivity analyses further showed that distal connectivity of mPFC covaried with PSE. No associations were found between neonate ReHo and PSE. These results offer preliminary evidence that PSE may affect functional features of the developing brain during gestation.

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