In This Issue

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A brief summary of the articles appearing in this issue of *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging.*

Special Issue: Maternal Proinflammatory Processes and Fetal Neurodevelopment: Integrating Clinical and Preclinical Research Approaches

Early environmental factors, including maternal nutrition and metabolic state during gestation, influence offspring neurodevelopment. Both human and preclinical models demonstrate a link between poor maternal nutrition, altered metabolic state, and risk for behavioral abnormalities in offspring. In this review, **Mitchell *et al.*** (pages 450–460) highlight evidence from the current literature that connects maternal nutrition and the associated metabolic changes with neural and behavioral outcomes in offspring. The authors also identify possible mechanisms underlying these neurodevelopmental outcomes.

A growing body of research indicates that heightened maternal inflammation during pregnancy is an important pathway through which maternal stress may impact fetal brain development. A parallel line of research demonstrates the effectiveness of psychotherapeutic interventions to reduce stress during pregnancy. In this review, **Graham *et al.*** (pages 461–470) argue for integration across these areas of research through a shared focus on inflammation as an outcome that is potentially modifiable through psychotherapeutic intervention and highly relevant to maternal mental health and offspring brain development.

The maternal immune activation (MIA) hypothesis proposes that activation of the immune system in pregnancy may result in altered neurodevelopment of the fetus. Although the model has an established history and supporting data, there is wide variation across studies in how the hypothesis is tested. Here, **O'Connor and Ciesla** (pages 471–479) outline how methodological refinements may improve our understanding of the mechanisms involved and their application for human health.

Advanced fetal magnetic resonance imaging has enabled researchers to noninvasively investigate in vivo brain and placental development. In this review, **De Asis-Cruz *et al.*** (pages 480–490) appraise quantitative imaging techniques, including proton magnetic resonance spectroscopy and placental diffusion imaging, and examine associations between prenatal exposures and structural and functional neurodevelopment. The authors also explore likely neurobiological processes mediating this relationship, specifically the role played by the maternal-fetal immune environment.

Rhesus monkeys are important animal models for the study of human disease and the safety of new therapies proposed for human use. They share many genetic, physiologic, reproductive, and developmental features with humans and thus can provide key insights that have direct relevance to the developing human fetus and infant. Here, **Tarantal *et al.*** (pages 491–497) review work in this species related to the study of infectious and environmental agents that can alter growth and development, including the impact of the Zika virus on microglia and cytomegalovirus infection, and the potential lasting impact of exposure to these agents on health across the life span.

There is a growing body of literature supporting the relationship between inflammatory events during pregnancy and offspring risk for neuropsychiatric disorders. In the current review, **Gyllenhammer *et al.*** (pages 498–509) describe emerging data supporting the potential mechanistic role that mitochondria may serve in this relationship. Specifically, the authors detail the obligatory role of mitochondria in brain development, the role of mitochondria as mediators of inflammatory processes, and evidence of mitochondrial dysfunction in preclinical inflammatory exposure models and human neurodevelopmental disorders.

The MIA model has emerged as an important translational tool to evaluate the association between maternal infections during pregnancy and increased risk for offspring neurodevelopmental disorders. In this review, **Ryan and Bauman** (pages 510–523) highlight similarities between humans and nonhuman primates, including placental structure, pregnancy physiology, gestational timelines, and offspring neurodevelopmental stages, that provide an opportunity to explore the MIA hypothesis in species more closely related to humans.

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