

# Perinatal Selective Serotonin Reuptake Inhibitor Exposure: Impact on Brain Development and Neural Plasticity

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## Key Words

Antidepressant · Serotonin · Plasticity · Depression · Stress · Hippocampus

## Abstract

Selective serotonin reuptake inhibitor (SSRI) medications are the most common antidepressant treatment used during pregnancy and the postpartum period. Up to 10% of pregnant women are prescribed SSRIs. Serotonin plays an integral part in neurodevelopment, and questions have been raised about the placental transfer of SSRIs and the effects of preventing reuptake of presynaptic serotonin on fetal neurodevelopment. Preclinical data is beginning to document a role of early exposure to SSRIs in long-term developmental outcomes related to a number of brain regions, such as the hippocampus, cortex and cerebellum. To date, the majority of preclinical work has investigated the developmental effects of SSRIs in the offspring of healthy mothers; however, more research is needed on the effects of these medications in the face of maternal adversity. This minireview will highlight emerging evidence from clinical and preclinical studies investigating the impact of perinatal SSRI exposure on brain development and neural plasticity.

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## Introduction

Pregnancy and the postpartum period are accompanied by distinct neural, hormonal and behavioral plasticity in the mother [1]. Unfortunately, this is also a time when a woman is vulnerable to the effects of stress and stress-related disorders [2]; recent estimates document that up to 20% of women experience mood disorders, such as depression and anxiety, during pregnancy and the postpartum period [2–4], and many women experience their first depressive episode during pregnancy [3]. Maternal stress, anxiety and depression alone can have significant effects on child development [5–7]. Therefore, effective treatment for maternal mood disorders is needed.

Selective serotonin reuptake inhibitor (SSRI) medications are the most common treatment for mood disorders during pregnancy and the postpartum period [8]. It has been estimated that up to 10% of pregnant women are being prescribed SSRI medications today [4, 9]. Given this increase in SSRI medication use during the perinatal period, questions have been raised about the placental transfer of SSRIs and the effects of these medications on fetal neurodevelopment [10, 11]. Although much more work is needed in this area, this minireview will highlight emerging evidence from clinical and preclinical studies investigating the impact of early exposure to SSRIs on brain development and neural plasticity.