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Major Research Interests:

- Behavioral, endocrine, and immune consequences of prenatal drug exposure
- Role of neurotrophic factors and cytokines in brain development and behavior
- Immune system influences on behavior

Heroin use during pregnancy poses substantial health risks for the mother and fetus. To minimize these risks, opiate substitution therapy is recommended for pregnant opiate-dependent women. Complicating effects of opiate exposure is the eventual withdrawal from the opiate (abstinence syndrome), either during pregnancy or following birth, a scenario facing a growing population. Previous studies using a chick embryo model system have found alterations in the hypothalamic-pituitary-adrenal (HPA) axis response to stressors and disruptions in neural-immune interactions following prenatal drug exposure. Recent studies have replicated these effects in the rodent. Future studies will attempt to ameliorate these effects by using opiates with differing pharmacological properties and by manipulating the magnitude of opiate withdrawal.

Recently it has been reported that two neurodevelopmental disorders, autism and schizophrenia, are associated with increased levels of the neurotrophin brain derived neurotrophic factor (BDNF). BDNF is an attractive candidate to examine for these disorders because it plays a critical role in establishing appropriate connections during neural development and mediates postnatal synaptic plasticity, learning, and mood. Using transgenic mice that overexpress BDNF, my collaborators and I are assessing various behavioral and biochemical parameters to model these neurodevelopmental disorders.

Behavioral changes accompany activation of the immune system, either acutely following a bacterial or viral infection, or chronically in disease states such as cancer and lupus. These behavioral changes include decreased appetite and activity, increased fatigue, and depressive and anxiety-like behaviors. Following acute infection, these behaviors promote recovery and survival. However during a chronic illness, they can impair quality of life. Research in my laboratory is examining the immune mechanisms involved in these behavior changes, focusing on various cytokines and their receptors.