



The UK Superfund Research Center supports biomedical and environmental science research to improve health by preventing exposures to environmental pollutants and promoting healthful lifestyles.

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### Postnatal Complications of Perinatal Polychlorinated Biphenyl Exposure

Polychlorinated biphenyls (PCBs), one of a number of chlorinated organic pollutants, are highly lipid-soluble toxins that are characterized by relative chemical stability and prevalence in the environment. These traits are responsible for their widely recognized role as a source of serious environmental public health risks. PCBs have been shown to cross the placenta and enter breast milk, and recent data suggests that prenatal organochlorine levels contribute to gender-specific obesity development in children. In a mouse model, observations from our laboratory revealed that offspring exposed perinatally to PCBs had significantly worse fat and lean mass profiles compared to offspring born to vehicle-treated dams. Further, mature offspring born to PCB-exposed dams had impaired glucose tolerance compared to offspring from vehicle-treated dams. Separately, we have shown that maternal exercise prior to and during healthy pregnancy and nursing can enhance long-term glucose homeostasis in offspring. The goal of our ongoing research is to elucidate the potential long-term health complications and mechanisms of PCB toxicity during the critical periods of *in utero* and early postnatal life and to explore maternal exercise as a transgenerational intervention.

The proposed studies will provide new etiological evidence supporting current observations that perinatal exposures to environmental PCBs are important contributors to the epidemic of diabetes in the United States. This work will also contribute innovative new insights to understanding the role of exercise in mitigating the environmental health impacts of PCB exposure by highlighting pregnancy as a sensitive period when environmental pollutants could have significant and long-lasting effects on offspring metabolism and when interventions could prove effective in ameliorating the detrimental health outcomes. Anticipated results are particularly significant in that they highlight early developmental stages, i.e., fetal and neonatal, as potential periods of particular vulnerability to lasting effects of toxic environmental insult from PCB contamination.



### Take Home Message:

Exposure of unborn children to pollutants may have detrimental implications long into adulthood, although maternal exercise may prevent toxicant-induced negative transgenerational effects.