

Obesity is a global epidemic that results in millions of deaths every year. It affects adults and children. Epidemiological studies indicate that maternal obesity before and during pregnancy is a risk factor for neurodevelopmental disorders in offspring such as hyperactivity, autism spectrum, anxiety, depression, schizophrenia and epilepsy. Although this is a critical social problem, precise mechanisms underlying alteration of the brain function remain unclear. Not all children of mothers who are obese during pregnancy develop psychiatric disorders, suggesting that other determinants, such as genetic predisposition might also be involved.

Lipocalin 2 (Lcn2) is a small, extracellularly secreted protein. Recent findings suggest that Lcn2 is an obesity-linked hormone that can reduce appetite. It can be synthesized in the periphery and pass the blood-brain barrier or produced locally in the brain. Research conducted in our laboratory showed that Lcn2 expression is dysregulated in offspring, plasma, and brains, delivered by obese mothers as compared to controls. In this project, we test a possible link between mothers' obesity, the expression of Lcn2, and the regulation of offspring behavior and neuron function.

Project results will significantly increase our understanding of the molecular mechanism underlying the development of offspring brain dysfunction. We hope that in the future plasma level of Lcn2 could be used as a non-invasive diagnostic marker of brain disorders in children.