Depression is one of the most common mental disorders in the general population and affects all aspects of human life. This disorder is characterized by feelings of sadness, loss of interest or pleasure, guilt, loneliness, low self-worth, disturbed sleep or appetite, low energy level, and poor concentration. The pathogenesis of depression is not fully elucidated. Over the past decade, several studies have suggested that diet could play an important role in the treatment and prevention of depression. Recent translational research brings a piece of evidence that **maternal nutrition is a risk factor to the development of brain disorders, including depression**, which increasingly affects the young population. In recent studies, our laboratory showed that a maternal high-fat diet provokes depression-like behavior in adolescent and adult offspring. However, little is known about how maternal nutritional imbalance during gestation and lactation contribute to depression in offspring. In the perinatal period, the intensive processes of myelination contribute to brain development, while any alterations during this crucial process may lead to neuropsychiatric disorders, including depression. Since most of the brain development occurs prenatally and during lactation, maternal nutrition has been identified as a key factor for brain growth and maturation, **however little is known about the effect of maternal high-fat diet during gestation and lactation on myelination in offspring brain**.

Based on the above information, the aim of this project is to evaluate the changes in myelination (genes, proteins, myelin structure) induced by maternal high-fat diet during pregnancy and lactation in adolescent male and females offspring, as well as is these changes persist even to adulthood. Finally, by **feeding the offspring with omega-3 fatty acid-enriched diets we will try to reverse the myelin impairment to prevent depression in adult offspring.**

There is no doubt that this project will bring solutions to global challenges in the maternal nutrition care process and may limit the risk of depression in successive generations. **Additionally, it will lead the research into new directions by providing important insights for preventing and/or developing targeted therapies for humans suffering from depression**.