Obesity is a global epidemic and one of the most important reasons responsible for reduced life expectancy. The trend is alarming in children and adolescence, which means that the epidemic will affect also adulthood and bring growing health implications for the next generation. As reported in clinical and preclinical research, only a fraction of the population develops obesity while others are obesity-resistant. There is still an open question why individuals subjected to palatable food (rich in fat and sugar) differ in susceptibility to develop obesity and which mechanisms are lined with this predisposition. Recent findings propose altered brain mechanisms linked with hedonic aspects of feeding and reward processing. The regulation of food intake and energy balance involves several neurotransmitters, including GABAergic signaling. There is no data about the relationship between long-term exposure to palatable food, adolescent male and female subjects, individual predisposition to the development of obesity, and brain $GABA_B$ receptors.

In the present project, we will address the following questions: (i) What are $GABA_B$ receptor-associated changes in several brain areas of adolescent rats after long-lasting exposure to high- fat-sugar diet, (ii) How sex differences affect the development of obesity and addiction-like phenotype, (iii) What are behavioral predictors of susceptibility to obesity in adolescent rats, and 4) Is it possible to reverse obesity phenotype with pharmacological tools based on $GABA_B$ receptor signaling in rats? This project will combine behavioral, molecular, neurochemical, imaging, and electrophysiological tools in Wistar rats that underwent a 12-week feeding program with a palatable diet.

There is no doubt that this project will uncover mechanisms underlying propensity to overeat and bring solutions to global challenges in the nutrition care process. Additionally, it will lead the research into new directions by providing important insights for developing targeted therapies for human obese males and females. Since obesity in children and adolescents (and later in adults) exerts an enormous medical, financial and emotional burden on world societies, results coming from this project will help to reduce the above consequences of this disorder. If significant results will be found in pharmacological studies with $GABA_B$ receptor ligands analyses, these data will generate strong interest in developing drugs based on this new strategy.