The project aims to understand the level and role of omentin-1 in regulating the neuroendocrine function of the hypothalamus, in which neurons produce gonadotropin-releasing hormone (GnRH). The hypothalamus is a central gland responsible for maintaining the body's internal homeostasis, including reproductive function. Female fertility is strongly dependent on the dynamic interaction between signals from the external environment and the body's internal environment. Disruptions in the production of key neurohormones, such as GnRH, produced by hypothalamic neurons, affects the reduction of sex hormone levels, delay or absence of puberty, and reduced competence of gametes, manifested as abnormal ovulation, contributing to the complex etiology of female infertility. Additionally, reduced fertility in females is associated with various reproductive disorders, such as hypogonadotropic hypogonadism, hyperprolactinemia, and polycystic ovary syndrome. Moreover, during the menstrual cycle in women or the estrous cycle in animals, the secretion profile of GnRH, gonadotropins, and steroid hormones changes. This is further influenced by chronic undernutrition or excessive caloric expenditure, activating a range of proteins and peptides, including hormones secreted by adipose tissue - adipokines. However, many of these factors and their mechanisms of action remain unexplained. The research hypothesis of this project proposes that omentin-1 is a novel link between the regulation of the body's energy metabolism and female reproduction at the level of the hypothalamus. Omentin-1 is an adipokine whose main function is to maintain energy homeostasis and its level changes depending on the body's energy state. Reduced levels of omentin-1 have been noted in the plasma of overweight and obese women compared to those of normal weight; similar trends have been observed in pigs. The first aim of the project is to determine the level and localization of the protein omentin-1 with GnRH and proposed integrin receptors αvβ3 and αvβ5 in the mediobasal hypothalamus (MBH) of neurons synthesizing GnRH during the estrous cycle of pigs. The second phase of the study will explain the role of omentin-1 in regulating GnRH and its impact on the global gene profile in the pig hypothalamus. Pigs are an excellent experimental model for studying various physiological and pathological processes due to their significant anatomical and functional similarities to humans in many internal organs. The results obtained will contribute to expanding knowledge about a new regulator involved in controlling female reproduction at the hypothalamic level, regulating GnRH levels. Considering that disruptions in the synthesis and secretion of GnRH lead to numerous reproductive pathologies at the pituitary and ovarian levels, resulting in reduced fertility or infertility, the results of the proposed project may have clinical significance in diagnostics and contribute to the development of new therapeutic methods.