Abstract

The gut microbiota is a key factor influencing the function of many organs in the human body, including the nervous, immune, and endocrine systems. This dynamic ecosystem can be modulated by diet, age, environment, even medication. The balanced composition of the microbiota is crucial for individual health, and its disruption leads to dysbiosis. The connection between the gut and the central nervous system is mediated by the microbiota-gut-brain axis. This axis consists of several pathways interconnected to mutually regulate their functions. Among the major components of the axis are the neural pathway, led by the vagus nerve, the immune pathway, and the endocrine pathway, including the HPA axis. Recent studies suggest that probiotic bacteria have the ability to partially rectify dysbiosis and alleviate its consequences for the organism.

This thesis focuses on researching the impact of gastrointestinal tract microbiota on the behaviour, immunity, and neuroendocrine aspects of mice. It delves into experimentally inducing dysbiosis using antibiotics and subsequently addressing it with the probiotic bacterium *Escherichia coli* O83:K24:H31. The aim is to determine whether these probiotics can mitigate the adverse effects of dysbiosis on the immune and neuroendocrine systems, as well as behavioural regulation.

Keywords: Dysbiosis, *Escherichia coli* O83:K24:H31, anxiety, depression, gut – brain axis, HPA axis, probiotics, mucosal imunity