Bacteria belonging to the mycobacteria group are known as dangerous pathogens causing tuberculosis and leprosy. Their high resistance to environmental factors and many antibiotics is due to the presence of a thick and impermeable cell envelope. The processes involved in cell envelope synthesis and their regulation remain largely unexplored and are the focus of this project.

Preliminary analyses suggest that the mycobacterial cell cycle is closely coordinated with cell envelope biosynthesis. This project aims to investigate the function of proteins involved in this coordination. We will analyze the effects of reducing the levels of selected proteins on cell growth and their susceptibility to antibiotics. Additionally, we will conduct microscopic analyses of the localization and dynamics of these proteins within the cells.

Furthermore, we will examine how the depletion of these proteins affects the ability of mycobacteria to infect host organisms. These studies will be carried out using *Danio rerio* (zebrafish) infected with *Mycobacterium marinum*.

We anticipate that the results of our research will contribute to a better understanding of the biology of mycobacteria, particularly the mechanisms coordinating their replication with cell envelope biosynthesis. Our studies may help identify new antibiotic targets and support the development of novel anti-tuberculosis therapies.