The aim of the presented project is to develop a multi-component anti-*Campylobacter* vaccine for poultry. *Campylobacter* spp. are, in addition to *Salmonella*, the most common cause of food borne human illnesses, manifested by diarrhea of varying severity. Additionally, among others as a result of growing number of people with immunodeficiency, more and more cases of serious complications associated with *Campylobacter* infections (systemic infections, autoimmune diseases) have been recently reported.

The main source of human infections by *Campylobacter* is improperly prepared poultry meat. *Campylobacter* colonize the digestive tract of birds at very high level (up to 10^9 CFU/g intestinal content) without causing serious symptoms. Food can become contaminated at any stage during its production, processing or cooking. Studies have shown, that over 50% of poultry carcasses available on the Polish market are contaminated by *Campylobacter*. Poland is the largest producer of poultry meat in the Europe. The authorities of the EU consider an issue of introducing strong regulations concerning the allowed content of live *Campylobacter* cell in poultry meat. Thus it is necessary to take preventive measures to eliminate or significantly reduce the content of bacteria in the intestines of birds. Reducing contamination of chicken carcasses by *Campylobacter* could lead to a reduction in the number of human campylobacteriosis, and thus, to a reduction in health care costs. The development of new effective methods of chicken's prevention of *Campylobacter* colonization and dissemination of their use will certainly be beneficial for the poultry industry.

The presented project proposes to create a vaccine for poultry consisting of two hybrid proteins containing epitopes of several *Campylobacter* antigens, which should trigger a strong immune response. So far, the most commonly tested formulations containing only one antigen *Campylobacter* have induced unsatisfactory protective effect. We propose to employ a two-stage scheme of immunization. First, purified hybrid proteins will be encapsulated in liposomes and then they will be administered for chicken embryos 2-3 days before hatching (primary vaccination, *in ovo*). Live bacteria of *Lactobacillus* genus presenting generated hybrid proteins on their surface, will be employed as a booster/s administered to chickens after hatching. Lactic acid bacteria (LAB), which include members of *Lactobacillus* genus, are predominant in the chicken microbiota and some of them have been classified as probiotics. Experiments conducted in our laboratory led to the identification of several isolates of *Lactobacillus* strains, that constitute chicken intestinal tract microbiota. Some of them exhibit strong anti-*Campylobacter* activity *in vitro*. Carrier, that stays longer in the immunized body should result in more efficient induction of the immune response. Thus, we propose to evaluate chicken intestinal tract colonization by *Lactobacillus* strains, with the goal of identifying strains which can consistently colonize or persist for an extended period of several weeks. The adhesion to epithelial surfaces is a critical step in the chicken's intestine colonization by *Lactobacillus spp.* So, we intend to analyze the mechanism of adhesion process in detail. This strategy will allow the selection of the most efficient LAB strain from the standpoint of anti-*Campylobacter* vaccine generation.