DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

The immune response which is a defense reaction of the body against pathogens plays an important role in maintaining homeostasis. It involves, among others, acute phase proteins, and antimicrobial peptides - defensins and cathelicidin.

Acute phase proteins belong to a large group of serum proteins. Their levels vary depending upon the health state of the organism. Factors affecting their expression are bacteria, viruses as well as injuries. During the infection levels of acute phase proteins may be increased (positive acute phase proteins) - haptoglobin (Hp), amyloid levels (SAA), fibrinogen (Fb), ceruloplasmin (Cp), α1-acid glycoprotein (AGP), α1-antitrypsin (AAT) and lactoferrin (Lf) or decreased - transferrin (Tf), transhyretin (TTR) and albumin. In previous studies their role as markers of inflammation, for example mastitis in cows or in sheep has been noted.

In the immune response antimicrobial peptides such as cathelicidins and defensins also take part. These peptides are active against Gram-positive and Gram-negative bacteria, enveloped viruses as well as fungi. Defensins are released upon contact with the pathogens, while higher level of cathelicidins was observed in healthy compared to the infected animals. They show direct activity against pathogenes but they also activate leukocyte. Their activity against pathogens is based on their interaction with the cell membranes of microorganisms, that involves the creation of holes in the membranes which leads to the cell death. By now, in mammals, 30 cathelicidins have been identified, six of them in goats: bactenecin 5 (BAC5), bactenecin 7.5 (BAC7.5), cathelicidin 6 (MAP28), cathelicidin 7A (MAP34A) and B (MAP34B), and cathelicidin 3.4 (ChBac3. 4). There are two main groups of defensins - alpha-defensins and beta-defensins. In goats, so far, only two beta-defensins: GBD GBD-1 and-2have been detected,.

One of serious health problems in goats is high prevalence of with small ruminants lentivirus (SRLV) infection. This virus, in adults, causes chronic disease manifested mainly with arthritis. One of its target organs outside the joint is a udder, and therefore kids are infected via milk. Long-term disease leads to the emaciation and accelerated culling or falls. If the disease develops in several-month-old kids, it causes inflammation of the brain and rapid death of an animal. This disease causes large economic losses worldwide, so it is important to understand processes in infected organism including epigenetic regulations of expression of genes involved in coping with SRLV.

Epigenetics is the science dealing with the study "*outside* conventional *genetics"*. The epigenetic changes in gene expression are caused by the switching genes on or off through attaching/detaching a methyl group without changes in the DNA sequence. Attaching methyl groups (-CH3) to cytosine (grouped in CpG islands of gene promoters) decreases expression of the given gene (and vice versa). Previous studies have shown an importance of epigenetic regulation. DNA methylation in mastitis in cows caused by *Escherichia coli* effected expression of αS1-casein gene. Similar results were obtained when mastitis infection was caused by *Streptococcus uberis*. The impact of nutrition on the methylation state of the β-casein gene, and hence changes in its expression were also proved. On the other hand, many factors influence the profile of expression of non-coding RNA (including miRNA), which regulates gene expression, DNA methylation, and controls modification of histones. The importance of activity of acute phase proteins was documented in studies conducted on sheep during infection with Peste des Petit Ruminants virus, in cows during Respiratory Syncytial Virus, Bovine Viral Diarrhea Virus, and Foot and mouth disease virus infections.

We assume that viral infections cause changes in acute phase proteins, and antimicrobial peptides expressions by epigenetic changes in methylation levels of genes in immune response, as well as by changes in microRNA (miRNA) profile. So far, there is little information on the effects of viral infections to the pattern of DNA methylation and miRNA profile selected in this study genes, thus the aim of the project is to determine the effect of infection of goats with SRLV on these epigenetic phenomena occurring in infected organisms. Furthermore SRLV is related to HIV, therefore, goats infected SRLV may provide an animal model for the study on the influence of retroviral infection in humans.