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Cytokine expression in the blood of goats infected with small ruminant lentivirus

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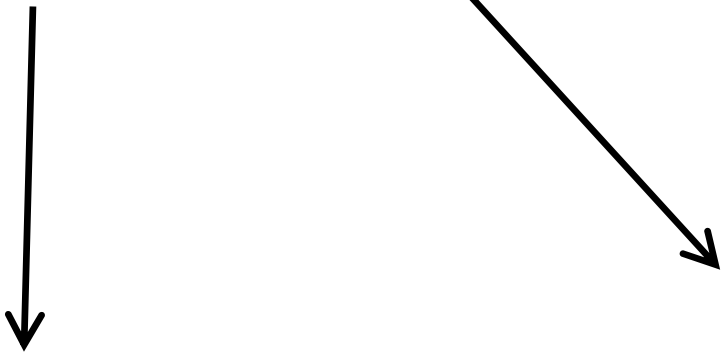
INNOWACYJNA GOSPODARKA
NARODOWA STRATEGIA SPÓJNOŚCI

IMMUNITY

One of the most important factor
of the proper functioning of organism

IMMUNITY



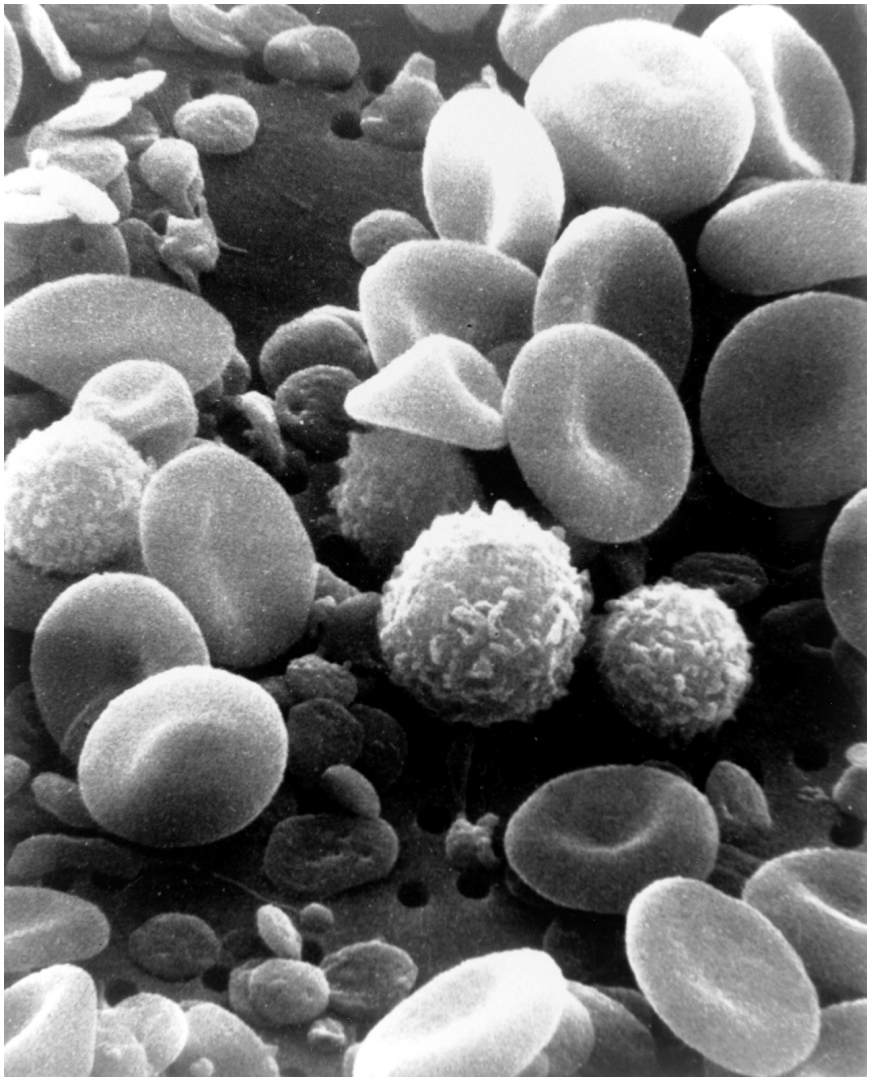
innate

- *first line of the defense against pathogens*
- *immediate reaction*
- *inaccurate reaction*
- *no immune memory*

adaptive

- *long term acting*
- *specific and effective reaction*

CELLS CONNECTED WITH THE INNATE IMMUNITY

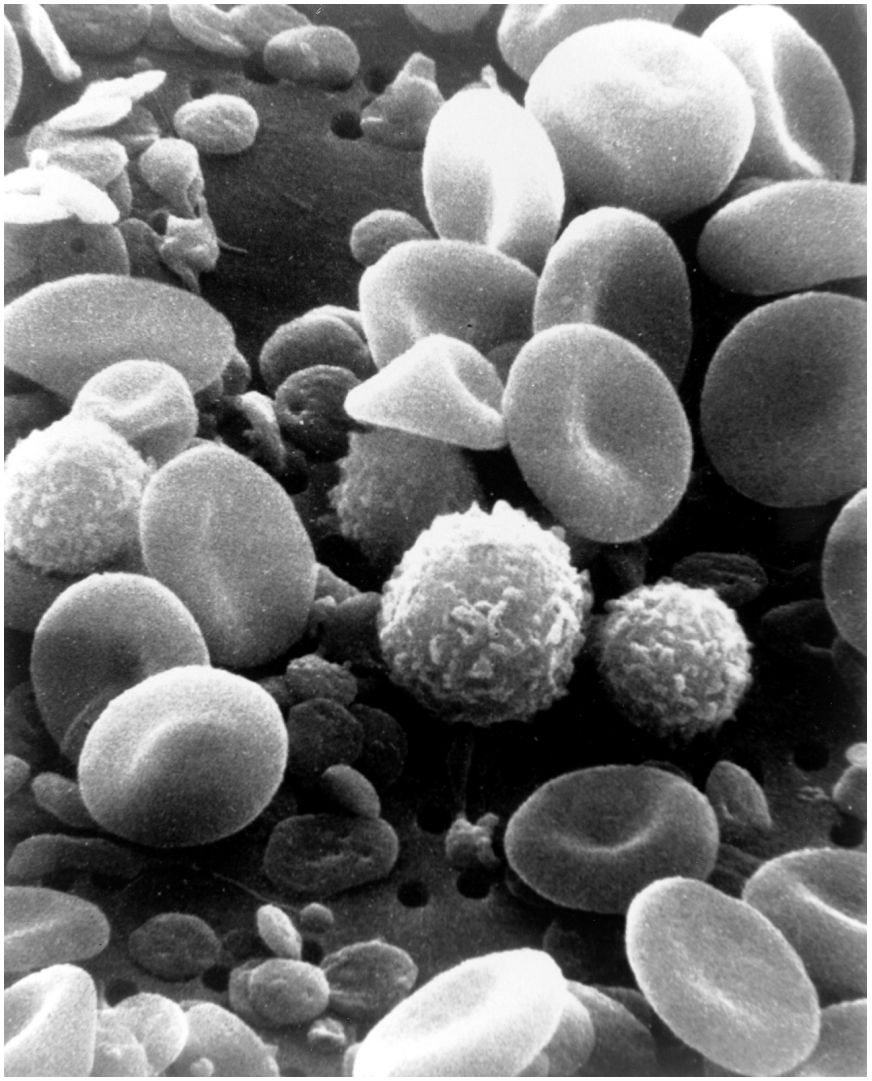


Leukocytes:

- *Monocytes*
- *Macrophages*
- *Neutrophils*

Epithelial cells

ANTIMICROBIAL PROTEINS CONNECTED WITH THE INNATE IMMUNITY



Leukocytes:

- *Monocytes*
- *Macrophages*
- *Neutrophils*

Epithelial cells

Interferons

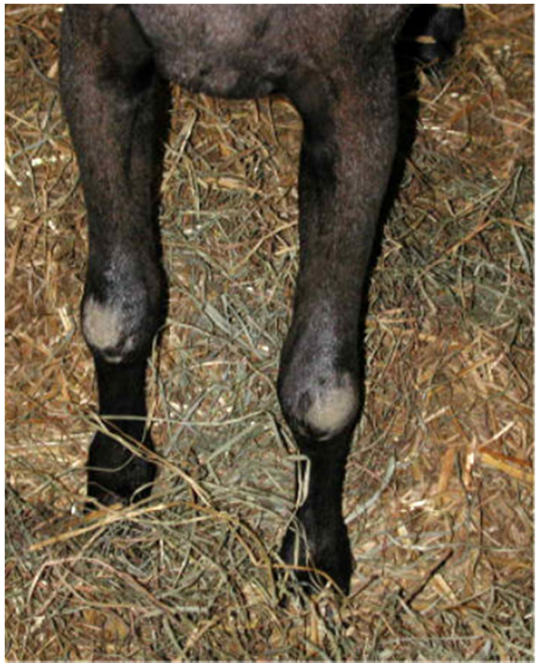
Interleukines

Small Ruminant Lentiviruses:

Caprine arthritis and encephalitis virus

Maedi-Visna virus

Ovine Progressive Pneumonia virus

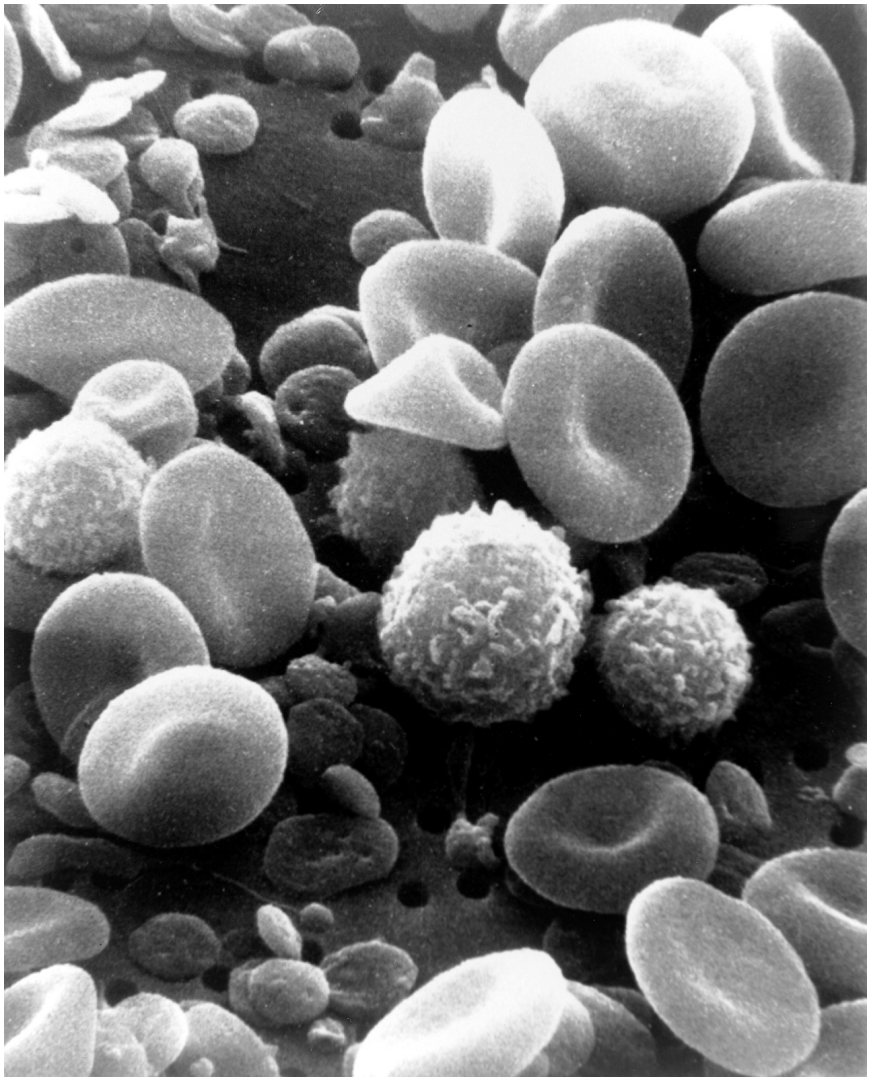


Retrovirus family – *Retroviridae*

Lentivirus subfamily – *Lentivirinae*

The disease

CELLS CONNECTED WITH THE INNATE IMMUNITY



Leukocytes:

- *Monocytes*
- *Macrophages*
- *Neutrophils*

Epithelial cells

SRLV infection

Literature data about innate immune response to viral infection

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Key words
cells / CD8

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Innate immunity to virus infection

Expression of Cytokine mRNA in Lentivirus-Induced
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Viral load, organ distribution, histopathological lesions, and cytokine mRNA expression in goats infected with a molecular clone of the caprine arthritis encephalitis virus

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and composition of inflat
terized at the time of the
ceivable, however, that

stimulating agent. Electrophoretic mobility shift assays demonstrated that, in contrast to effects of human immunodeficiency virus infection of macrophages, CAEV infection had no effect on the level of constitutive nuclear factor-κB (NF-κB) activity or on the level of LPS-stimulated NF-κB activity, suggesting that NF-κB is not involved in altered regulation of cytokine expression in CAEV-infected cells. In contrast, activator protein 1 (AP-1) binding activity was decreased in infected macrophages. These data show that CAEV infection may result in a dysregulation of expression of cytokines in macrophages. This finding suggests that CAEV may modulate the accessory functions of infected macrophages and the antiviral immune response in vivo.

Objective

The aim of the project was the determination of mRNA and protein expression of pro-inflammatory cytokines in the blood collected from goats infected with small ruminant lentivirus

Hypothesis

There are differences in gene and protein expression of pro-inflammatory cytokines in the blood,
of uninfected and SRLV infected goats.

Expected results

Determine which pro-inflammatory cytokines are involved in the immune response against SRLV.

Determine deregulated expression of pro-inflammatory cytokines in the blood leukocytes.

Animals

Dairy goats

Polish White Improved and Polish Fawn Improved
Healthy and SRLV infected
without *mastitis* and in generally good condition

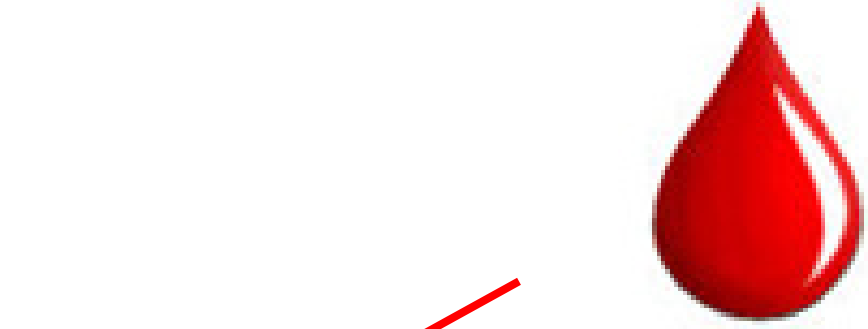
2 groups – 26 individuals

experimental – animals infected with SRLV

control– healthy animals, free of SRLV

Analogous groups – breed and age

MATERIAL AND METHODS

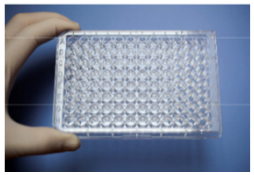


RNA

SERUM

cDNA

ELISA

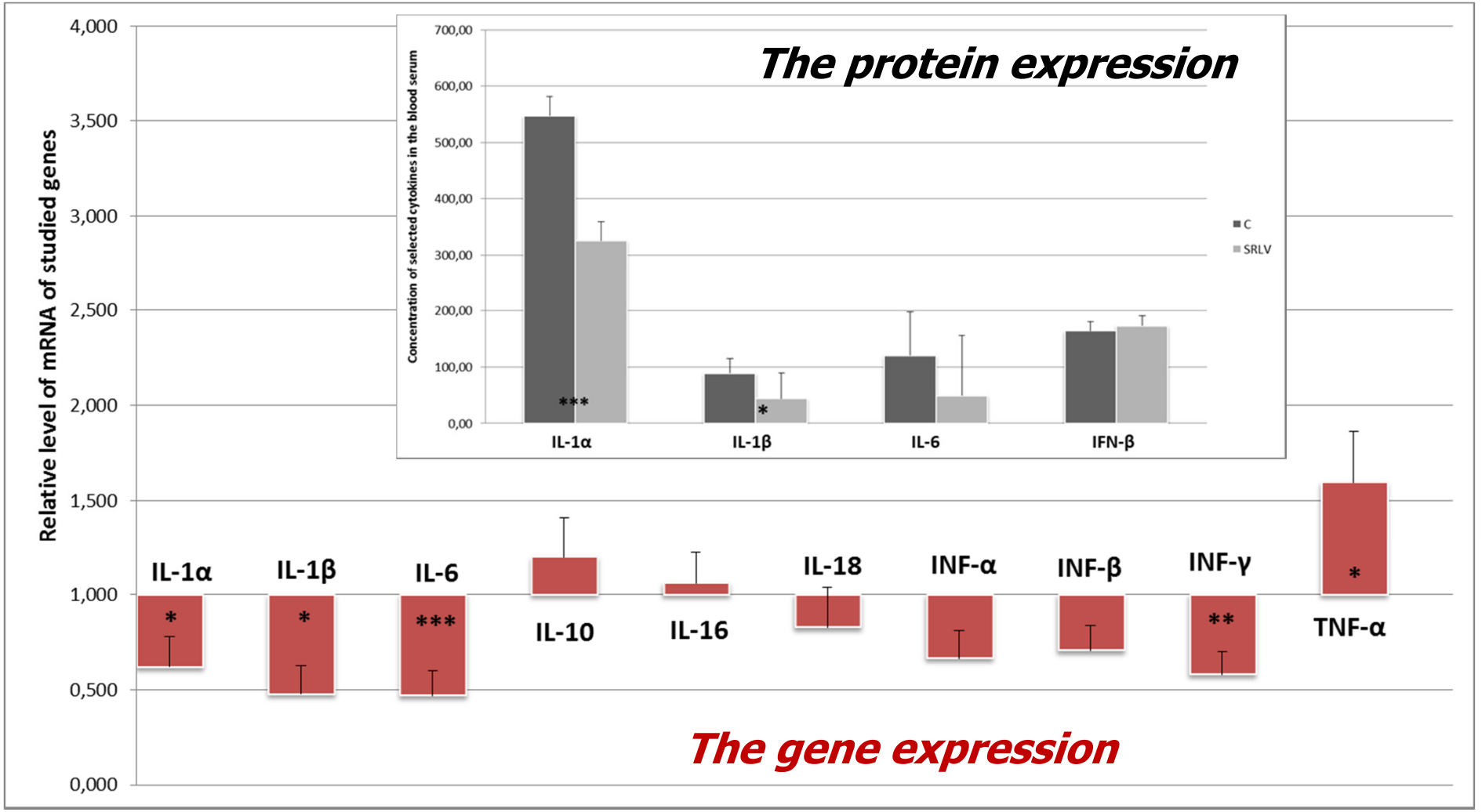


Real Time PCR

TARGET CYTOKINES

INTERLEUKINES	INTERFERONS	TNF SUPERFAMILY MOLECULES
IL-1α	*INF-α*	*TNF-α*
IL-1β	*INF-β*	
IL-2	*INF-γ*	
IL-4		
IL-6		
IL-10		
IL-12		
IL-16		
IL-18		

RESULTS


Relative level of mRNA of studied genes
4,000
3,500
3,000
2,500
2,000
1,500
1,000
0,500
0,000
IL-1α
IL-1β
IL-6
IL-10
IL-16
IL-18
INF-α
INF-β
INF-γ
TNF-α
*
*
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*
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*
The gene expression
The protein expression
Concentration of selected cytokines in the blood serum
700,00
600,00
500,00
400,00
300,00
200,00
100,00
0,00
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*
IL-1α
IL-1β
IL-6
IFN-β
C
SRLV

CONCLUSIONS

1. Decreased gene and protein expression of IL-1α, IL-1β and IL-6 suggests impaired function of the immune system of SRLV infected goats, preventing them the fight against disease.

2. mRNA levels cannot be used as surrogates for corresponding protein levels without verification.

3. Differences between gene and protein expression of TNF-α and INF-γ may suggest several post-transcriptional, post-translational modifications, or protein degradation not connected with the effect of the virus.

4. It is necessary to verify the results using another method (Western blott) or another biological material (plasma).

PLANS FOR THE FUTURE

1. Verification of obtained results

2. Epigenetic study of the effect of SRLV
on the regulation of gene and protein expression

Thank You for the attention