DEPARTMENT OF IMMUNOLOGY
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RESEARCH PROBLEMS

• AGE-RELATED CHANGES OF IMMUNE RESPONSE

• HORMONAL MODULATION OF IMMUNE RESPONSE

• IMMUNOLOGICAL ASPECTS OF CARDIOVASCULAR DISEASE
PREVIOUS AND CURRENT
ROLE OF NATURAL KILLER CELLS IN AGEING

• We found that successful healthy ageing is associated with a shift towards high cytotoxic activity of Natural Killer cells. The high values of NK-associated parameters may be preserved until very old age.
• Healthy elderly people have an increased number of the regulatory NK cells with intra-cellular IFNγ.
• This status correlates with anti-viral immune response in the elderly what we observed on the natural model of vaccination against influenza.
We found that ageing process is accompanied by an enhanced expression of pro-inflammatory cytokines. Low immune response to vaccination in the elderly, who stayed apparently healthy, is associated with an increased expression of genes of such inflammatory cytokines as: Interleukin 1, TNF$\alpha$, Interleukin 6, Interleukin 12. Enhanced expression of pro-inflammatory cytokines was associated with carrier status of latent CMV infection in the elderly low responders to influenza vaccination.

HORMONAL MODULATION OF IMMUNE RESPONSE

ESTROGENS DOWN-REGULATE PRO-INFLAMMATORY AND UP-REGULATE ANTI-INFLAMMATORY CYTOKINES
Non-stimulated ex vivo monocytes of healthy postmenopausal women express the TNF gene.

- This may be the effect of estrogen deprivation.
Non-stimulated ex vivo monocytes of healthy postmenopausal women express the IL-6 gene

This may be the effect of an exaggerated TNF expression which in turn stimulates IL-6 gene expression

Non-stimulated PBMC of postmenopausal women produce more bioactive TNF and IL-6 compared to young controls.
In vitro effects of 17β-estradiol on the spontaneous TNF and IL-6 production by PBMC of postmenopausal women

![Graph showing the effects of 17β-estradiol on TNF and IL-6 production](image)

* p<0.05
In vivo effects of $17\beta$-estradiol treatment on the spontaneous TNF and IL-6 production by PBMC of postmenopausal women
Non-stimulated PBMC of postmenopausal women produce less IL-10 compared to young controls.
In vitro effects of 17β-estradiol on the IL-10 gene expression in the PBMC of postmenopausal women
CURRENT RESEARCH

IMMUNOLOGICAL ASPECTS OF CARDIOVASCULAR DISEASE
Polymorphism of the human Interleukin 6 (IL6) gene at position –174G/C in coronary heart disease (CHD) patients.

**YEARS FROM ONSET OF THE DISEASE TILL AN OPERATION**

**CONCENTRATION OF IL6 IN VITRO CULTURES**
Polymorphism of the human atrial natriuretic peptide (ANP) gene in coronary heart disease (CHD) patients

- Polymorphism is analysed in CHD patients with different cardiac arrhythmias occurring in (or without) association with cardiac surgery.
- The A2A2 allele combination carriers constitute 55% of the whole group of CHD patients and seem to be protective from atrial fibrillation.
INFECTIONS WITH CMV AND CHLAMYDIA PNEUMONIAE IN CHD PATIENTS

positive control

185 bp

sample of mononuclear cells
Analysis of function of CD14+CD16+ monocytes

- detection of monocyte populations by cytophotometric technique
- tests revealing presence of intra-cytoplasmic cytokines in CD14+CD16+ monocytes
- in vitro cultures analysing an effect of Lovastatin on spontaneous and LPS-induced synthesis of intra-cytoplasmic IL6
CD14+CD16+ BLOOD monocytes in CORONARY HEART DISEASE and controls
Human cytokine array system – expression profile of multiple cytokines

- In serum of the patients with coronary heart disease, with CCS 3 and 4 grade of the angina pectoris, we found an expression of 18 new cytokines.