

## MUCOSAL IMMUNITY OF THE LOWER URINARY TRACT IN WOMEN WITH CHRONIC BACTERIAL INFECTIONS

### Hypothesis / aims of study

In 77.7% cases the cause of uncomplicated urinary tract infections in women is an uropathogenic E. coli. Therapy of chronic cystitis is based on antibiotic therapy without the use of immunomodulators.

Objective: To study effect of E. coli lysate (Uro-Vaxom) on the urethra level of mRNA defensins in women with recurrent infection of the lower urinary tract (RILUT).

### Study design, materials and methods

The study included 40 women with RILUT in age from 18 to 68 years who received lyophilized E. coli lysate (per os) with antibacterial drugs. We studied the level of Def 1-a and Def-103b mRNA gene expression in urethra by using RT-PCR.

### Results

The level of Dev-103b expression was reduced before the treatment (0.49 EU) as compared with healthy individuals. Treatment promoted the improvement of Def-103b level after 1 month (2.84 EU) and 3 months (2.27 EU). However, 6 months after the therapy Def-103b levels declined again to 1.54 EU (by 1.8-fold of the normal level,  $p < 0,05$ ). Therapy elevated the level of Def-1a gene expression in 1 month by 4.6-fold, 3 months – by 2.9-fold. In 1 month the treatment with combined regimens succeeded in achieving of sterile urine in 27 cases (67.5%), and in 9 cases – in reduction of microbial number in urine culture. Following 3 months of treatment sterile urine remained in 23 cases, and 6 months - only in 16 cases (40%).

Table 1. Effect of Uro-Vaxom on Def-103b and Def-1a Gene Expression in the Urinary Tract in Patients with Recurrent Infections of the Lower Urinary Tract

Sampling Time	Def-103b M±SD Me (LQ-UQ)	Def-1a M±SD Me (LQ-UQ)
0 month	0,49±0,17# 0,45(0,34-0,68)	0,58±0,21# 0,62(0,37-0,77)
1 month	2,93±0,29* 2,89(2,67-3,2)	2,69±0,39* 2,8(2,3-3)
3 months	2,27±0,42* 2,25(1,9-2,55)	1,69±0,37* 1,8(1,3-2)
6 months	1,54±0,65*# 1,8(0,9-1,9)	0,75±0,29# 0,72(0,55-0,99)
Control (Healthy)	2,84±0,44 2,9(2,5-3,1)	2,4±0,47 2,47(2-2,9)

Me - median values, LQ-UQ - the lower and upper quartiles

\* -  $P < 0,05$  – differences compared with the group before treatment (Mann-Whitney U test)

# -  $P > 0,05$ - differences compared with the control (healthy)

### Interpretation of results

The effect is probably related to the activation of immune system cells in the mucous membranes of the urethra. These cells can recognize the molecular structure of E. coli by PRRs. Further, there is a cascade of cytokine activation, involving neutrophils, macrophages and other cells of the immune system to the focus of inflammation. As a result of these events antimicrobial peptide gene expression occurs including Def-1a and Def-103b; these molecules play an important role in protecting against urethra infection.

### Concluding message

Lysate of E. coli in combination with antibacterial drugs is justified as it will reduce the number of exacerbations per year and improve the quality of life of patients with recurrent infection of the lower urinary tract. Lysate of E. coli

increased the levels of gene expression of defensins Def-103b and Def-1a, which indicates the corrective effect on the innate effectors of mucosal immunity.

Disclosures

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**Ethics Committee:** Russian Academy of Medical Science Institutional Review Board **Helsinki:** Yes **Informed Consent:** Yes