

## Abstract:

Cystic fibrosis (CF) is an autosomal recessive disease caused by the mutations of the *CFTR* gene encoding CFTR protein which serves like a field ion channel in the body. For the patients suffering from CF is a typical increased adherence of bacteria to lung epithelium caused by the accumulation of thickened mucus on the surface of air passages and varied glycosylation in lungs. These conditions increase sensitivity of patients who suffer from CF to bacterial infections of lungs caused by *Pseudomonas aeruginosa* (PA). A considerable role in the pathogenicity of PA plays its virulent factors such as for example PA-IL and PA-IIL lectins, which enable an adherence of PA on the host cells joining on its surface receptors containing D-galactose (PA-IL) or L-fucose (PA-IIL). In this thesis the main aim was to verify an ability of given anti-PA-IIL chicken antibodies and multivalent PA-IIL inhibitors (specifically of the so-called fucose-based glycoclasters) to prevent PA adherence on lung epithelial cells and to stop from a formation of the PA infections at the patients.

A prophylactic impact both antiadhesive agents (anti-PA-IIL antibodies, fucose-based glycoclasters) was studied *ex vivo* on the model system of immortalized lung epithelial cell lines CuFi-1 isolated from the ill patients with CF and NuLi-1 isolated from the healthy individuals. For the adhesive test was as a bacterial model used a control base of bacteria PA (ST 1763). Lung epithelial cells and bacterial cells were fluorescently labeled with PKH dyes.

For the experimental realizations were chosen various fractions IgY antibodies targeting at PA-IIL lectin. At the lines of CuFi-1 IgY isolated fractions before and after immunization of chicken did not show any effect. By contrast, at another specific anti-PA-IIL antibody was confirmed protective effect against PA adhesion on epithelial cells.

Other studied antiadhesive substances were synthetic glycoclasters also targeting at lectin PA-IIL. The ability to influence the adherence PA to lung epithelial cells showed at the lines of CuFi-1 as tetravalent glycoclaster as well as divalent glycoclaster in higher concentration too. Fucose-based multivalent PA-IIL inhibitors present potential facility of prevention of the infections caused by PA.

**Key words:** cystic fibrosis, lung epithelial cells, *Pseudomonas aeruginosa*, lectin PA-IIL, chicken antibodies IgY, glycoclasters.