

Opravný list bakalářské práce

Přírodovědecká fakulta Univerzity Karlovy

Název práce: Studium profylaktického účinku glykoklastrů na modelu bakteriální adherence

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Oprava anglického abstraktu:

Cystic fibrosis (CF) is an autosomal recessive disease caused by the mutations of the *CFTR* gene encoding protein CFTR, which serves as an ion channel in the body. Increased adherence of bacteria to lung epithelium is typical for patients suffering from CF and is caused by the accumulation of thickened mucus on the surface of the respiratory tract and glycosylation modifications in the lungs. These conditions increase the 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 PA-IL and PA-IIL lectins, which enable 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 the 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 the formation of the PA-infections in the patients.

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

Various fractions of antibodies (IgY) targeting PA-IIL lectin were chosen for the experiments. Isolated fractions of IgY before and after immunization of chicken did not show any effect in CuFi-1 cell lines. On the contrary, protective effect against adhesion of PA on epithelial cells was confirmed using a different specific anti-PA-IIL antibody.

Other studied antiadhesive substances targeting also lectin PA-IIL were synthetic glycoclusters. Tetravalent glycocluster as well as divalent glycocluster in higher concentrations showed the ability to influence the adherence of PA to lung epithelial cells in CuFi-1 lines. Fucose-based multivalent PA-IIL inhibitors present a potential facility to prevent the infections caused by PA.

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