

## **Immunity against infections in Arctic region compared to Central Europe region.**

It is common belief that exposure to low temperatures increases the risk of respiratory tract infections and that in winter months people get cold more often. It remains question of debate if it is the result of higher amplification of pathogens (viruses, bacteria) or defects in function of our immune system. Immune system role is to protect our organism from many infection diseases. In general immune system is divided into acquired immune system (including lymphocytes and produced by B cells antibodies) and innate immune system (including natural barriers, macrophages, neutrophils and protective proteins. The result of drops in the temperature or exposure to very low temperatures can be impaired immune system and in result increased susceptibility to infections. One of the mechanisms protecting us from infections are defensive proteins of innate immunity, also referred to as natural antibiotics (i.e. cathelicidins). Cathelicidins are different in each type of organism, in human being cathelicidin LL37 is produced by various cell types neutrophils, macrophages and also epithelial cells. It has antimicrobial properties and can protect us from infection.

Hypothesis: People living in certain regions are accustomed to certain temperatures. When the temperature falls in winter months, people fall ill more often because they are not used to lower temperatures. Such vulnerability to infections is probably due to the impairment of the immune system. The hypothesis that people travelling to cold regions have a lowered production of defensive proteins will be verified.

Test Method:

Before travelling to the Arctic I will make questionnaires on websites in different countries (for Arctic regions- questionnaires will be translated to English and Russian and send to facebook groups in different countries and inhabitants of Arctic regions). We will be able to check how many people from each geographic region were sick each year. Based on these questionnaires we will be able to check how many people in each country are sick with airway infections. I created Polish version of questionnaire and send it to check if people will be eager to respond to it and provide information on their infections. Three hundred seventy eight people filled the questionnaire and send it back. The mean age of the responders was 17,9 years and the mean number of common colds was 2,67 and 3,26 times during the last year they had sore throat. The preliminary study shows that facebook can serve as a tool to ask people from different geographical regions about their immunity and susceptibility to infections and I would like to compare results from my country with results from other countries (Canada, USA-Alaska and Russia).

To check if people in Arctic region produce less cathelicidines (LL-37) I will collect swabs from humans noses and/or oral cavities and analysing the concentration of proteins in three time points - before travelling to the Arctic region, right after arriving, and after one week spent in the Arctic region. These swabs will be compared with swabs from people living in the Arctic region. Swabs will be transported to the laboratory and then checked by immunoenzymatic method.