

Asthma is a civilization disease affecting over 300 million humans and causes over 250 000 deaths worldwide every year. Therefore, due to an insufficient understanding of asthma pathomechanism, available therapeutic options are mostly limited to symptoms reduction. It is possible through the implementation of therapy based on inhaled corticosteroids (ICS) administration. Unfortunately, prolonged treatment with the increasing doses of inhaled corticosteroids may lead to numerous side-effects and resistance development. Moreover, poorly controlled lung inflammation may result in the progression of irreversible changes referred to as airway remodeling. Due to the lack of effective therapeutic options, ICS non-responding asthmatics remain a significant clinical challenge. Therefore, there is a substantial need to establish novel therapeutic strategies that allow better control of inflammation during severe and steroid-resistant asthma. An exciting and extremely promising option is the implementation of mesenchymal stem cell (MSC)-based therapies decreasing lung inflammation and remodeling processes. Unfortunately, this strategy is not available in routine clinical practice due to a limited understanding of the MSC-mediated mechanisms.

Therefore in the current project, I aimed to extend the basic knowledge concerning the processes regulated by adipose tissue-derived mesenchymal stem cells (MSC) in the experimental neutrophilic asthma model.

The implementation of the proposed project will allow understanding novel MSC-mediated mechanisms leading to airway inflammation regulation. The explanation of the processes regulated by MSCs may also significantly contribute to further development of new therapeutic options, dedicated to suboptimally controlled asthmatic without the necessity of expensive cell therapy implementation.