Historically plants were an important components of medicinal preparations. Presently, in modern pharmacology plants are an important source of chemical structures in drug discovery (i.a. taxol, camptothecin, galantamine, artemisinin, vincamine). It is because compounds present in plants posses diverse structures and in contrast to synthetic one, due to its biochemical functions in plant organisms, they are likely to interact with proteins and undergo intracellular migration. It is worth underlining that between 1981 and 2010 as much as 54% of small-molecule drugs originated from natural products or was semi-synthetic derivatives of naturally occurring compounds. Nowadays due to a rapid development of research strategies there is a re-emergence of natural products for drug discovery.

The aim of the project is to find a source of potentially anti-inflammatory agents among members of the Oleaceae family. The well-established traditional use of plants from that family in the treating inflammation-associated diseases, considered parallelly with the variety of chemical structures present led to the hypothesis that they could be a rich source of novel anti-inflammatory agents.

The project fits into the current trends in modern pharmacy and will allow to select compounds able to relieve symptoms of chronic inflammation.

The project will comprise an accurate examination of chemical composition of extracts prepared from selected medicinal plant materials, active principles identification and isolation together with pharmacological examinations of isolated compounds using cell and animal models, allowing anti-inflammatory mechanism determination.

The research will be conducted for extracts obtained from different parts of plants belonging to three genera of Oleaceae family: Fraxinus (ash), Syringa (lilac) and Forsythia (forsythia). The work plan was divided into two parts: phytochemical examinations and bioactivity examinations. The main task of phytochemical part will be the analysis of extracts' composition, while from the most active ones, compounds responsible for observed bioactivity will be isolated. The bioactivity examinations will comprise of determination of extracts' and isolated compounds' influence on pro- and anti-inflammatory functions of immune cells (neutrophils and monocyte/macrophages) such as release of reactive oxygen species and cytokines. The molecular mechanism of action of chosen isolated compounds will be evaluated by examination of influence on selected cytokines' gene expression and cellular signaling pathways. For chosen, most promising compounds the influence on immune system activation on animal model will be examined.