DESCRIPTION FOR THE GENERAL PUBLIC

The goals of the submitted project are important, both from a medical, scientific and social point of view, and most important feasible. The main assumption lying behind research in the frame of the project is to find among the natural substances occurring in plants (coumarin compounds), which by virtue of their pharmacological activity may be used to treat various types of anxiety disorders. The number of people affected by pathological fears are causing real threat. According to the World Health Organization (WHO) data, almost one third of population in developed countries experienced at least once in their lives, a fear that was a serious disorder of their health. What even worse, these data appear to be underestimated, and anxiety disorders often take the form of chronic disease. These types of diseases are already one of the greatest challenges of modern medicine because they generate high social costs for individuals (impaired contact with people, disturbed family ties), societies and health care systems. In the European Union, the direct and indirect costs of anxiety disorders such as absence from work, medical expenses and premature death reach an astronomical sum of 41 billion euros.

Contemporary medicine has perceived this huge problem, creating several generations of anxiolytic drugs including commonly used beznodiazepines, which unfortunately produce many unwanted effects during treatment, such as memory disorders, psychomotor deterioration, fast-growing tolerance, or addiction. Nowadays, almost half of the patients with anxiety disorders use phytotherapy - even as a complementary therapy. Animal studies have confirmed the effectiveness of furanocoumarins (eg, imperatorins) from various organs of *Archangelica officinalis*, as well as the extracts containing the furanocoumarin syndrome as anxiolytic (anxiolytic). Very promising is the fact that effective doses were similar to the doses of synthetic drugs, which testifies to the purposefulness of the study of "green anxiolytics". Coumarin with different chemical structure are group of compounds having unique characteristics such as adequate lipophilicity, the ability to cross the blood-brain barrier and a multi-activity on the central nervous system (eg. anticonvulsant and antineurodegenerative). It is very important, therefore, for the following project, to examine as many *Apiaceae* plants as possible, which are excellent sources of natural coumarins of various types. Evaluation of anxiolytic activity will be conducted on a universal animal model, larvae of fishes *Danio rerio* (zebrafish). Testing of compounds with potential anxiolytic activity on this model is justified for economic reasons and the fact that evolutionary fear is an emotion common to all animals and its mechanisms show a high degree of homology among the different species. Compounds will be isolated by high performance counter current chromatography (HPCCC) , which is based on the separation of isolated substances between two immiscible solvent systems, one of which plays the role of a mobile phase and the other stationary (though paradoxically non-solid and liquid) . Thanks to the most modern and unique apparatus in Poland and the experience of the scientific supervisor team it is possible to obtain compounds of great purity in a very short time of tens of minutes. Substances subjected to biological testing in zebrafish and isolated with modern HPCCC methods will come from plant species belonging to the Apiaceae family. Many of these species are common weeds constitute a problem for crops and invasive species disrupting the balance in the ecosystem. These plants, for example, of various types of *Heracleum* , with the most famous of *Heracleum sosnowskyi*, due to the large quantities of essential oil (rich in coumarin) in combination with UV radiation cause a serious burns.