Photodynamic therapy (PDT) is a method of cancer treatment, alongside radiotherapy, chemotherapy, or surgical methods. The advantage of this method is a relatively low invasiveness and toxicity as well as its cosmetic value, as it does not leave any scars. Aging, stress and exposure to carcinogenic environmental factors has caused cancer to become a civilization disease of the 21$^{st}$ century, and the fight against it becomes a priority. That is why the scientists dealing with medicine and science are seeking new and better methods of effective treatment beyond current standards, searching for opportunities in physics, nanotechnology or personalized oncology.

Photodynamic therapy is based on administering a patient with an inactive compound – a photosensitizer, which accumulates in diseased tissue. Photosensitizer, upon irradiation, is able to transfer absorbed energy to oxygen molecules, which in the process become toxic to cells and to diseased tissues. As a result of the formation of reactive oxygen species, cellular processes responsible for cell death are initiated.

The photosensitizing compounds are most commonly porphyrinoids. Porphynoids are macrocyclic compounds that are widespread among living organisms and determine their existence. An example is heme present in hemoglobin or the chlorin system built into the chlorophyll structure. The physicochemical properties they possess, the ability to generate singlet oxygen as well as the absorption of light of the appropriate wavelength have prompted research groups to obtain synthetic derivatives of porphyrins by modifying their chemical structure. Examples of such synthetic analogues are phthalocyanines and planned in the proposed project porphyrazines.

Addressing the problem of cancer and development of knowledge about PDT, this project aims to obtain new porphyrazine derivatives as potential photosensitizers for photodynamic therapy. The project includes the synthesis and physicochemical characterization of the obtained chemical compounds. These macrocycles, after incorporation into liposomes, will be tested against cancer cells. The author is convinced that obtaining and studies on the proposed porphyrazines will lead to promising research results for pharmaceutical sciences. Thus obtained data could in the future be proven useful in clinical practice.