

## Research project objectives

The main goal of the project " **Interconversions of supramolecular architectures based on Schiff base ligands and transition metal ions as potential protocol of metallotherapeutics delivery**" is the creation of a new library of ligands and their complexes based on *trans*-1,4-diaminocyclohexane moiety, study on the impact of various factors on the formation of chosen supramolecular architectures and then investigation on their interactions with DNA and Bovine Serum Albumin (BSA).

The assumed goals of the proposed project are (Fig. 1):

- Synthesis of a new library of Schiff base ligands based on the *trans*-1,4-diaminocyclohexane subunit with various aldehydes.
- Design and synthesis of complexes with various d-block metal ions such as: Cu(I), Ag(I), Zn(II), Ni(II) and Pt(II) due to the created geometry of the complexes (tetrahedral, octahedral or square planar), as well as, the choice of the metal atom and counterion with respect to the structure-activity correlation.
- Structure and spectroscopic characteristics of the obtained compounds by means of X-ray diffractometry of single crystals, NMR, IR spectroscopy, elemental analysis and ESI-MS.
- Investigation of the binding potential of the synthesized complexes with CT-DNA and BSA.
- Study on dynamic interconversions of supramolecular compounds as potential protocol for smart delivery of drugs.

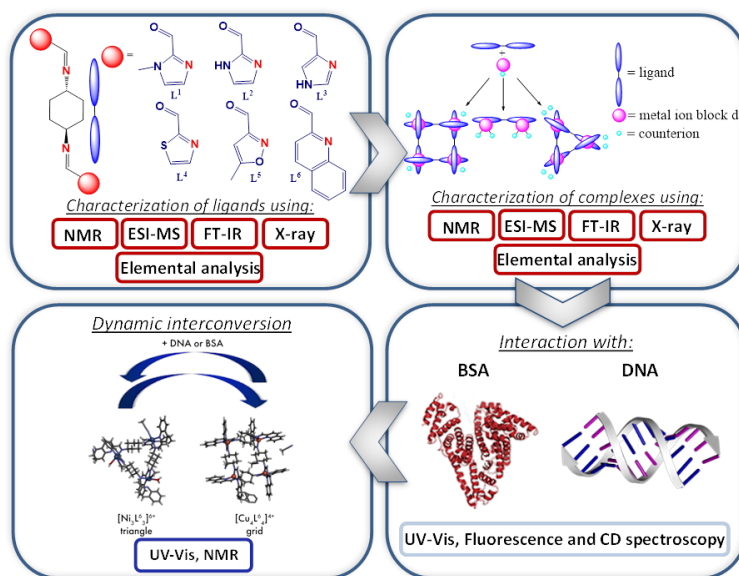


Fig. 1 Scheme outlining the main goals of the project.

## Description of research

The research assumes obtaining a library of ligands based on *trans*-1,4-diaminocyclohexane, as well as the synthesis of complex compounds with these ligands and metal ions such as: Cu(I), Ag(I), Zn(II), Ni(II) and Pt(II). Metal ions have been selected to form various types of supramolecular structures. Spectroscopic and structural characterization will be carried out using different techniques for all obtained compounds. The next step will be investigation the binding potential of the synthesized complexes with DNA and BSA. Moreover, impact of the DNA and BSA on the transformation of complex compounds will be studied as a forward-looking plan.

## Research project impact

One has to keep in mind that 1,4-diaminocyclohexane exists in *cis* and *trans* isomeric forms. Most of the research on the biomolecules binding focuses on the *cis* derivatives of DACH. There are several publications related to *trans*-1,4-diaminocyclohexane complexes in general. Therefore, one of the novelties of the proposed project will be the development of a library of Schiff base ligands based on this subunit, as well as examining their coordination potential and determining the formation of grids and triangles with group d metals. Moreover, studying the interaction of DNA and BSA with these compounds will broaden the knowledge available on this topic and perhaps even contribute to the further development of drug delivery. Also, complex transformations would be studied using DNA and BSA as the causative agent. In addition, the results of the study will be presented at high-ranking international scientific conferences related to the topic of coordination chemistry, as well as published in journals from the Philadelphia list. Moreover, they will be included in the doctoral dissertation of the Main Investigator.