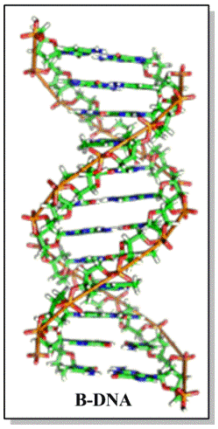
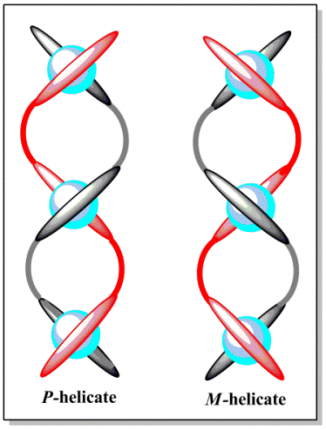
1. Objectives of the project

Project titled: "Synthesis of chiral trimetallic double helicates and their interaction with double and single stranded DNA" aims to show the structural correlation between DNA helix and short supramolecular helix. This project is divided into two main parts: (i) synthesis of supramolecular helicates and isolation of *M*- and *P*-isomers and (ii) evaluation of *M*- and *P*-helicates interactions with single (ss) and double stranded (ds) right-handed B-DNA oligomers.

2. Research to be carried out

According to the experimental work the project has been divided into 5 Work Packages. Fulfillment of all stages will lead to the main goal of the project which is characterization and comparison of interaction of trimetallic double helicates with single and double stranded DNA oligomers. It will be followed by the multi-step synthesis of ligands **TTT** and **BTB** and their complexes **1**-**9**. The *M*- and *P*-helicates will be separated by crystallization approach. Obtained compounds will be characterized with use of a variety of analytical techniques in order to show their structure. Biological studies will allow one to evaluate the binding constants K_{bind} of compounds with single and double stranded DNA, predict the way of binding and to see their ability to hydrolyze phosphodiester bonding resulting in DNA cutting.





3. Reasons for choosing the research topic

Over the last decades cancer has become the problem of whole civilization. Scientists and doctors are trying to overcome this crisis with a large amount of methods including the use of transition metal complexes in the treatment. The mechanism of action of cytostatics based on metal ions, which are currently used in anticancer therapies (e.g. cisplatin, oxaliplatin), usually goes through the interaction with DNA in the cells nuclei. Therefore the detailed characteristics of interactions of chiral helicates with the most common right-handed B-DNA helix could contribute to the development in this area of research and allow to draw new applications and maybe to create a new generation of drugs in the future.

All results that author has reported or performed already indicate that supramolecular helicates may be a powerful tool in future biochemical studies. Especially, the helix-turn direction seems to be an interesting starting point in the discovery of new paths in DNA-targeted anticancer therapies or new molecular sensors or markers. Keeping in mind scarce literature reports concerning comparison of biological properties of right- (*P*-) and left- (*M*-) handed supramolecular helicates, author aims to study this phenomena.