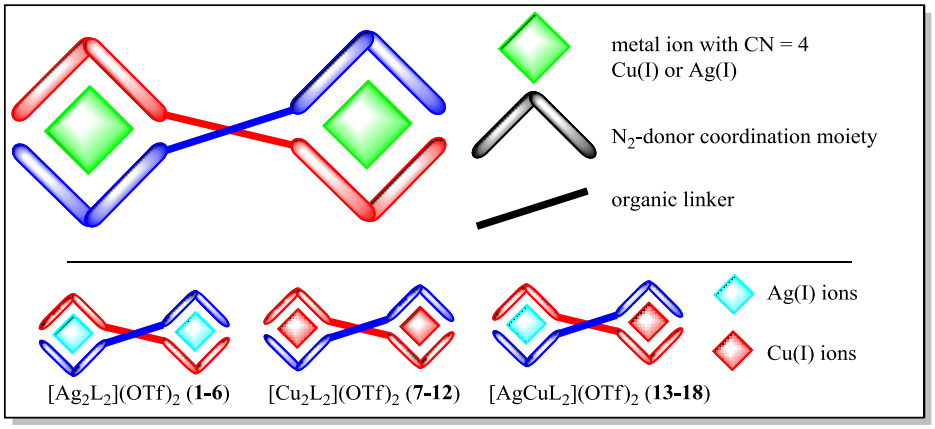
1. Objectives of the project

Project titled: "Optimization of supramolecular helicates size in terms of interaction with DNA and antitumor activity" aims to determine the optimal size of the helicate cation which can effectively bind to DNA. Disorders of the DNA structure cause the inhibition of replication and thus stop mitotic divisions of cells. Utilization of heterometallic helicates containing both Ag(I) and Cu(I) ions coordinated by bis(bipyridine) ligands would allow one to obtain satisfactory emission properties and redox properties of complexes. These compounds would potentially be able to selectively migrate to cancer cells and simultaneous visualization of them would be possible, using their emission properties.

2. Research to be carried out

The initial stage involves the synthesis of six ligands **L^1-L^6** and their complexes **1-18** (picture on the left). The resulting compounds will be characterized by a variety of techniques of chemical analysis. Biological studies will help to predict the type of interaction with DNA, determine the antiproliferative activity of compounds and perform their visualization in the cells, using their emission properties (picture on the right).



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, satraplatin), 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 and the human telomeres 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.