INDO SWISS JOINT RESEARCH PROGRAMME (ISJRP)

JOINT RESEARCH PROJECT

ABSTRACT

Grant No.: 138844

INTERACTION OF SYNTHETIC ORGANIC AND ORGANOMETALLIC MOLECULES WITH G-QUADRUPLEX DNA AND EVALUATING THEM AS DNMT AND HDAC INHIBITORS

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PROJECT ABSTRACT

Cancer is a disease causing concern to everyone around the Globe. Though classical treatments (surgery, chemo- and radiotherapy) are available, it is important to search and adopt more efficient and novel therapeutic approach to overcome the limitations of these classical treatments. Discovery of new synthetic compounds which can restore apoptosis selectively in cancer cells is a very promising approach in identification of novel anticancer drugs. It is central to our project to combine biological, biophysical and chemistry to work on identification of novel synthetic chemical compounds for cancer through various studies. In this project, we follow three pronged approach to identify suitable candidates from lead compounds synthesized in respective laboratories: *(a)* Interaction with ruthenium and other metal complexes with quadruplex DNA. *(b)* DNA hypermethylation by DNA methyl-transferase (DNMT) inhibitors at the CpG islands to identify therapeutic candidates for cancer cure. *(c)* We will also look for candidates from available compounds, which can acts as HDAC inhibitors under *in vitro* conditions. The goal of the project is to synthesize and develop new lead compounds and to understand the mechanism of drug action in restoring apoptosis. We will design and synthesize organic and inorganic molecules, screen them to discover new activators of apoptosis, which will then be used as novel hits for the synthesis of potent bioactive drugs for cancer cure. Molecular modelling using *in silico* techniques will be performed to better understand the interaction of the new quadruplex DNA binders, ultimately leading to the discovery of new chemotherapeutics.