The project aims to explore the potential of modifying microtubule-targeting agents (MTAs) by introducing a metalorganic group. We want to investigate how such modification affects the anti-cancer activity of these drugs and whether it can lead to new activities not present in purely organic compounds.

Within the project, we plan to conduct a series of studies to examine the impact of the metalorganic group on the anti-mitotic activity of MTAs. We will focus on modifying the structure of known tubulin polymerization inhibitors and dual inhibitors targeting various molecular targets. We will utilize chemical synthesis techniques to introduce the metalorganic group into the structure of these drugs. Subsequently, we will evaluate the biological activity of these modified compounds by examining their ability to inhibit the growth of cancer cells and their toxicity toward non-cancerous cells. Additionally, we will research the mechanisms of action of these compounds to understand better how the metalorganic group influences their interactions with protein targets and cellular processes related to microtubules.

The choice of this research topic stems from the need to develop new anti-cancer drugs that are effective against different types of tumors and minimize the development of drug resistance. Microtubule-targeting current medicines are effective, but they have specific limitations, such as toxicity to healthy cells and the development of drug resistance. Modifying these drugs by introducing a metalorganic group may open new therapeutic possibilities by improving their anti-cancer activity and inducing new synergistic effects. Our research can provide valuable insights for designing new anti-cancer drugs and understanding the mechanisms of action of these compounds. Introducing the metalorganic group into the structure of MTAs will enhance their anti-cancer activity. We anticipate that these modified compounds will demonstrate greater effectiveness in inhibiting the growth of cancer cells compared to the original drugs. Furthermore, we expect the metalorganic group to impact the interactions with protein targets and cellular processes related to microtubules, leading to new therapeutic effects. The results of these studies may contribute to the development of new anti-cancer drugs with improved activity and reduced risk of drug resistance.