

## Prof. Dr. Alexander Kros



### Cat4Can: Catalysis for Cancer Treatment

#### Abstract

The increased incidence and mortality of tumors that do not respond to standard of care or other targeted therapies is a major challenge in clinical management of these cancer patients. In order to provide innovative therapeutic avenues for treatment refractory patients, it is urgent to develop novel mechanisms of anticancer drugs mode of action that will overcome the drawbacks of current therapies. In Cat4CanCenter, we will merge the research fields of metal-based catalysis for drug development and innovative delivery routes with cancer biology and immunology, applied to one of the deadliest cancers, glioblastoma (GBM), a fatal primary brain tumor for which no curing therapy exists, due to its location within the brain parenchyma and complex tumor microenvironment. Many potential drugs failed in the clinic due to their inherent toxicity and off-target side-effects, which add up to the challenges in reaching the protected brain site. Recently, innovative catalyst design enabled synthetic transformations in the presence of biological molecules. In Cat4CanCenter we will develop four innovative approaches to treat GBM. This new methodology requires the design of cage protected catalysts that will be delivered to targeted cell types using advanced lipid nanoparticle technology. Next, the catalysts will convert nontoxic prodrugs into active drugs within the GBM bulk. Our groundbreaking strategy aims for successful therapies to treat glioblastoma, by developing complementary approaches to therapeutically tackle the complexity of this disease. The new strategies, catalysts and prodrugs will be studied in detail from cell media, to in vitro and state of the art in vivo model systems of GBM, which requires expert laboratories with complementary skills. By appointing researchers that will work in multiple laboratories we will ensure the efficient transfer of knowledge between (supramolecular) catalysis (Reek), formulation in drug delivery systems (Kros) and pre-clinical studies (Akkari).