

The SWI/SNF-type complexes are machineries present in cell nuclei of all organisms. There are several classes of SWI/SNF complexes which differ by their subunit composition. They are responsible for switching on and off genes in a proper moment. They achieve this due to the control of the access to DNA. Their function is frequently affected in cancer cells due to mutations. The study performed by various scientists, including researchers from my Team indicated that inactivation of some subunits of various classes of SWI/SNF complexes leads to the so called synthetic lethality, a phenomenon observed for the first time in 1922 in fruit fly. It has been observed, that the combination of two viable mutations leads to the lethality. Interestingly, it has been shown that synthetic lethality may be used to treat cancer. On the other hand, partial inactivation of SWI/SNF complex leads to the development of various syndromes in humans and developmental alterations in plants like dwarfism, sterility, abnormal root, leaf and flower development and sometimes lethality. Despite the fact that we know relatively much about the SWI/SNF complexes, there is completely lack of knowledge about that what happens just after the loss of SWI/SNF activity, because there are no good tools suitable to precise, inducible inactivation of their activity.

Thus, in this project we plan to construct a perfect, innovative system based on the special kind of antibody from camelid enabling inactivation o SWI/SNF complexes in a precisely controlled manner. This approach will allow us to investigate, using advanced techniques applied in my laboratory as well as in laboratories of our Foreign Partners, what happens in the cell just after precise inactivation of SWI/SNF complex. Moreover, we will be able to identify which subunits of SWI/SNF complex can be used for synthetic lethality induction to be useful in the future for establishment of new anticancer therapy.