Fluorescent labeling allows effective analysis of studied compounds, significantly increasing the sensitivity of determinations compared with absorption methods. Novel dyes and the methodology for the preparation of fluorescent derivatives of medicines and other chemical substances are important issues for the development of chemical and medical analysis as well as drug research.

Azidothymidine (AZT) is an antiretroviral drug used in the treatment of HIV infections. However, the use of AZT is associated with many side effects. In this situation, it is highly beneficial for the patient to adjust the individual dose of the azidothymidine. This is particularly important for inter-individual differences in the rate of drug metabolism, which may have serious effects on the use of drugs with many serious side effects.

Efficient labelling of azidothymidine with a fluorescent marker would allow to easily determine its concentration in patient blood and urine samples. This would extend the application of personalized medicine to antiviral treatment with azidothymidine. Personalization of the therapy would involve individual adjustment of the azidothymidine dose used in treatment by monitoring azidothymidine concentrations in patients' blood. Such an approach would result in clear and precise determine the metabolic profile of the patient and minimizing side effects and maximizing the therapeutic effect during pharmacotherapy.

The chemical reaction used to connect the fluorescent dye and azidothymidine is the copper(I)-catalyzed azide-alkyne cycloaddition (CuAAC), which is the main reaction of the *click chemistry* approach. This strategy focuses on the use of efficient and easy to perform reactions and is widely used in pharmaceutical sciences and fluorescent labelling. However, the undoubted gap is a limitation by the range of options available for the choice of existing alkyne fluorescent markers. An additional barrier is the very high price of fluorophores offered by chemical reagent vendors

The aim of the project is to obtain novel alkyne derivatives of known fluorescent *Safirnium* dyes and use them for labelling azidothymidine and three model azides in the CuAAC reaction. Then it is planned to measure the absorption and fluorescence spectra of the obtained compounds in UV and visible light (UV-Vis). At the last stage of the project, high-performance liquid chromatography (HPLC) with fluorescence detection will be used to determine concentrations of azidothymidine and model azide compounds. Limits of detection and quantification (LOD and LOQ) will be determined. Subsequently, studies of the hepatotoxicity and neurotoxicity of the compounds obtained will be carried out to determine the safety of the investigated dyes and their fluorescent derivatives.