ORGANIC CHEMISTRY

Preparation of structural analogs of pyrrolidine alkaloids with incorporated molecular switches.
supervisor: prof. RNDr. Jozef Gonda, DrSc.
study form: full time
The project deals with the development of sigmatropic rearrangements and new synthetic strategies for the preparation of biologically active pyrrolidine alkaloids and their structural analogues with incorporated molecular switches. This methodology utilizes the thermal and microwave-induced [3,3]-heterosigmatropic rearrangements and aldol reactions carried out under the conditions of asymmetric induction and organocatalysis.

Stereoselective synthesis of the unusual sphingoid bases and related long-chain amino alcohols as promising anticancer agents.
supervisor: doc. RNDr. Miroslava Martinková, PhD.
study form: full time
Stereoselective synthesis of the enantiomerically pure unusual sphingoid bases and related long-chain amino alcohols will start from the dimethyl L-tartrate (the chiron approach) and will utilize the [3,3]-heterosigmatropic rearrangements and the well-established OCM reaction as the key transformations. The obtained results from the realized studies of the rearrangement reactions will provide further insight into the scope and limitations of the aza-Claisen rearrangements of chiral allylic thiocyanates and trichloroacetimidates. It should be noted that the discovery of new anticancer agents still remains a key factor to progress in cancer treatment. In an effort to find new candidates with the interesting biological profile based on the modulation of sphingolipid metabolism, the target molecules will be evaluated for their in vitro antiproliferative/cytotoxic activities on selected human cancer cell lines.