

TWINNING final report

The Vanacova group studies the principles of RNA processing, chemical modifications and stability in eukaryotic cells, mainly human cell lines. In the TWINNING project we have been collaborating with the groups of Mark Helm in Mainz, Vladimir Benes at EMBL. In addition, we have been in frequent contact with the groups of David Tollervey and Donal O'Carroll who have advised us on specific protocols and provided expression constructs and cell lines.

The first project focused on the characterization of the target repertoire of the human tRNA methyltransferase ALKBH8. Using the HITS-CLIP analysis, we have uncovered additional, previously unknown tRNA targets as well as binding to several non-tRNA types of RNAs, among those snoRNAs. The Helm's team helped us to validate the presence of the hmC5m marks on the newly identified tRNA species. This work was published in the RNA Journal (DOI: [10.1261/rna.079421.122](https://doi.org/10.1261/rna.079421.122)).

The major focus of our research is however on the role and mechanisms of m6A in mRNAs. In particular, we study the molecular functions of the two known mammalian m6A demethylases FTO and ALKBH5. In collaboration with the team of Vladimir Benes at EMBL we characterized the transcriptome of human cells in the presence and absence of these two enzymes, respectively. The team of Vladimir Benes helped to train our PhD student Praveenkumar Rengaraj in bioinformatics analyses of next generation sequencing datasets. The student went for two short-term stays. During the first stay he has learned to apply the basic key bioinformatic concepts to analyse the RNA-sequencing data. The second stay was targeted on more advanced bioinformatics applications. And several complex downstream analyses. Currently, we are utilizing this expertise to understand the role of FTO and ALKBH5 and preparing the first collaborative manuscript for publication.