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## A novel approach for unique MRD markers identification in acute leukemia patients

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A cute leukemia's (AL) comprise a heterogeneous group of hematologic malignancies, and individual patient responses to treatment can be difficult to predict. Monitoring of minimal residual disease (MRD) is thus very important and holds great potential for improving treatment strategies. Common MRD targets include recurrent cytogenetic abnormalities, gene rearrangements and gene mutations. Unfortunately, these well-characterized targets are not available for all AL patients. Identification of new specific molecular markers of leukemic blasts is therefore required. Our aim was to develop a flexible strategy for mapping of cytogenetically identified unique clone-specific abnormalities down to the single nucleotide level and, based on the sequence, design a specific real-time PCR assay for MRD assessment in AL patients without any previously described MRD marker. Using a combination of cytogenetic (chromosome banding), molecular cytogenetic (mFISH, mBAND) and molecular biological (next-generation sequencing, long-range PCR, Sanger sequencing) techniques we are able to characterize the DNA sequence flanking unique chromosomal breakpoints. For precise identification of these breakpoints we use fine-needle microdissection of derivative chromosomes followed by next-generation sequencing of the dissected material. Finally, we design a specific real-time PCR assay for monitoring MRD level during the patient's treatment. Our work clearly shows that walking from chromosomal level to the nucleotide level is feasible and readily applicable for eligible AL patients. The described approach is accurate for standard clinical practice and could be used as a tool for personalized "tailor-made" medicine.

## Biography

Tereza Jancuskova is a PhD student at the 3<sup>rd</sup> Medical Faculty of the Charles University in Prague, Czech Republic. Her research is focused on the identification of specific markers for minimal residual disease assessment in acute leukemia patients. She graduated from Charles University, Faculty of Science in 2008, specializing in Genetics, Molecular Biology and Virology.

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