

# Genetics & Applications

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## EXPRESSION LEVELS OF BCL2, BAX AND MDR1 AS PHARMACOTRANSCRIPTOMIC AND PROGNOSTIC MARKERS OF PROGNOSIS IN ACUTE MYELOID LEUKEMIA

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Acute myeloid leukemia (AML) is a malignancy of hematopoietic tissue which occurs due to a halt in differentiation, loss of proliferation control and dysregulated apoptosis of myeloid progenitor cells. In many cancers, as well as AML, dysregulation of apoptosis constitutes the basis of pathogenesis and this phenomenon is important for chemotherapy success. Pharmacotranscriptomic markers of AML prognosis could be targets of specific therapy. The anti-apoptotic gene BCL2 (B-cell lymphoma protein 2), the pro-apoptotic BAX (BCL2-associated X) and genes involved in drug resistance, like MDR1 could have a significant impact on AML prognosis and therapy response. Bone-marrow samples at diagnosis were collected from 51 adult patients with AML-NK. Expressions of BCL2, BAX and MDR1 were analysed using the real-time polymerase chain reaction method. Statistical evaluation was performed. The presence of chemoresistance was found to be associated with overexpression of BCL2 (BCL2+) ( $p=0.018$ ), while underexpression of BAX in patients has shown a greater affinity towards relapse ( $p=0.034$ ). Evaluating the expressions of BCL2 and BAX in a combined effect has shown that 87% of patients with BAX/BCL2low status were resistant to therapy ( $p=0.024$ ). BCL2+ status was associated with high expression of MDR1 ( $p<0.001$ ). Likewise, high expression of MDR1 was associated with the absence of NPM1 and FLT3-ITD mutations ( $p=0.048$  and  $p=0.010$ , respectively). This is the first study that focused only on AML-NK patients, when it comes to analysis of BCL2, BAX and MDR1 gene expression profiles. The results of this preliminary study have shown that high BCL2 expression would likely lead to resistance from chemotherapy, making anti-BCL2 treatment a viable option in patients with this expression profile. A study on a larger group of patients could clarify the prognostic importance of the studied genes in adult AML-NK patients and improve the precision medicine approach in the field of hematology.

**Keywords:** AML, BCL2, BAX, MDR1, prognosis

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