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A Proposed Kinetic Model for the Diagnostic and Prognostic Value of WT1 and p53 in Acute Myeloid Leukemia

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Abstract: Background: Wilms tumor (WT1) and p53 proteins were identified in the pathogenesis of several malignancies, including hematological malignancies. As a result of their interaction and diverse context-specific functions, this study aimed to emphasize the diagnostic and prognostic impacts of WT1 and p53 expression in acute myeloid leukemia (AML). Methods: Twelve bone marrow (BM) biopsies were obtained from AML patients who were diagnosed in accordance with the French-American-British diagnostic criteria. For comparative purposes, nine normal BM biopsies were included. The expression rate of WT1 and p53 were determined by an immunohistochemistry assay. Results: A significantly higher ($p < 0.005$) and strongly correlated ($? = 0.855$, $p = 0.001$) expression rates of WT1 and p53 were observed in the BM of AML patients in comparison to control BM. Furthermore, relapsed AML patients had significantly higher expression of WT1, but not p53, when compared to newly diagnosed patients. In regard of patient's responsiveness to chemotherapy, no significant difference was reported between good and poor responders. However, the relative ratio of p53 to WT1 expression was evidently correlated to the responsiveness groups ($p < 0.05$), where the ratio was observed to be significantly higher among poor responders. Poor responders were characterized by a statistically significant and dominant p53 expression (p53/WT1 > 1.0) while both good responding patients and control subjects had a dominant WT1 expression (p53/WT1 < 1.0). Conclusions: The enhanced expression levels of WT1 and p53 proteins in the BM of AML patients is supportive of their intermediate role in the pathogenesis of the disease. WT1 expression rate may encompass a negative prognostic value of the disease. Furthermore, the ratio of p53/WT expression may serve as a hallmark of the patient?s responsiveness to chemotherapy, where a dominant WT1 expression may reveal good responsiveness to chemotherapy. Herein, we are proposing