Fighting for the Orange Ribbon: Acute Myeloid Leukemia Type-3 Differentiation Triggered by Cisplatin

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Acute Myeloid Leukemia (AML) is estimated to affect over 18,000 people in the United States this year. It occurs when there's a blockage in differentiation. AML type 3 doesn't have a chemotherapeutical agent that triggers terminal differentiation. The aim of this novel research is to study the myeloblastic differentiation effect of the drug Cisplatin on Myeloid Leukemia Cell line U937 and compare it to the ATRA positive control. Equal samples of the suspension were placed into a well plate and treated using Cisplatin, ATRA control, and untreated cells. The effectiveness of the treatment was evaluated using 3 tests. First, treated cells were stained with fluorescently-labeled CD markers, cluster of differentiation markers, (antibodies: CD11b, CD14, and CD15). Second, samples of the treated cells were dyed with Giemsa. Third, the nucleic acid of the cells were bound to fluorescently-labeled 7-Aminoactinomysin D for Cell Cycle Analysis. In Giemsa staining, the multilobular nuclei is apparent and the nucleus to cytoplasm ratio is lowered, indicating positive results. For the Differentiation Marker Expression, the monocytes shows that Cisplatin had the greatest differentiation, while in granulocytes, ATRA showed triple the amount of Cisplatin, which showed triple the amount of untreated cells, indicating that ATRA triggers granulocytic differentiation and Cisplatin triggers monocytic differentiation. The Cell Cycle Analysis showed abnormal growth. The overexpression blocked cell cycle progression in the G2/M phase progression indicates positive results. This study suggests that Cisplatin prompted differentiation, and may be clinically used for Acute Myeloid Leukemia type-3 patients, providing future benefits for cancer patients.

Awards Won:

Fourth Award of $500