Classification of Prospective Blood Donors Using the Naïve Bayes Classifier Method (Case Study in Mataram City, West Nusa Tenggara, Indonesia)

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Background: The increasing rate of cancer chemoresistance and adverse side effects of therapy have led to the wide use of various chemotherapeutic combinations in cancer management, including lymphoid malignancy. Objective We investigated the effects of a combination of 1,3,6-trihydroxy-4,5,7-trichloroxanthone (TTX) and doxorubicin on the Raji lymphoma cell line.

Materials and Method: Raji cells were treated with different concentrations of TTX, doxorubicin, or combinations thereof. Cancer cell growth inhibition was evaluated using 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide/MTT assay to determine the half-maximal inhibitory concentration. Combination index values were calculated using CompuSyn (CompoSyn, Inc, Paramus, NJ). Molecular docking was conducted using a Protein-Ligand ANT System.

Results: The mean (SD) half-maximal inhibitory concentration values of TTX and doxorubicin were 15.948 (3.101) µM and 25.432 (1.417) µM, respectively. The combination index values of the different combinations ranged from 0.057 to 0.285, indicating strong to very strong synergistic effects. The docking study results reveal that TTX docks at the active site of Raf-1 and c-Jun N-kinase receptors with predicted free energies of binding of −79.37 and −75.42 kcal/mol, respectively.

Conclusion: The xanthone-doxorubicin combination showed promising in vitro activity against lymphoma cells. The results also indicate that the TTX and doxorubicin combination’s effect was due to the interaction between TTX with Raf-1 and c-Jun N-kinase receptors, 2 determinants of doxorubicin resistance progression.

Keywords: c-Jun N-terminal kinase, Xanthone synthetic, Raf-1 Synergistic, Lymphoma, Doxorubicin sensitivity