

## The Anti-cancerous Potential of Polyphenols in the Treatment of Human Myeloid and Lymphoid Leukaemia

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**Background:** The mortality of leukaemia is still high despite the considerable improvements in chemotherapeutic agents. For this reason, our study aimed to investigate polyphenols as alternative agents for the treatment of leukaemia. The selected polyphenols have been recently shown to be effective in the treatment of solid tumours, although little work has focus on leukaemia. Here, we specifically selected eight compounds from the major classes of polyphenols (quercetin , chrysin, apigenin, emodin, aloe-emodin, rhein, cis-stilbene and trans-stilbene) and have studied their affect on cell proliferation, cell cycle and apoptosis on a panel of human myeloid (KG1a, HL60 THP-1, and K562) and lymphoid (JURKAT, CCRF-CEM, MOLT-3, and U937) leukaemia cell lines. **Methods:** The effect of polyphenols on cell proliferation was measured by CellTiter-Glo<sup>®</sup> luminescent assay; cell cycle was assessed using propidium iodide (PI) staining and flow cytometry and the induction of apoptosis was assessed by caspase 3 activity assay using flow cytometry and Hoescht staining using fluorescence microscopy. **Results:** our study showed that quercetin, emodin and cis-stilbene were the most effective polyphenols at inhibiting the cell proliferation , arresting the cell cycle and inducing the apoptosis ( $P < 0.05$ ) with IC50 values ranged between 10-50  $\mu$ M following 24hr for all the leukemic types. However, it important to note that the action of the studied polyphenols varied between different leukemic cell lines suggesting that there is a different mechanism of action of each of these molecules. All lymphoid cell lines (JURKAT, CCRF-CEM, MOLT-3, and U937) showed greatest sensitivity to the polyphenolic compounds comparing to the myeloid cell line. **Conclusions:** Our findings suggest that polyphenols could be a novel chemotherapeutic drugs candidate for the treatment of lymphoid leukaemia types.