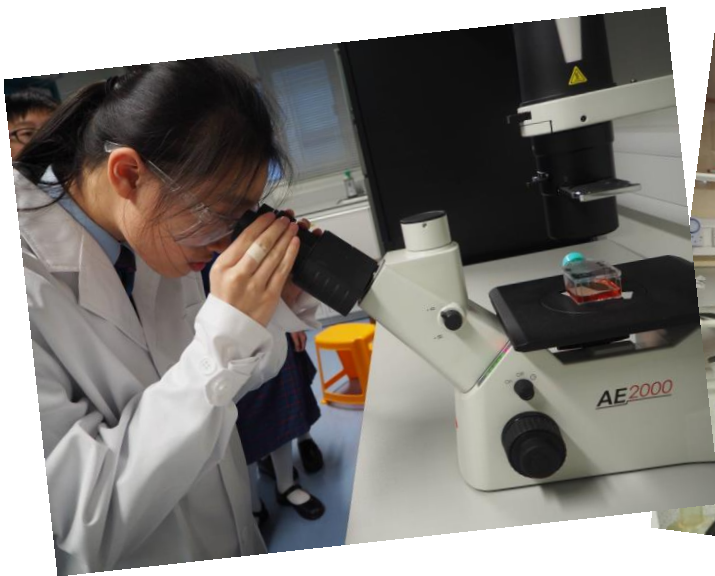


JBBC24

Potato: A Potential Therapeutic Drug Against Leukemia?

對抗白血，薯神百寶？

Written Report



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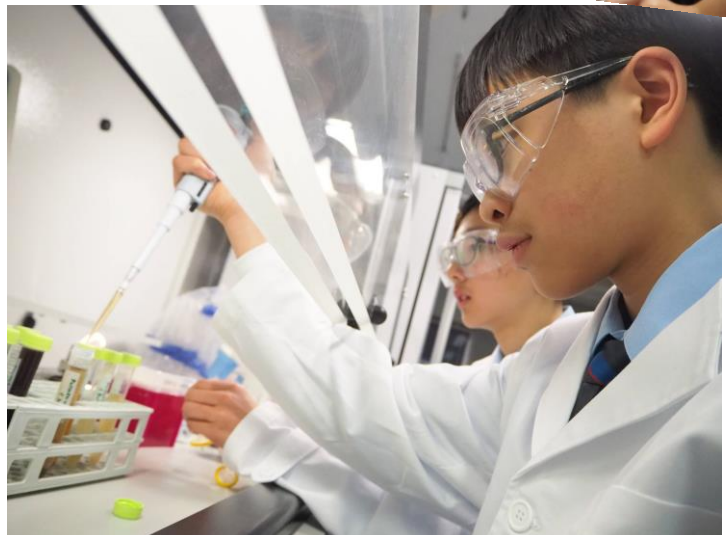
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Abstract

Our group found out if potato juices could act against leukemia. First, total free-radical scavenging ability of potato juices was compared by Briggs-Rauscher Reaction to estimate if potato was cancer-preventive by acting against oxidative stress. Then, HL-60 cells were subject to various potato juices to investigate if they posed morphological change, growth inhibitory and killing effect on HL-60.

Results showed that all potato samples have significantly higher relative antioxidizing powers than vitamin C, as revealed by extremely low p -values ($***p < 0.001$) in Student's t -test. Raw potato juice has higher antioxidizing power than vitamin C by 4.23 folds while raw sprouted potato juice by 5.41 folds. The power is the highest for raw sweet potatoes, with 17.62 folds increase. Boiled sweet potato juice got the highest antioxidizing power, with 23.97 fold higher in free scavenging ability than Vitamin C, the well-known antioxidant. Boiling could help release antioxidizing ingredient from potato cells, rather than denaturation.

In addition, when administered 1 mg/ml of potato juice to HL-60 cells for 24h, the cell density significantly reduced, and the cells looked not as intact as before. Some cells experienced apoptosis and necrosis. Lastly, at the low concentrations of 0.5 mg/ml and 1 mg/ml, potato samples posed 20% growth inhibition to HL-60 cells and increased mortality by 2.5 folds at 24h incubation. Growth inhibitory effect was more prominent for potato samples extracted by DMSO than by water, posing 30% growth inhibition for 24h. Certain organic constituents in potatoes were more potent substances to act against growth of HL-60 cancer cells.

Our studies elucidated the significant role of potatoes in exhibiting antioxidizing power, growth inhibitory effect and killing effect of potato samples on HL-60. Further investigation even enables us to unveil the biochemical pathways involved in growth inhibition in the future.

摘要

科研小組著力研究馬鈴薯汁能否有效抑制白血病細胞。透過布里格斯-Rauscher 的振盪顏色變化反應，小組研究馬鈴薯汁能否有效清除自由基，對抗氧化逆境以防癌，然後看看馬鈴薯汁能否對 HL-60 白血病細胞構成形態變化、生長抑制及殺傷作用。

結果發現所有薯汁樣本比維他命 C 的抗氧能力為高，在數據分析下均有顯著分別。生馬鈴薯汁的抗氧能力比維他命 C 高出 4.23 倍，生發芽馬鈴薯汁的抗氧能力比維他命 C 高出 5.41 倍，生甘薯汁及煮沸甘薯汁的抗氧能力更比維他命 C 分別高出 17.62 倍及 23.97 倍，結果十分驚人，原來煮沸薯汁能幫助釋放更多抗氧物，反而不會將其有效成分變性。

再者，小組嘗試將 1mg/ml 薯汁放入 HL-60 白血病細胞作測試，發現當 24 小時過後，其細胞密度被大大減低，在形態分析下發現細胞變得不再完整，部份細胞更進行凋亡及壞死。在 0.5mg/ml 及 1mg/ml 的濃度下，薯汁樣本在 24 小時內均能有效抑制 HL-60 白血病細胞達 20% 的生長，細胞死亡率提升 2.5 倍。當以二甲基亞砷提取薯汁有效成分後，生長抑制更達 30%，由此可見，薯汁內的有機成分對 HL-60 白血病細胞生長抑制更為有效。

小組研究確立馬鈴薯的抗氧化能力，及馬鈴薯對 HL-60 白血病細胞的生長抑制和殺傷效能，更有助將來對生長抑制機制上的研究。