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Title: QUERCETIN EXHIBITS ANTI-LEUKEMIA EFFECTS VIA REGULATION OF METABOLIC REPROGRAMMING

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Background:

Quercetin is a flavonoid which exists in multiple foods such as fruit and vegetables. Various studies have indicated that quercetin possesses capacities of anti-oxidant, anti-inflammatory and, especially, anti-cancer effects such as reducing tumor microenvironment components, suppressing carcinoma growth and modulating metabolic reprogramming in tumor cells. Previous experiments demonstrated that quercetin could inhibit the cell viability of primary and P388 AML cells in vitro, but its mechanism remains unclear. Here we speculated that quercetin might mediate its anti-leukemic effects via regulating of metabolic reprogramming.

Aims:

To analyze the effects of quercetin on the metabolic activity of acute myeloid leukemia cell lines KG-1α and HL-60.

Methods:

CCK-8 analysis was used to detect the prohibitive effects of quercetin on the proliferation of KG-1α and HL-60 cells, and flow cytometry was used to analyze the apoptosis; Quantitative real time polymerase chain reaction (qRT-PCR) was used to detect the gene expression of *AMPK*, *CPT1A* and *GLUT1*. The contents of ATP and pyruvate were measured to determine the level of cell metabolism.

Results:

CCK-8 analysis showed the quercetin had a statistically significant inhibitory effect on the proliferation of KG-1α ($r_{24\ h}$= 0.780, $r_{48\ h}$= 0.786, $r_{72\ h}$= 0.796)and HL-60 cells ($r_{48\ h}$= 0.799, $r_{72\ h}$= 0.760)in a dose dependent manner; The flow cytometry results displayed that quercetin promoted the apoptosis of KG-1α（P<0.001） and HL-60 cells（P<0.001）. The PCR results demonstrated that quercetin decreased the expression of *AMPK*, *GLUT1* and *CPT1A* gene in KG-1α and HL-60 cells（P<0.05）. Moreover, quercetin significantly reduced the level of ATP and pyruvate in KG-1α and HL-60 cells (P < 0.001)

Summary/Conclusion:

Quercetin inhibited the proliferation of AML cells in a concentration-dependent manner and promoted cell apoptosis rates, which might be regulated by alteration in *AMPK*, *GLUT1* and *CPT1A*. Quercetin might provide theoretical and experimental basis for treatment in AML.

Keywords: Acute myeloid leukemia, AML