

Flavonoid-rich berry-extract treatment decreases glucose uptake in human intestinal Caco-2 cells

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Berries are a rich dietary source of bioactive polyphenols, including flavonoids, such as anthocyanins⁽¹⁾. Dietary flavonoids are known to decrease the expression of the facilitative GLUT2 and the sodium-glucose cotransporter (SGLT1) genes, the two main glucose transporters in human subjects' intestinal Caco-2 cells⁽²⁾. Acute inhibitory effects on glucose absorption have previously been observed in the presence of flavonoids, however, little is known regarding genomic effects on uptake⁽³⁾. The present study investigated the influence of a flavonoid-rich berry-extract on glucose uptake in human subject's intestinal Caco-2 cell monolayers.

Human subject's intestinal Caco-2 cells, cultured for 19 d, were treated, acutely (15 min) or chronically (16 h) with a flavonoid-rich berry-extract (OptiBerry; InterHealth Nutraceuticals, Benicia, CA, USA) at a final concentration of 0.125% (w/v) then subjected to radiolabelled glucose for 2 min, in the presence or absence of Na. Uptake was determined by liquid scintillation counting of cell lysate. Data were normalised to cell protein concentration and presented as uptake as a percentage of control. Statistical significance was determined by Student's *t*-test ($P \leq 0.05$; $n 12$).

Results indicated that berry flavonoids significantly decrease glucose uptake in human subject's intestinal Caco-2 cells both acutely and chronically. These inhibitory effects are evident in both Na -dependent and Na -independent glucose uptake pathways. Studies are in progress to investigate the biological relevance of the observed effects in relation to berry consumption and glucose metabolism. Potentially, such berry-extracts may be useful in the dietary modulation of postprandial glucose homeostasis.

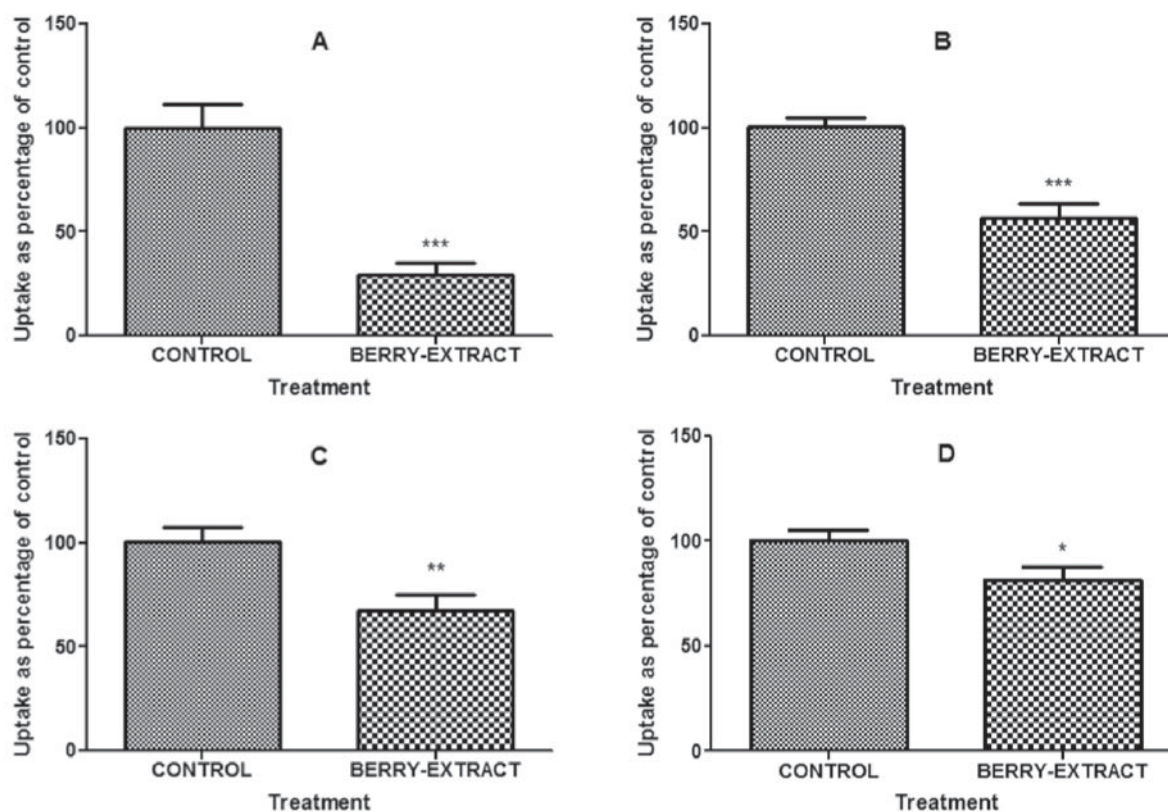


Fig. 1. Effects of berry-extract treatment on Na⁻dependent and -independent glucose uptake in human subject's intestinal Caco-2 cells. **A.** Acute berry-extract treatment in the presence of Na. **B.** Acute berry-extract treatment in the absence of Na. **C.** Chronic berry-extract treatment in the presence of Na. **D.** Chronic berry-extract treatment in the absence of Na. Data expressed as mean uptake as a percentage of control (SEM), $n 12$; *: $P \leq 0.05$, **: $P \leq 0.01$, ***: $P \leq 0.001$.

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