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Obesity may protect against benign brain tumors

We hypothesize that the hyperinsulinemia of obesity, adipose derived hormones, or perhaps elevated lipids might be capable of disrupting the Warburg effect or otherwise inhibiting the growth of benign brain tumors.

Data are from the following sources:

- Report of brain tumor incidence 2000–2004 from 19 US states, data from Table 9 of Ref. [1].
- Report of obesity prevalence from Centers for Disease Control Ref. [2]. Obesity is defined as body mass index (BMI) of 30 or greater.

There was a significant inverse correlation between percent obesity versus percent benign brain tumors in 19 US states ($r = 0.666$, $p = 0.002$).

One hallmark of obesity is a reduction in sensitivity to insulin [3]. Obese subjects have higher fasting insulin levels and show lower insulin sensitivity than the non-obese.

There is considerable evidence that insulin is capable of shrinking tumors. For example, Salter et al. found that insulin may cause inhibition in the growth of malignant tissue [4]. Johnson and Wright showed that glucagon alone or in combination with insulin markedly inhibited a spectrum of transplantable murine neoplasms [5]. Insulin was apparently disrupting the Warburg effect, a metabolic derangement that causes most cancer cells to produce energy by a high rate of glycolysis [6].

A second inhibitor of benign brain tumor growth in obese subjects might be the adipocyte-derived hormones, for example, adiponectin, resistin, plasminogen activator inhibitor-1 (PAI-1), TNFα, IL-6, leptin, or estradiol (E2) [7]. Indeed, the presence of progesterone receptors, even in a small number of tumor cells, is a favorable prognostic factor for meningiomas [8].

Conflict of interest

None declared.

Reference

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Zinc lozenges for the common cold: Should we ignore the side-effects?

Sir,

We read with great interest the article by Eby [1]. We agree with the author that ionic zinc content of the lozenges may be one of the factors responsible for the beneficial effect in common cold. Some other relevant negative factors include zinc lozenges producing side-effects and compromising the compliance as well as masking, higher than therapeutic dose of zinc being used in some of the trials, etc. [2,3]. First one (side-effects compromising compliance as well as masking) may be responsible for the varied effects in these trials.

In the recent review [4], we included 14 double-blind placebo-controlled trials in the analysis of side-effects of zinc formulations (lozenges or syrup). The data was entered into Review Manager 5 for analysis, and odds ratio (OR) with 95% confidence interval (CI) was calculated. *P*-value < 0.05 was taken as significant. We found that, zinc lozenges are more likely to produce side-effects than syrup formulations. The results were as follows: any side-effect [lozenge, 2.15 (1.36–3.38) ($P = 0.001$) *versus* syrup, 1.03 (0.64–1.66) ($P = 0.9$)]; bad taste [lozenge, 3.24 (2.25–4.67) ($P < 0.0001$) *versus* syrup, 1.15 (0.55–2.39) ($P = 0.71$)]; nausea [lozenge, 2.46 (1.56–4.89) ($P = 0.0001$) *versus* syrup, 1.24 (0.50–3.08) ($P = 0.64$)]; diarrhoea [lozenge, 2.09 (0.92–4.75) ($P = 0.08$) *versus* syrup, 1.34 (0.30–6.09) ($P = 0.7$)]; dry mouth [lozenge, 1.42 (0.95–2.11) ($P = 0.09$) *versus* syrup, 1.13 (0.43–3.01) ($P = 0.8$)].

To conclude, in addition to analysis of various formulations of zinc, importance should also be given to the side-effect profile,