

Aim: To investigate the effect of GC on BAT function in humans.

Method: In a randomised double-blind cross-over design, 13 healthy adults (6 men, 7 women; age mean \pm SEM, 28 ± 2 year; BMI 24 ± 1 kg/m²) underwent 1 week each of oral prednisolone (15mg/day) and placebo treatment with an intervening 2-week wash-out period. At the end of each treatment, under standardised cooling (19°C), BAT function was assessed by measuring (i) BAT activity on PET-CT scan after 75 MBq of FDG (ii) supraclavicular, (SCL) skin temperatures using infrared thermography, (iii) energy production after a standardised meal using indirect calorimetry.

Results: Compared to placebo, SCL BAT activity (SUV_{max} 6.1 ± 2.2 vs 3.7 ± 1.2 , $P=0.049$) was lower with prednisolone. During cooling, SCL skin temperature fell to a greater degree with prednisolone (-0.45 ± 0.1 vs -1.0 ± 0.1 °C, $P=0.01$). Energy production was stimulated by the meal and the stimulation was significantly higher during prednisolone treatment (187 ± 16 vs 255 ± 25 kcal/day, $P<0.01$). Postprandially, SCL skin temperature rose during placebo but fell during prednisolone treatment ($+0.2 \pm 0.1$ vs -0.3 ± 0.1 °C, $P=0.03$).

Summary: Prednisolone suppresses BAT activity on PET-CT, enhances meal induced energy production but reduces thermogenesis.

Conclusions: GC suppresses the function of human BAT. The enhancement of energy production in the face of a reduced thermogenic response suggests that GC reduces the dissipation of energy as heat, enhancing deposition as energy stores after nutrient intake. This is a likely mechanism by which GC induces obesity.

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27

Cost-effectiveness and equity impacts of a sugar sweetened beverage tax in Australia



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A sugar sweetened beverage (SSB) tax has been shown to be effective in reducing consumption of SSBs and increasing government revenue, but the fairness of such a policy should also be considered. We assess the cost-effectiveness of a SSB tax of 20% for Australia with explicit inclusion of equity through the distribution of health gains and the financial impacts by socioeconomic position (SEP) subgroup.

Cohort models were used for each Socio-Economic Indexes for Areas (SEIFA) quintile to estimate the impact of the tax on body mass index (BMI) for the 2010 Australian population. The health-adjusted life years (HALYs) and health care costs averted were estimated as a result of the changes in BMI resulting from the predicted decrease in SSB consumption, taking into account the diseases that have a demonstrated significant contribution to risk of excess weight. SEP specific inputs included baseline BMI and SSB intake, price elasticities, incidence and prevalence of disease and mortality. We also estimated quintile specific changes in expenditure on SSB, tax burden and tax revenue raised.

Application of a 20% SSB tax across the Australian population will lead to improvements in HALYs and considerable health care cost savings across the Australian population, with the greatest gains in the lowest SEP group. We estimate the increase in annual expenditure on SSBs to be around \$4 higher in the lowest quintile compared to the highest (around \$11 compared to \$7). Total tax revenue resulting from this policy is estimated to be \$610m.

A SSB tax can bring substantial health and health care cost savings, especially to those in the lowest SEP group. The tax revenue could potentially fund interventions that further reduce rates of obesity and/or reduce the obesity disparities between SEP groups.

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