

Concurrent Session 14

Water absorption from thickened fluids in a rat model

K Sharpe¹, LC Ward¹, J Cichero², P Sopade³, P Halley³

¹School of Molecular and Microbial Sciences, ²School of Rehabilitation Sciences, ³Centre for High Performance Polymers, University of Queensland, QLD 4072

Background - Individuals with swallowing difficulties (dysphagia) commonly have to have oral fluids thickened in order to avoid aspiration into the lungs. Most thickening agents are either gum-based, guar or xanthan, or are derived from modified starches. There is evidence, predominantly anecdotal, that dysphagic individuals, many of whom are elderly, are sub-clinically dehydrated. It has been speculated that this may be due, in part, to the water holding capacity of these thickening agents decreasing water absorption from the gut.

Objective - To determine the rate of intestinal absorption of water from thickened fluids.

Design - Laboratory study in rats *in vivo*. Rats received, by gavage, on a body-weight basis, bolus doses of water or water thickened to the same viscosity with commercially available thickeners and containing tracer amounts of ³H₂O. Blood samples, from the tail vein, were obtained at intervals for up to 4 h and the specific activity of ³H determined by liquid scintillation spectrometry. The rate of absorption of water was calculated from a compartmental model following exponential curve fitting. Differences in absorption rates between treatments were assessed by ANOVA with *post hoc* multiple comparisons.

Outcomes - No significant differences in water absorption rates between thickened fluids or pure water were observed: water - 0.0140 ± 0.004 ; xanthan - 0.0142 ± 0.007 ; guar - 0.0159 ± 0.008 ; starch, $0.0146 \pm 0.006 \mu\text{l min}^{-1} \text{ml}^{-1}$ blood.

Conclusions - These data provide no support for the view that the addition of thickening agents, irrespective of type, to orally ingested fluids significantly alters the absorption rate of water from the gut. These data do not however preclude the possibility that absolute absorption, i.e. total fluid uptake, may be decreased by thickeners.

Tea catechins reduce body fat mass associated with a high fat diet and improves glucose tolerance in Sprague Dawley rats

N Chen^{1,2}, ML Mathai¹, AJ Sinclair³, HS Weisinger², RS Weisinger⁴

¹Howard Florey Institute of Experimental Physiology and Medicine and ²Department of Optometry and Vision Sciences, University of Melbourne, Vic 3010

³Department of Food Science, Royal Melbourne Institute of Technology, Melbourne, Vic 3000

⁴School of Psychological Sciences, La Trobe University, Bundoora, Vic 3086

Background - Tea is a widely consumed beverage and its potential health benefits have long been reputed. Flavonoids, potent antioxidants found in tea, have been shown to exert antidiabetic and antiobesogenic properties.

Objectives - The effect of prolonged treatment of tea catechins on body weight gain associated with a high fat diet and glucose tolerance was assessed on Sprague Dawley rats.

Design - Male animals (n=12/group) were placed on a 15% (high) fat diet from 3 weeks of age. They were given one of four fluid treatments from four weeks of age: Green tea (GT), Black tea (BT), Epigallocatechin Gallate (EGCG), a flavonoid found in abundance in green tea, or water (control). Weekly body weights were recorded and fluid and food intakes measured daily. Body composition of animals was determined at 11, 18 and 25 weeks of age. Glucose tolerance was tested at 19 weeks of age. All comparisons made are relative to water treated rats.

Outcomes - Throughout the study, there were no differences in food or fluid intakes. There were no differences in body weight at weeks 11 or 18. However, the EGCG treated animals were significantly heavier than the water ($P < 0.01$) and black tea ($P < 0.001$) treated groups at week 25. Green and black tea groups showed a lower percentage fat ($P < 0.05$) and higher lean mass ($P < 0.01$) at week 18. At week 25, lean mass was significantly greater and percentage fat significantly lower in all treatment groups. Fat mass in green and black tea treated groups was significantly lower at weeks 18 (GT $P < 0.01$, BT $P < 0.05$) and 25 (GT $P < 0.05$, BT $P < 0.01$). Glucose tolerance testing showed that the control animals had impaired glucose handling compared to all treatment groups. This was significant at 90 minutes (GT $P < 0.001$, BT $P < 0.01$, EGCG 0.001) and 120 minutes (GT $P < 0.05$, BT $P < 0.05$, EGCG 0.01) after glucose loading.

Conclusion - These results demonstrate that tea catechins may be used as a novel therapy in the treatment of obesity and diabetes.