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Does alcohol consumed with a meal affect vascular function

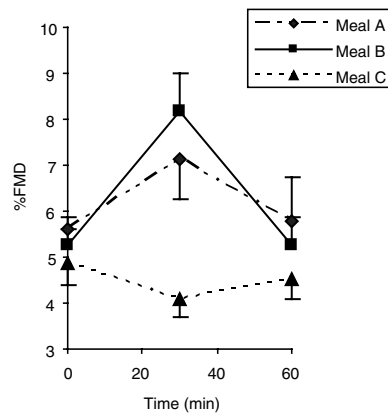
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Numerous studies in the literature report effects of alcohol and polyphenols on vascular function. However, interpretation of these effects has been confounded by the limitation of study designs and the composition of the food and drinks consumed⁽¹⁾. It has been reported that de-alcoholised red wine improves vascular function, although red wine has no such effect⁽²⁾. The aim of the present study was to determine whether it is alcohol or other components of polyphenol-containing drinks that influence vascular function.

Six healthy subjects (three females and three males; age 22.7 (SE 5.2) years, BMI 22.3 (SE 1.94; range 19.4–25.3) kg/m²) were recruited. Written consent was obtained before the start of the study and ethical permission was obtained from the University of Surrey Ethics Committee (EC/2993/1211/SBMS). They consumed a standard meal on three separate occasions. The meal consisted of lasagne and chocolate cake, with a total energy intake of 3402 kJ (813 kcal; % energy intake: 47.3 from fat, 16.7 from protein, 37 from carbohydrate). On each occasion subjects consumed a different drink (175 ml) with their meal: red-grape juice plus water (A); red-grape juice plus vodka (12% (v/v) alcohol; B); water (C). The drinks and food were consumed at the same time of day (13.00 hours) in a randomised order to remove any order effects. Vascular function was assessed by flow-mediated dilatation (FMD) using ultrasound (Acuson Aspen; CVS, Aliso Viejo, CA, USA) and measurements of the brachial artery were obtained using brachial image software (Medical Imaging Applications, LLC). Baseline FMD responses were recorded before the start of each study and further readings were taken 30 and 60 min after consuming the meal. Capillary blood samples were taken for the measurement of glucose, TAG and NEFA.

The Figure shows the percentage FMD responses to all three meals. Repeated-measures ANOVA showed a significant effect of the treatments (meal+drinks; $P=0.008$). While there was no independent effect of time ($P=0.079$), there was a significant interaction between treatment and time ($P=0.012$). There was no significant difference in percentage FMD or other variables at baseline. There were also no significant differences in plasma glucose, TAG and NEFA, either within treatments or between treatments.



The consumption of meals A and B significantly improved endothelial function relative to meal C. Although meal B produced the greatest vascular response, there was no significant difference in percentage FMD responses between meals A and B. The study provides evidence to suggest that the favourable vascular response produced by alcoholic beverages such as red wine is not necessarily a result of the alcohol but of other polyphenolic components.

1. Puddey IB, Zilkens RR, Croft KD & Beilin LJ (2001) *Clin Exp Pharmacol Physiol* **28**, 1020–1024.
2. Agewall S, Wright S, Doughty RN, Whalley GA, Duxbury M & Sharpe N (2000) *Eur Heart J* **21**, 74–78.