



Relationships between nut consumption and vascular and cognitive function

A/Prof Alison Coates
University of South Australia

17th Australian Almond Conference



HOSTED BY:
The Almond Board of Australia



SUPPORTED BY:
Horticulture Innovation Australia Ltd

Pullman Hotel Melbourne, Albert Park, Victoria
November 8th - 10th, 2016



Assoc. Professor Alison Coates



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Lecturer & Researcher, School of Allied Health Sciences, **University of South Australia**

Associate Prof Coates is a lecturer and researcher in the School of Health Sciences at the University of South Australia. As a nutritional scientist, she is interested in how bioactive compounds from food can reduce risk factors for obesity, cardiometabolic diseases and impaired cognitive function. Alison has been involved in over 20 clinical trials using nutritional supplements and foods sponsored by industry partnerships and through government grants. She is currently working with the Almond Board of California investigating the potential for almonds to improve cognition. She is a registered nutritionist and has written over 80 peer-reviewed journal articles and book chapters. Her contribution to the area of cardiometabolic health and nutrition has been recognized by a South Australian Tall Poppy Award and invited presentations..

- Nutrition for vascular and cognitive health
- Nuts and vascular health
- Nuts and cognitive health
- Preview of latest almond research testing vascular and cognitive health



Nutrition against cognitive decline



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- Increase rates of neurodegenerative diseases such as dementia
- Impaired vascular function associated with increased risk of dementia
- Dietary interventions may be able to prevent or forestall neurodegeneration.



- Slowing and reducing cognitive decline may be achieved by following a healthy dietary pattern which
 - limits intake of added sugars
 - maximizing intakes of fish, fruits, nuts, and seeds.



Nutrients in Nuts

Rich in minerals

- Calcium
- Magnesium
- Potassium

Rich in good fats

- mono + polyunsaturated fatty acids
- Plant sterols

Rich in vasoactive amino acids

- arginine

Rich in fibre



Low sodium

Rich in antioxidants

Rich in polyphenols, carotenoids

Rich in vitamins

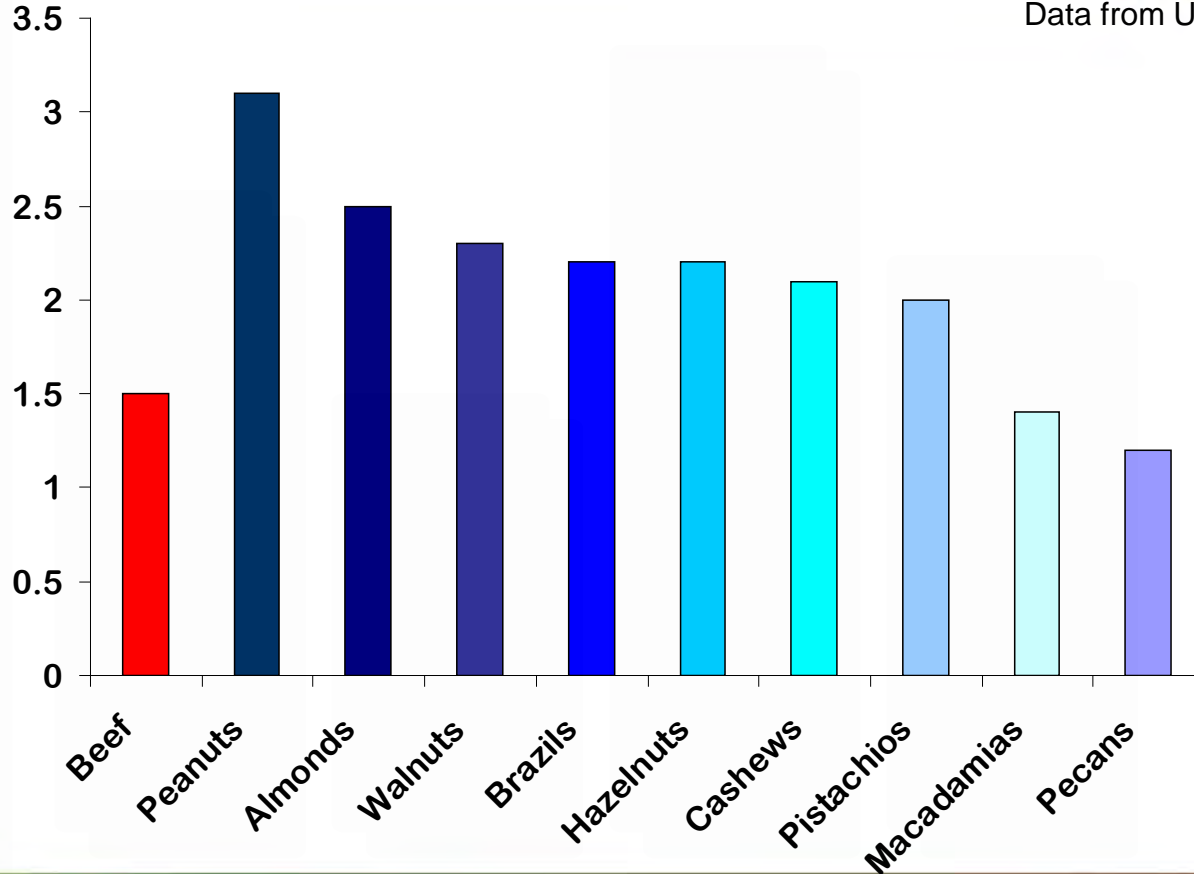
- Folate
- Vitamin E

Arginine Content of Nuts (g/100g)



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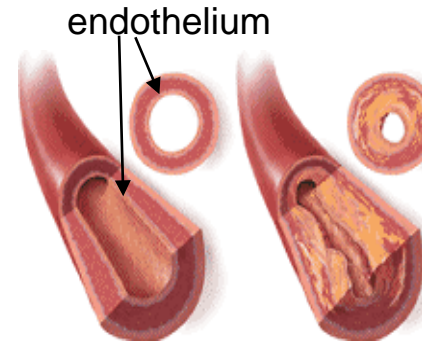
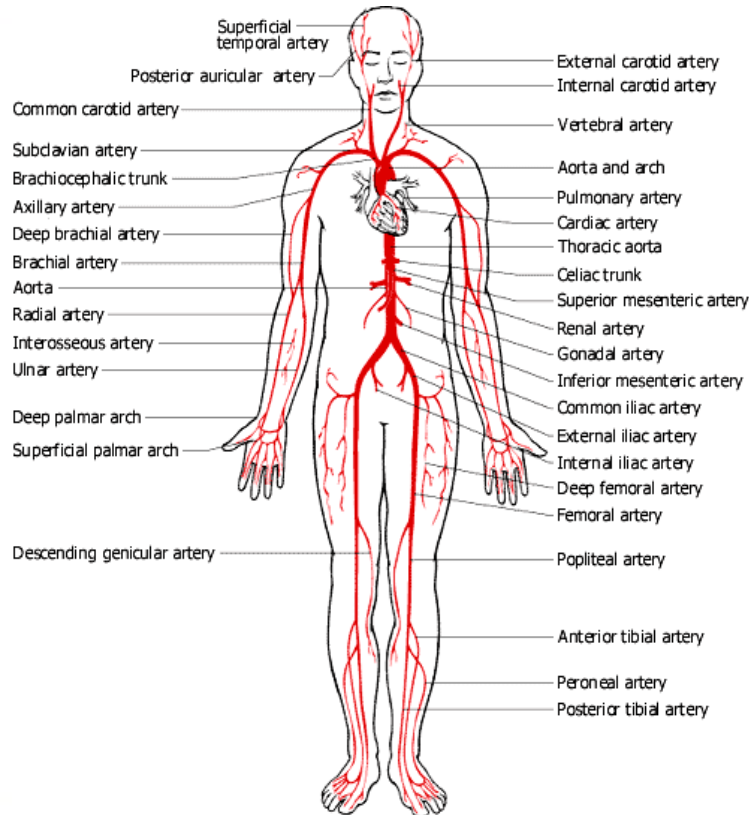
Data from USDA



Nutrients and Vascular Function



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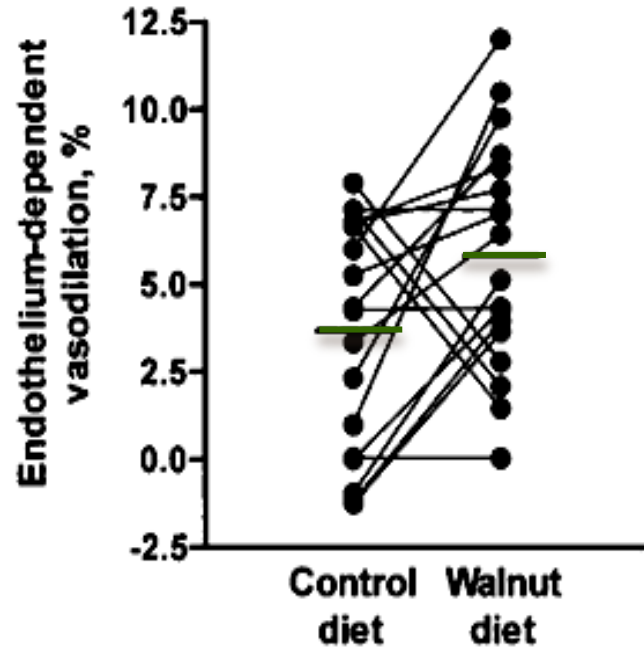
**Arginine + bioactive
nutrients in nuts
important for maintaining
healthy blood vessels**

Nuts and Vascular Function



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**Blood vessel function improves after
4 weeks of consuming walnuts (n=18)**

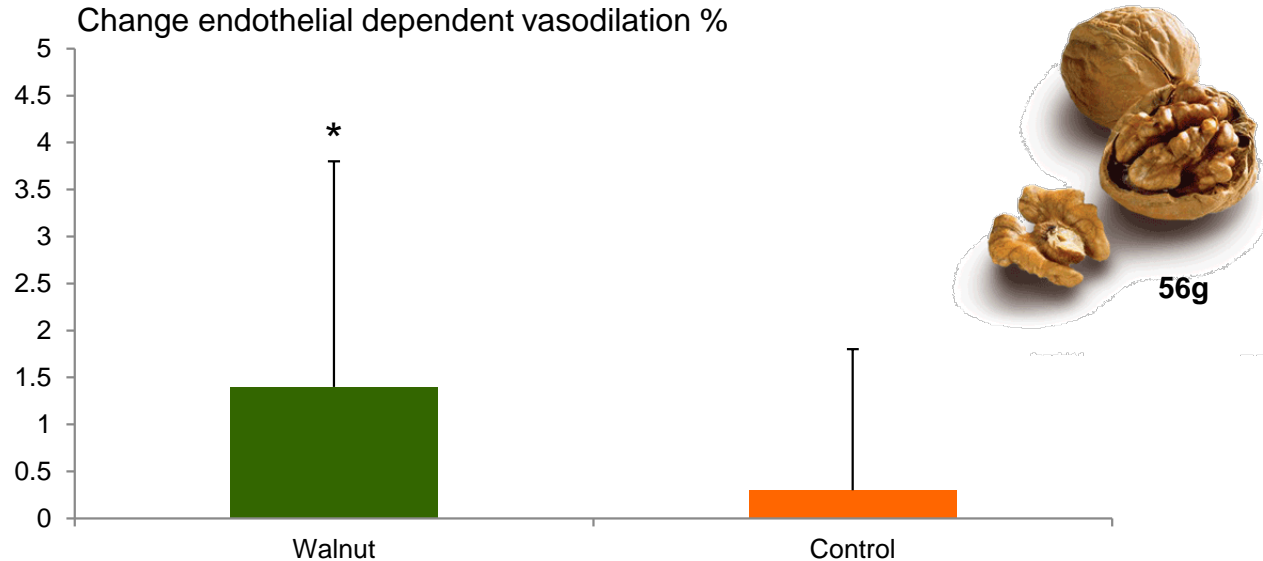


Nuts and Vascular Function



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Blood vessel function improves after 8 weeks of consuming walnuts (n=46 overweight adults)



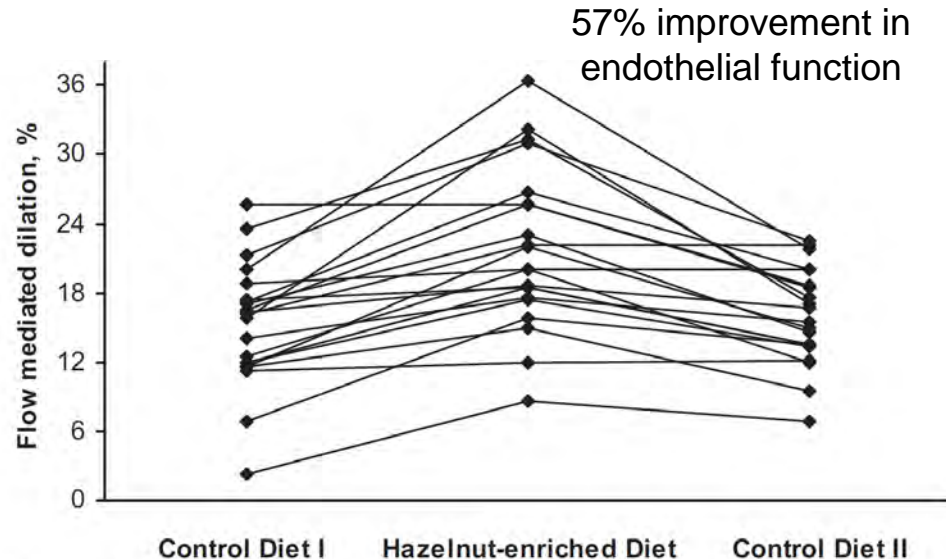
* Denotes $p < 0.05$

Nuts and Vascular Function



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Blood vessel function improves after 4 weeks of consuming hazelnuts (n=21 adults with high cholesterol)



18-20% energy

Figure 1 FMD values of subjects at the end of each diet period.

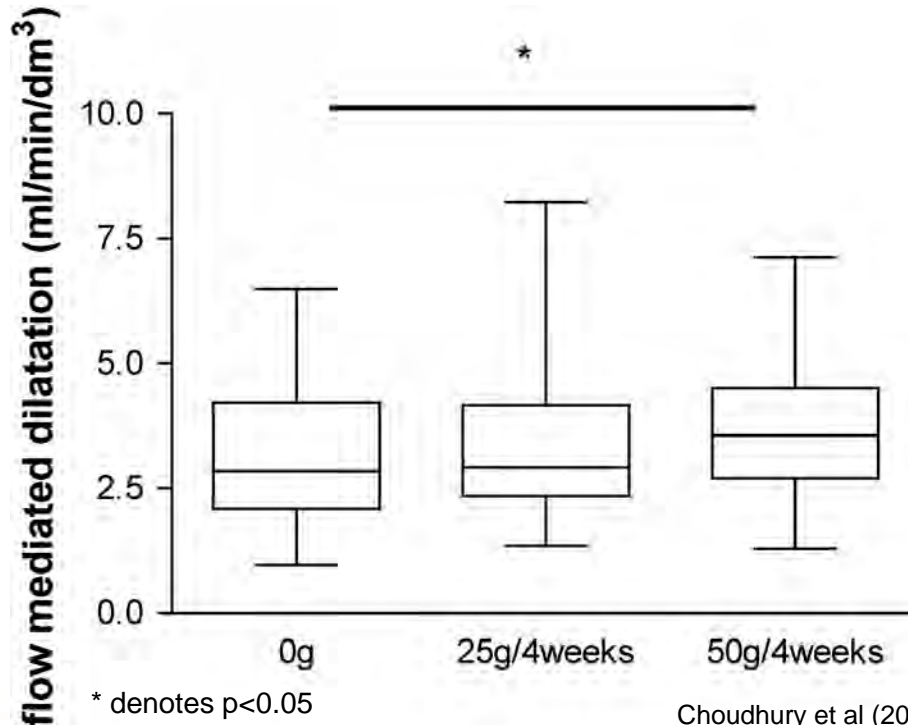
Orem et al (2013). J Clin Lipidol.7(2):123-31.

Nuts and Vascular Function



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Blood vessel function improves after 4 weeks of consuming almonds (n=15 healthy men)



25-50g

Nuts and Vascular Function

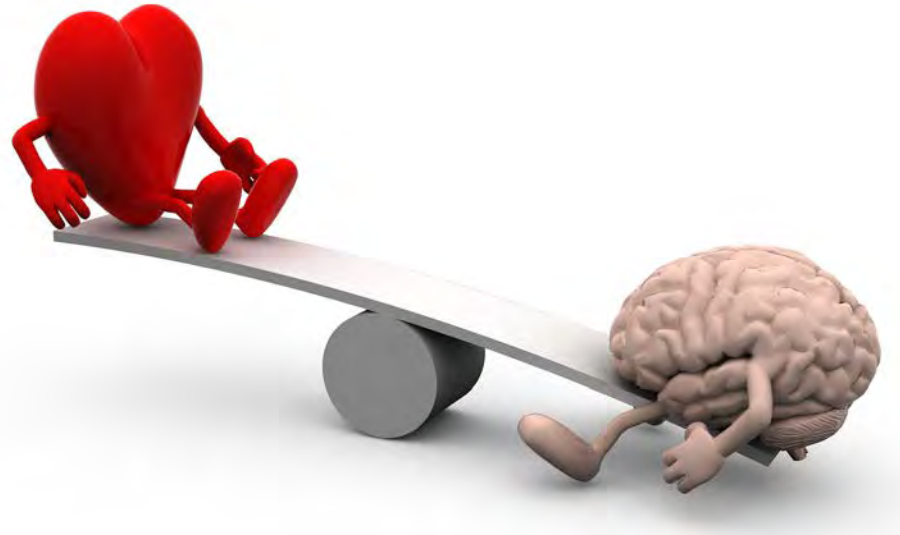
Not all studies report beneficial effects on vascular function

Nuts	Population	Treatment	Outcome
Pistachios ¹	30 T2DM patients	20% energy, 4 weeks	No change in endothelial function
Almonds ²	45 CAD patients	85g, 6 weeks	No change in endothelial function
Brazil nuts ³	91 hypertensive dyslipidaemic patients	13g, 12 weeks	No change in microvascular endothelial function

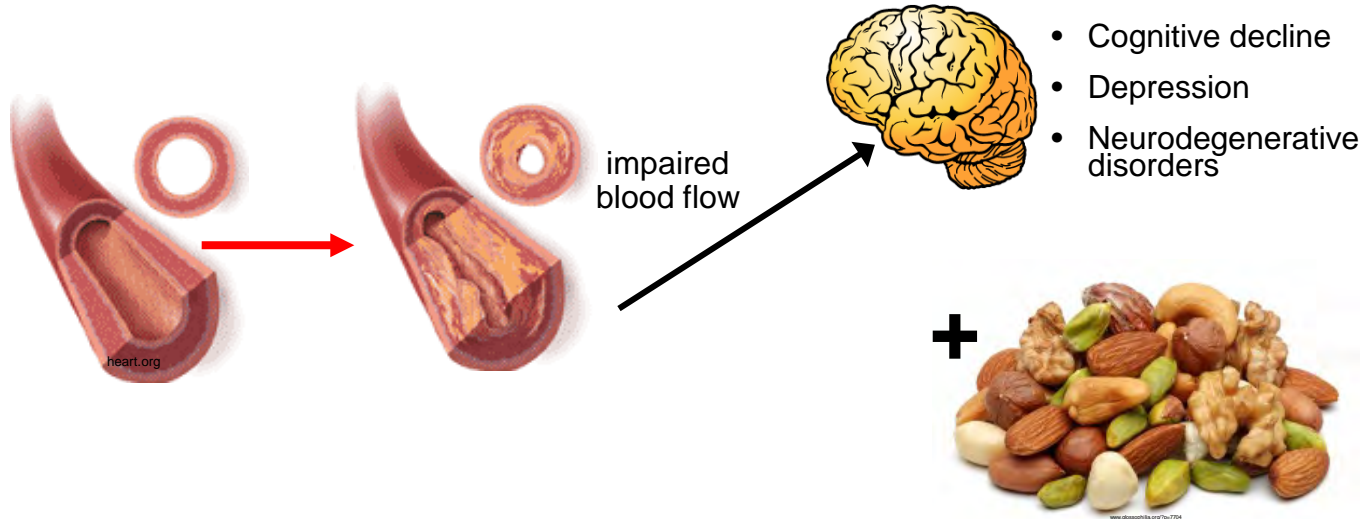
1.Sauder et al (2015) Metabolism.64(11):1521-9 2.Chen *et al* (2015) Nutr J. 17;14:61

3.Huguenin et al (2015) Microcirculation.22(8):687-99.

**Improving cardiovascular disease risk factors may
be associated with better brain health**



Nutrients in nuts may improve cognition by improving vascular health



Nuts and Cognitive Function



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- Higher long-term total nut intake associated with better average cognitive status¹
- PREDIMED study (n=522 high vascular risk) found a Mediterranean dietary pattern enhanced with either **olive oil or nuts** appears to improve cognition compared with a low-fat diet²



¹O'Brien et al. (2014) J Nutr Health Aging.18(5):496-502.

²Martínez-Lapiscina et al. (2013) J Neurol Neurosurg Psychiatry. 84(12):1318-25

Walnuts boost your brains



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- Large cross-sectional study using data from National Health and Nutrition Examination Survey (NHANES).
 - Walnut eaters had faster reaction times and the ability to process information
 - True for all adults, regardless of age, gender or ethnicity



www.blog.discount-supplements.co.uk/blog/wp-content/uploads/walnut.jpg

Walnuts and Cognitive Function



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University students consumed 60g ground walnuts /day for 8 weeks

- Significant improvements in **correct coding and retrieval of information (11% improvement)**
- No significant increases in mood, non-verbal reasoning or memory on the walnut-supplemented diet

Brain Power!



WWW.MONTAGUDRIEDFRUITNUTS.CO.ZA



Peanuts Improve Cognition



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Funding source: Australian Research Council Linkage Grant (LP100200597) in partnership with the Peanut Company of Australia.



University of
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**ARENA: Alliance for Research
in Exercise, Nutrition and Activity**



Peanut Company
of Australia



Australian Government
Australian Research Council



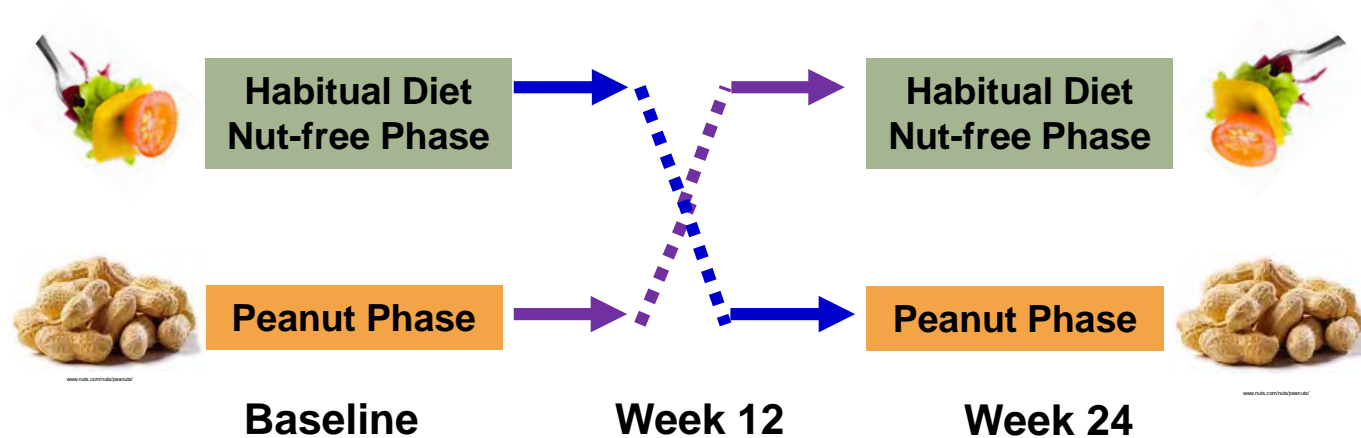
Study Design



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Randomised cross-over



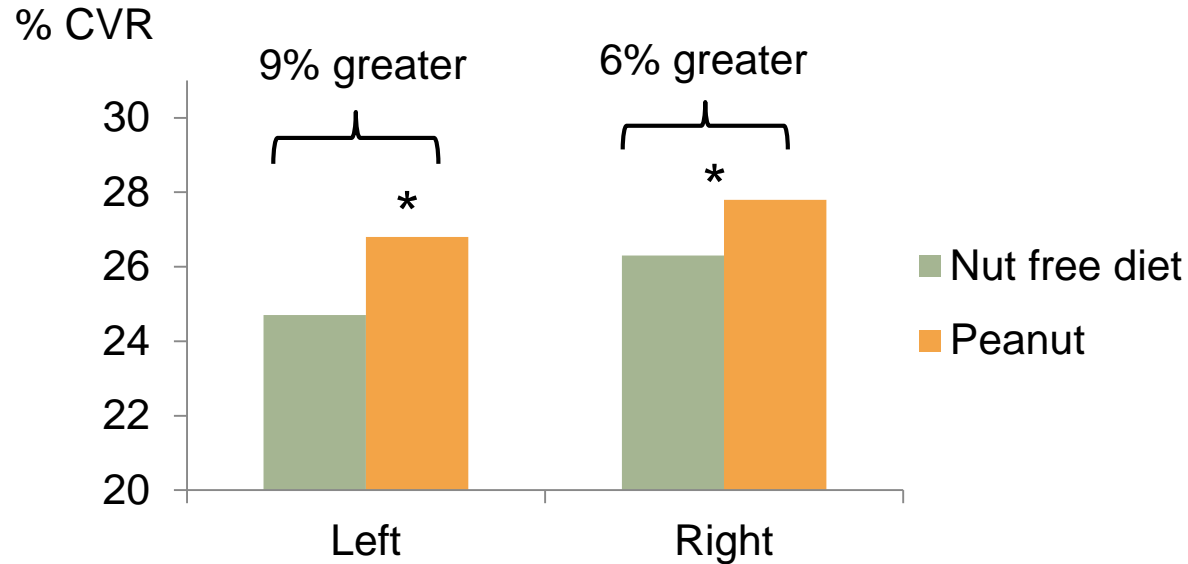
Peanuts Improve Vascular Function



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Increased responsiveness of brain blood vessels

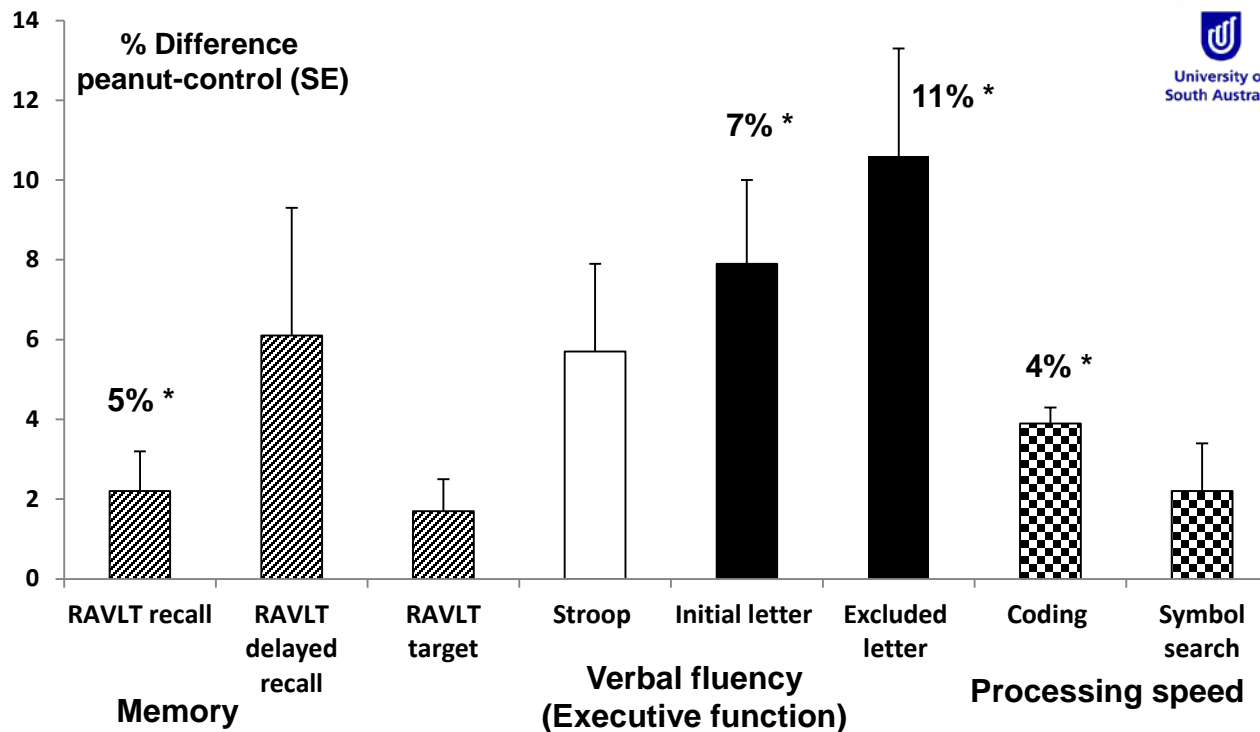


* Denotes $p < 0.05$

Improvements in cognitive function



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* Denotes $p < 0.05$

Could almonds have the same benefits?



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12 week RCT funded by the Almond Board of California

Aim: To compare 15% energy from almonds or control snack foods on biomarkers of cognitive function, cardiovascular and metabolic health



Snack Food - Cognition Study

Volunteers needed to investigate the effect of eating almonds on cognitive performance and heart health

Are you:

- Overweight?
- Aged 50-80 years?
- A non-smoker?
- Not allergic to nuts?

If you answered 'yes' to all of the above then you may be eligible for this study.

Volunteers will be asked to consume almonds or alternative snack foods every day for 12 weeks. All almonds and snack foods will be provided to volunteers at no cost. We will examine cognitive function and heart health at the beginning and end of the 12 weeks.

Participation in the study will last 12 weeks and will involve seven visits:

- Two (2) in-person screening visits at UniSA City East Campus prior to the study lasting about 45 minutes each.
- Two (2) in-person clinic visits at UniSA City East Campus at the beginning and end of the study lasting about 3.0 hours each.
- Three (3) in-person visits to collect study foods at UniSA City East Campus lasting about 20 minutes each.

Upon successful completion of the study, volunteers will receive an honorarium payment of \$100 and all participants will receive a copy of their individual results as well as a summary of the study findings.

Participation in this study is voluntary. If you would like more information about the study please contact Ph: 8302 1365 or Email: sansom.researchvolunteers@unisa.edu.au

This study is approved by The University's Human Research Ethics Committee



Image source: Nuts for Life, www.nutsforlife.com.au



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63 people recruited to date (150 needed)

**Recruiting adults
aged 50-80 years in
Adelaide**

<http://www.unisa.edu.au/Research/Sansom-Institute-for-Health-Research/Laboratories-and-Facilities/Clinical-Trial-Facility/Volunteers/Snack-Food-Cognition-Study>

**COMING
SOON!**

Conclusion



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- Growing evidence to support a beneficial effect of nuts on vascular function
- Growing evidence that regular consumption of nuts can help slow cognitive decline associated with ageing
- **Important next steps**
 - How much should we be eating?
 - Are all nuts beneficial?

