Heart Health: The Role Diet and Plant Sterols Play in Maintaining Healthy Cholesterol Levels

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Heart Health
The Role Plant Sterols Play in Maintaining Healthy Cholesterol Levels

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For Today
1. Prevalence of elevated cholesterol levels in Australia and New Zealand
2. Impact of diet and lifestyle factors on heart health
3. Role of plant sterols
4. Top Heart Health Tips

Dyslipidaemia in Australia

Blood lipids
- Total cholesterol
- HDL (good) cholesterol
- LDL (bad) cholesterol
- Triglycerides

Per cent

- Total cholesterol ≥ 5.5 mmol/L
- LDL ≥ 3.5 mmol/L
- HDL < 1.0 mmol/L (men) and < 1.3 mmol/L (women)
- Triglycerides ≥ 2.0 mmol/L

Australian Health Survey: Biomedical Results for Chronic Diseases, 2011-12: 486-4364/0.55/005
High Cholesterol in Australia

• 1 in 3 adults have high cholesterol\(^1\)
• High cholesterol responsible for 8% of total ischaemic heart disease deaths\(^2\)
• Only 1 in 10 of those self-reported having high cholesterol as a current and long-term health condition\(^3\)

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And in New Zealand

One in three adults aged over 65 years had high cholesterol

Average cholesterol level for adults sits at 5.39 mmol/L where health guidelines recommend it be below 4.0 mmol/L.

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\(^1\) Australian Health Survey: Biomedical Results for Chronic Diseases, 2011-12. ABS 4364.0.55.005
\(^3\) www.heartfoundation.org.au/news/time-for-action-on-heart-disease-and-stroke
Know your Number

Lipid targets never treated in isolation – viewed in overall CVD risk profile (e.g. prior CVD event, HT, smoking, weight, family Hx)

<table>
<thead>
<tr>
<th>Lipid Targets in Australia*</th>
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<tbody>
<tr>
<td>Total cholesterol</td>
</tr>
<tr>
<td>HDL-cholesterol</td>
</tr>
<tr>
<td>LDL-cholesterol</td>
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<tr>
<td>Non HDL-cholesterol</td>
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<tr>
<td>Triglycerides</td>
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Statin and non-statin therapies (including diet) used to ↓ LDL-C were associated with similar RRs of major vascular events e.g. ~25% ↓ in events for each 1 mmol/L ↓ in LDL-C

https://jamanetwork.com/journals/jama/fullarticle/2556125

Heart Healthy Eating Principles

1. Foods of diversity
2. Variety of healthy foods
3. Reduce or avoid foods high in saturated and trans fats
4. Reduce or avoid salt
5. Foods high in vegetables, fruits and legumes

Narrowing in on Dietary Patterns

Collins CE et al. Dietary patterns and cardiovascular disease outcomes: an evidence check rapid review brokered by the Sax Institute for the National Heart Foundation of Australia, April 2017.

Review looked at diet and chronic disease links from 304 meta-analyses and systematic reviews published in the last 63 years.

1. Plant-based foods more protective against risk of chronic disease c.f. animal-based foods
2. Wholegrain-based foods more protective than fruits and vegetables
3. Refined grains deleterious
4. Dairy products neutral
5. Red/processed meat increased risk
6. Tea the most protective beverage; soft-drinks the least
What about Saturated Fat?

- When saturated fat replaced by **unsaturated fat**, ↓ risk of CHD events and total mortality (PUFA > MUFA)
- When saturated fat replaced by **wholegrains**, ↓ risk of CHD events
- When saturated fat replaced by **refined carbohydrates**, risk unchanged


Going with the Grain

- ↑ in 3 servings of wholegrains per day: ↓ CVD mortality by 22%
- ↑ in 3 servings of wholegrains per day: ↓ CVD mortality by 26%

For each 16 g of wholegrains consumed: ↓ CVD mortality by 9%

TMAO: A new link to heart disease?

- TMAO (trimethylamine N-oxide) generated by gut microbiota
- Linked to atherosclerosis in animal studies and ↑ platelet aggregation and inflammatory pathways
- Higher levels associated with CVD morbidity and mortality
- Dietary precursors are carnitine and choline – both high in red meat
- Vegetarian diets ↓ gut bacteria that metabolise carnitine

Plant Sterols

- Have a chemical structure similar to that of cholesterol and are able to reduce the absorption of cholesterol in the digestive system
- Vegetable oils highest natural source with smaller quantities found in nuts, legumes, and cereal grains
- Western diet contains 160-400 mg/day

8% ↓ in LDL-C with doses of 2–2.5 g/d
10% ↓ in LDL-C with doses of 2.5–3.0 g/d
Adults with high risk of CVD benefit from the cholesterol-lowering effect of consuming phytosterols naturally occurring in plant foods and from phytosterol enriched foods.

Consume 2–3 g of plant sterols from enriched foods daily as part of a heart healthy diet to assist in ↓ LDL cholesterol levels.

1. Two fruit and five vegetables each day. Fresh, frozen and canned are all good options
2. Make at least half of grain serves as wholegrains. 1 serve = 1 slice bread, ½ cup cooked rice or pasta, 2 wheat/oat biscuits
3. More soluble fibre from oats, barley, psyllium, legumes, sweet potato, pears, apples, citrus fruits and eggplant
4. Eat foods rich in unsaturated fats such as nuts (1-2 handfuls most days), seeds, and olive oil and have less of foods high in saturated fat such as fatty meat, butter and coconut oil
5. Oily fish twice per week e.g. anchovies, tuna, Atlantic salmon, trout, trevally, sardines, whiting and snapper
Top Tips for a Healthy Heart

6. Include 2–3 g of plant sterols per day from enriched foods. For example, Weet-Bix Cholesterol Lowering which contains 2 grams of plant sterols per serve.

7. Include soy foods which contain high-quality protein that can help with lowering cholesterol. Target 25 g soy protein/day (1-3 serves). Soy beans, edamame, tofu, tempeh, soy milk/yoghurt, soy and linseed bread.

8. Eat less salt, drink less alcohol and quit smoking.

9. Get active.

10. Keep weight in check.
Harnessing The Power of Plant Sterols

Peter Clifton
Professor of Nutrition
University of South Australia

Overview

- The Role Plant Sterols play in Maintaining Healthy Cholesterol Levels
- Totality of the Evidence
- International Authorities: Evidence-Based Dietary Recommendations
- Weet-Bix™ Cholesterol Lowering Clinical Trial
- Top Plant Sterol Q&A’s
- Emerging Evidence

The Science: The Role of Diet

Systematic review Sax Institute, 2017 – Addressing the Saturated Fat (SF) controversy.

Analysed from systematic reviews published since 2009

Dietary Fats and the primary and secondary prevention of heart implications and associated risk factors

53 studies assessed using the NHMRC Framework
The Science: The Role of Diet

Systematic review Sax Institute, 2017 – Addressing the Saturated Fat (SF) controversy.

- Is SF and Polyunsaturated Fat (PUFA) related to Heart Health Implications?
- Is SF and PUFA related to Heart Health outcomes in those with existing Heart Conditions?

The Science: NEW NEWS

- Changing saturated/PUFA intake is difficult, consuming sterol-enriched foods on a daily basis is easy!
- 12 meta-analyses covering healthy people, people with Familial Hypercholesterolemia, type 2 Diabetes, on statins
- But phytosterols do more than lower LDL cholesterol and reduce heart health events - which is a risk factor for dementia they may directly influence the process

Plant Sterols – Nature’s Secret Weapon

One of the 10 greatest discoveries in nutrition in last 40 years

2g of Plant Sterols
How do Plant Sterols Lower Cholesterol?

The Science: Plant Sterols

- Plant sterols are clinically proven by over 40 clinical studies.
- Plant sterol enriched foods which deliver 2G per day, lower LDL cholesterol by up to 9%.
- The National Heart Foundation of Australia, recommends 2–3g of plant sterol enriched foods for people with elevated cholesterol.

Is there any good news when it comes to Cholesterol?

If you lower LDL Cholesterol by 10%....

10%  20%

...likelihood of a heart health event reduces by up to 20%
Leading Health Authorities Recommendations

• Evidence-based dietary recommendations for management of cholesterol, including recommendations around plant sterols are also supported by international authorities.

• European Society Cardiology
• American Heart Association
• International Atherosclerosis Society
• Dutch Heart Foundation
• Finnish Nutrition Association
• Finnish Medical Society
• Nutrition Foundation of Italy

Weet-Bix Cholesterol Lowering: Clinically Proven

Cholesterol-Lowering Effects of Plant Sterols in One Serve of Wholegrain Wheat Breakfast Cereal Biscuits—a Randomised Crossover Clinical Trial
Peter Clifton & Jennifer Keogh, March 2018

The results of the Clinical Trial confirm that consuming 2 Weet-Bix Cholesterol Lowering a day for 4 weeks, lowers LDL “bad” cholesterol by up to 9%.

Results are in line with total body of clinical evidence

Weet-Bix Cholesterol Lowering: Clinically Proven

Diet quality was improved by adding Weet-Bix

Close to half of the participants could not identify the product containing plant sterols
**Food Regulation Change and New Technology**

2 grams of plant sterols found in...

- 2 Weet-Bix (1 serve)
- 25g or 1 large tbsp (2.5 serves)

**Life Changing Innovation**

- Effective
- Easy
- Enjoyable
- Endorsed

**An Australian/New Zealand First in Breakfast Cereals**

Breakfast cereal with plant sterols
Common Plant Sterol Q&As

- Benefit of Consuming > 2-3 g of Plant Sterols?
- Timing of Plant Sterol Dose?
- Does Cooking/Heat Affect Plant Sterols?
- Stability of Plant Sterols?
- Where is the Plant Sterol from in WBCL?
- Safety Aspects of Plant Sterols?

The Science: Emerging Evidence

Dementia is the 2nd leading cause of death of Australians Phytosterols:
- Involved in the regulation of lipid metabolism & the pathogenesis of dementia
- Mediate cell & membrane cholesterol efflux or beta amyloid (Aβ) metabolism, which have preventative & therapeutic effects on dementia

Phytosterols are less amyloidogenic than cholesterol

Only one phytosterol, stigmasterol, reduced Aβ generation by:
1) Directly β-secretase activity
2) Reducing expression of all γ-secretase components
3) Reducing cholesterol and presenilin distribution in lipid rafts implicated in amyloidogenic APP cleavage
4) BACE1 internalization to endosomal compartments, involved in APP β-secretase cleavage

The dietary intake of phytosterol blends mainly containing stigmasterol might be beneficial in preventing Adult Dementia

(Burg 2013)
Additional Resources to Take Charge on Heart Health:

- Sanitarium Health Professional Website – Aus
- Sanitarium Health Professional Website – NZ
- Heart Foundation Australia
- Heart Foundation New Zealand
- Grains & Legumes Nutrition Council – Heart Health
- Australian Breakfast Cereals Manufactures Forum – Breakfast Cereals & Heart Health