

VITAL

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NEWS, VIEWS & INFORMATION FOR NUTRITION PROFESSIONALS

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APRIL

The forgotten omega-3	2
Breaking the 'iron triangle'	4
A Tick for butchers	5
Heart-friendly handbook	6
The teenage anti-acne diet	6





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Welcome to our autumn issue of *Vital*.

With 40 per cent of deaths in Australia attributable to cardiovascular disease, this issue of *Vital* focuses on practical ways to lower the risk.

Dr Barbara Meyer, from the University of Wollongong, and Dr Neil Mann, from RMIT, share with us the results of their exciting research looking at the health benefits of the forgotten omega-3, docosapentaenoic acid (DPA).

We also report on the first dietary intervention study to look at the effects of red meat and haem iron on the markers for oxidative stress and inflammation, two risk factors for coronary heart disease.

In this issue of *Vital*, we give you a snapshot of how MLA is working together with the Heart Foundation to help Australians choose leaner cuts of meat with lower saturated fat levels.

We review the latest book by accredited practising dietitian, Nicole Senior, and home economist Veronica Cuskelly, *Eat to Beat Cholesterol*, which explains the importance of good nutrition in helping to lower cholesterol and improve heart health.

Finally, we introduce to you the *Teenage Anti-acne Diet*, based on scientific research conducted by RMIT in conjunction with the Royal Melbourne and Royal Children's hospitals.

I hope you find this special 'heart healthy' issue of *Vital* informative and I look forward to receiving your feedback and ideas for future issues.

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The forgotten omega-3

Two recent studies suggest that the little-known long-chain omega-3, docosapentaenoic acid (DPA), has positive effects on heart health.



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Much of the research on long-chain omega-3 fatty acids has focused on the health benefits of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), found largely in fish and seafood. EPA and DHA have been shown to lower lipid profiles, platelet aggregation and activation, and risk of stroke. They also have anti-arrhythmic and anti-thrombotic effects. However, docosapentaenoic acid (DPA) has been less well studied and as a consequence, very little is known about this long-chain omega-3 fatty acid predominantly found in red meat.

Recently, Dr Neil Mann, from RMIT, and Dr Barbara Meyer, from the University of Wollongong, collaborated on two intervention studies, each examining the role DPA plays: 1) in healthy individuals¹ and 2) in hypertriglyceridaemic individuals² (see page 3). Both studies involved subjects being randomly assigned to one of three supplementation groups: seal oil supplementation (DPA-rich), fish oil supplementation, or placebo.

Seal oil was chosen for its high levels of DPA. "It's difficult to get a purified form of DPA," says Dr Mann. "At that time, the richest form commercially available was seal oil."

The results of both studies suggest that seal oil is just as effective as fish oil in lowering cardiovascular disease risk factors in healthy people, as well as lowering plasma triglyceride levels and blood pressure in those with hypertriglyceridaemia.

"We were particularly interested in looking at the effect of DPA on platelet function, particularly in reducing platelets clumping together and initiating blood clots," Dr Mann says. "We used a relatively new haematology technique to measure how 'sticky' platelets get, hence measuring their level of activity. We found the seal oil group had significantly less active platelets, compared to the other groups. This indicates that DPA may be beneficial in lowering platelet activity," Dr Mann says.

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Dr Meyer says the results have implications for both nutrient claims and healthcare professional advice on heart health. Currently, Food Standards Australia New Zealand does not allow omega-3 nutrient claims for DPA, only for EPA and DHA. "This is because very little is known about DPA," says Dr Meyer. "If DPA was included, then lean red meat would be classified as a good source of omega-3s, providing an alternative source for those that do not eat fish," she says.

A recent reanalysis of the Australian National Nutrition Survey reported that almost a third of our total omega-3 intake (246mg/day) is derived from red meat, making red meat the second largest source of omega-3s in the Australian diet³. Because this data indicated DPA (mainly from red meat) contributes a large proportion of our overall long-chain omega-3 intake, Dr Meyer believes, "more research to support the health benefits of DPA is required, and the more information we can get, the better."

These initial studies provide a positive insight into the health benefits of DPA; however, larger trials using a more purified form of DPA are now required. "We are looking at carrying out a larger study using concentrated DPA extracted from fish oil," Dr Mann says. "Seal oil has only 5–6 per cent of DPA, whereas the concentrated fish oil capsules being prepared are 50 per cent DPA."

Study one: effectiveness of DPA in lowering cardiovascular risk factors in healthy subjects¹

Objectives

To compare the effects of DPA-rich seal oil supplementation with fish oil on:

- lowering triglyceride levels
- influencing LDL and HDL-cholesterol levels
- platelet activation and platelet aggregation
- plasma C-reactive protein levels (a marker of systemic inflammation).

Subjects

30 healthy subjects.

Study design

Subjects were randomly allocated to one of three groups for 14 days:

Group	Long-chain omega-3 content of capsules (1g/day)		
	EPA	DHA	DPA
Seal oil capsules (DPA)	360mg	450mg	250mg
Fish oil capsules (DHA & EPA)	210mg	810mg	30mg
Placebo (vegetable oil) capsules	0mg	0mg	0mg

At baseline and at 14 days:

- full lipid profiles were carried out
- measurements of platelet activation and aggregation, and incorporation of omega-3 fatty acids into platelet phospholipids, were taken.

Study results:

- Seal oil supplementation significantly increased incorporation of DPA, DHA and EPA into platelet phospholipids while fish oil supplementation increased EPA and DHA only.
- Seal oil supplementation significantly decreased plasma triglyceride and significantly increased HDL-cholesterol compared to the fish oil and placebo groups, which showed no improvements in blood lipid profiles.
- Seal oil supplementation significantly decreased platelet activation, although none of the groups showed changes in platelet aggregation.
- No group showed changes in C-reactive protein.

Conclusion:

The results show that, in healthy people, seal oil may be more effective than fish oil at lowering cardiovascular disease risk factors related to platelet activation and blood lipids.

Study two: effectiveness of DPA in lowering plasma triglyceride levels and other cardiovascular risk factors in hypertriglyceridaemic subjects²

Objective

To compare the effects of DPA-rich seal oil supplementation with fish oil on lowering cardiovascular risk factors in hypertriglyceridaemic subjects.

Subjects

52 hypertriglyceridaemic subjects.

Study design

Diet intervention as per the previous study, but over a six-week period. Fasting blood samples for red blood cell (RBC) fatty acids, plasma triglycerides and blood pressure were taken at baseline and at six weeks.

Study results

- No changes in plasma triglycerides or blood pressure were detected in the placebo group.
- Seal oil supplementation significantly increased incorporation of DPA, DHA and EPA into RBC with fish oil increasing DHA only.
- Plasma triglycerides were reduced by 7 per cent and 14 per cent in the fish oil and seal oil groups, respectively.
- Seal oil and fish oil reduced systolic blood pressure in these hypertriglyceridaemic subjects, by 8 and 5mmHg, respectively, but there were no differences in diastolic blood pressure.

Conclusion

The study suggests that seal oil is just as effective as fish oil at lowering plasma triglyceride levels as well as systolic blood pressure in hypertriglyceridaemic subjects.

Key points

- The omega-3 predominantly found in red meat is DPA.
- Red meat is the second largest source of omega-3s among Australians, indicating DPA contributes a large proportion of our overall long-chain omega-3 intake.
- In hypertriglyceridaemic subjects, DPA-rich seal oil is as effective as fish oil in lowering plasma triglyceride levels and systolic blood pressure.
- In healthy individuals, DPA-rich seal oil may be more effective than fish oil at lowering cardiovascular disease risk factors such as platelet activation and blood lipids.

References:

1. Mann et al (2006), *Asia Pacific Journal of Clinical Nutrition*, 15(3):S48
2. Meyer et al (2006), *Asia Pacific Journal of Clinical Nutrition*, 15(3):S125
3. Howe et al (2006), *Nutrition*, 22:47-53

Breaking the 'iron triangle'

A new study challenges current thinking that lean red meat increases oxidative stress and inflammation, two heart disease risk factors.



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Several population studies have linked red meat intake with an increased risk of heart disease. "In these studies, one suggested mechanism for this increased risk is that red meat increases oxidative stress and inflammation, and that iron may be the cause. However, there is little support for this from intervention studies," says Dr Jonathan Hodgson, Senior Research Fellow at the School of Medicine and Pharmacology, University of Western Australia.

Dr Hodgson recently led the first randomised controlled study¹ on the effects of animal protein and blood pressure (reported in *Vital* 30, January 2006). He found that higher intakes of lean red meat in hypertensive subjects resulted in a significant reduction in systolic blood pressure.

"In these studies, one suggested mechanism for this increased risk is that red meat increases oxidative stress and inflammation, and that iron may be the cause. However, there is little support for this from intervention studies."

Last year, Dr Hodgson used his study to test the theory that lean red meat increases oxidative stress and inflammation². In the eight-week study, one subject group increased its intake of lean red meat by 200g per day, partially replacing carbohydrate-rich foods, while the control group maintained its high-carbohydrate diet.

Effect of diet on iron stores

In the higher protein group, dietary iron increased by 3.2mg per day, but analysis of iron markers showed significantly lower serum iron and transferrin saturation concentrations, with no changes in serum ferritin.

"Most studies in iron-replete subjects generally find little or no change in markers of iron stores. This is because there are mechanisms to maintain iron status," says Dr Hodgson.

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Effect of diet on oxidative stress and inflammation

Isoprostanes – good markers of oxidative damage to body lipids – were used to measure oxidative stress. Results in the higher protein group showed no adverse effects on oxidative stress with a significant reduction in urinary F₂-isoprostanes and no change in plasma F₂-isoprostanes.

Counts for leukocytes, neutrophils, lymphocytes, monocytes, high-sensitivity plasma C-reactive protein (CRP), serum amyloid A protein (SAA) and plasma fibrinogen were used to assess inflammation. The higher protein group showed no increase in inflammation with a significant decrease in leukocyte counts, no change in plasma fibrinogen and a trend towards lower CRP.

CSIRO researchers found similar results with a higher protein, low-fat diet, which included 200g of lean red meat at least four times a week. There were no significant effects on markers of iron status or CRP³.

Although several population studies suggest a link between red meat, haem iron and increased risk of heart disease, it's uncertain whether the link is causal. "In iron-replete individuals, an increase in lean red meat intake, partially replacing carbohydrate, is unlikely to increase oxidative stress or inflammation," says Dr Hodgson of his study results. "Factors other than lean red meat itself may be responsible, such as saturated fat or processed meat intake, or unhealthy lifestyle factors."

"In iron-replete individuals, an increase in lean red meat intake, partially replacing carbohydrate, is unlikely to increase oxidative stress or inflammation."

Dr Hodgson does not rule out the link between iron status and oxidative stress and inflammation, particularly when results showed a simultaneous reduction in all three. Further studies need to examine this further.

Key points

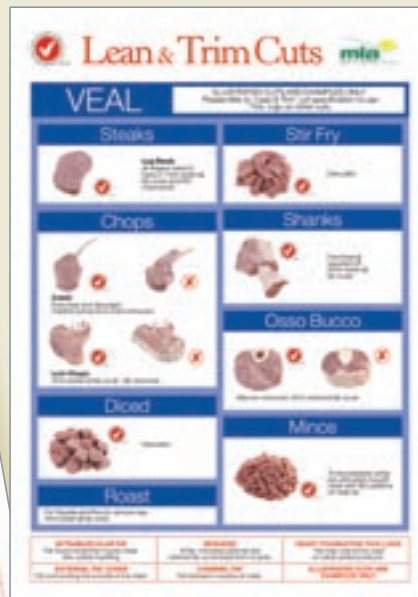
- Population studies suggest a link between red meat intake and oxidative stress and inflammation. There is little evidence from intervention studies to support this.
- There could be mechanisms to maintain iron status in the body in iron-replete individuals.
- Partial replacement of dietary carbohydrate with protein from lean red meat did not elevate markers of oxidative stress or inflammation.

References:

1. Hodgson et al (2006), *American Journal of Clinical Nutrition*, 83: 780-787
2. Hodgson J M et al (2007), *Journal of Nutrition*, 137:363-367
3. Noakes M et al (2005), *American Journal of Clinical Nutrition*, 81:1298-1306

A Tick for butchers

Consumers rely heavily on the Heart Foundation's Tick when choosing food. Through MLA's Tick in Butchers program, butchers are helping consumers make healthier meat choices too.



The National Heart Foundation's Tick program was launched nationally in 1989 to help consumers choose healthier foods quickly and easily. The program also encourages food manufacturers and providers to improve the nutritional profiles of their foods. Foods displaying the iconic red and white Tick symbol must comply with strict nutritional and labelling standards set by the Heart Foundation.

The program has created a high level of awareness of the Tick among consumers, and from 2004 the Tick also applied to meat sold in butchers' shops. MLA, together with the Heart Foundation, has since made compliance with the Tick requirements easier for butchers – and choosing leaner cuts of meat easier for consumers – through its Tick in Butchers program.

'The program has created a high level of awareness of the Tick among consumers, and from 2004 the Tick also applied to meat sold in butchers' shops.'

"With red meat, the Heart Foundation found a two-fold approach was needed to achieve its mission of helping Australians eat better," says

Meghan Van den Hooven from the National Heart Foundation's Tick Food Information Program. "Firstly, we believed it was essential to clear misconceptions about the role of red meat in a healthy, balanced diet, as there was much consumer confusion about whether or not red meat should be eaten." From 1983 to 1996 red meat consumption rapidly declined, with intakes for women down 45% and men down 36%¹ despite our national dietary guidelines recommending we eat lean red meat 3-4 times per week.

"Secondly, the Heart Foundation felt it was important to help consumers spot the healthier choices when meat shopping. The Tick is a proven way of letting consumers know that it meets strict Heart Foundation standards; making it clear that it's an independently approved, healthier choice." According to Heart Foundation research, grocery buyers also rely heavily on the Tick when choosing lean red meat.²

The Tick in Butchers program helps achieve both of the above goals. Butchers register to participate in the program, and are provided with tools to help them prepare meat to qualify for the Tick. These include posters illustrating how, and which, beef, lamb and veal cuts must be prepared.

'Many cuts of lean beef, lamb and veal already qualify for the Tick, as the average saturated fat content per 100g of raw meat is 1.6g for lean beef, 2.4g for lean lamb and 0.7g for lean veal.'

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References:

1. Red Meat and Health Expert Advisory Committee (2001), *The role of red meat in healthy Australian diets*.
2. *Instinct and Reason* (2003)
3. Droulez V et al (2006), *Food Australia*, 58(7): 335-341

Key points

- Grocery buyers rely heavily on the Heart Foundation's Tick when choosing lean red meat.
- MLA's Tick in Butchers program helps clear misconceptions about the role of red meat in a healthy diet, and helps consumers choose leaner cuts of meat.
- To qualify for the Tick lean red meat must meet strict Heart Foundation criteria.

Heart-friendly handbook

With a heart-health guide, food facts and recipes all in one, a new book provides a one-stop shop for patients fighting high cholesterol.

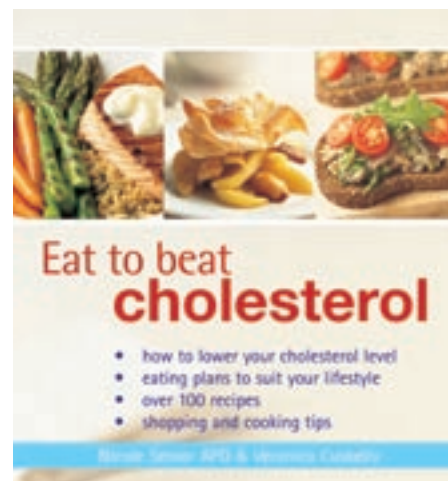
One look at Australia's health statistics and it's obvious the fight against heart disease is far from over. Cardiovascular disease is responsible for almost 40 per cent of deaths in Australia¹. It's no wonder, when statistics show 50 per cent of Australian adults have high cholesterol (above 5.5mmol/L)¹ and 90 per cent have at least one modifiable risk factor for heart stroke and vascular diseases².

But cholesterol can be controlled. *Eat to Beat Cholesterol* is one weapon in the fight against cardiovascular disease. Written by Nicole Senior, accredited practising dietitian and nutrition consultant, and award-winning recipe writer Veronica Cuskelly, this user-friendly book explains the importance of cholesterol and heart health. It brings together practical tips about heart-friendly food, nutritious recipes, kilojoule-controlled meal plans, suggested dietary targets for chronic disease prevention, food facts every patient will want to know, and much more.

"The recipes are balanced, nutritious, achievable and delicious," says Nicole. "The solution to high cholesterol levels is in our local supermarket – heart-friendly foods such as vegetables, wholegrains, fruits, legumes, lean meats, fish, nuts and healthy oils."

The book's facts dispel a number of food myths. "Many people with high cholesterol think red meat is off the menu, for instance. But lean red meat is a nutritious food low in saturated fat. It adds enjoyment, flavour and filling power to heart-friendly meals based on wholegrains and vegetables," Nicole says. "Many people don't realise that Australian lean red meat also contains long chain omega-3 fats that help protect the heart."

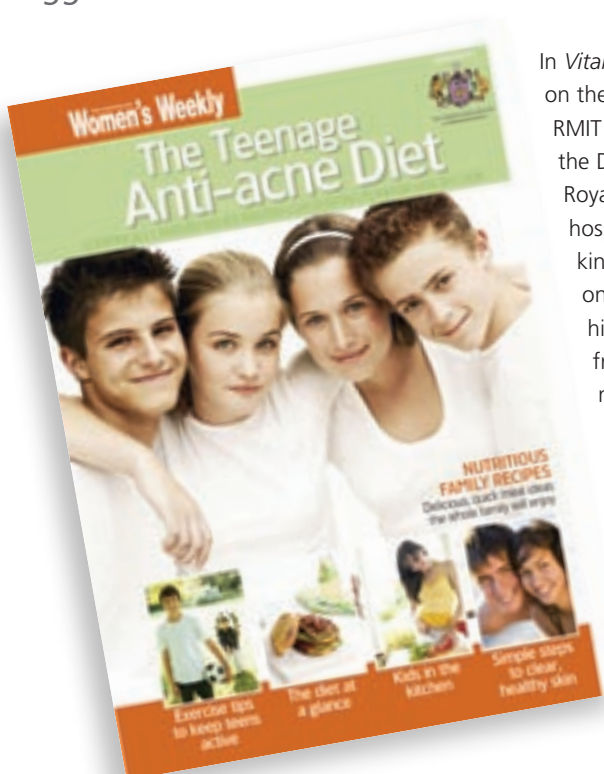
Eat to Beat Cholesterol (New Holland, rrp \$29.95) is available from department stores, book shops or at www.greatideas.net.au



1. Australian Institute of Health & Welfare (2006), *Australia's health 2006*
2. Australian Institute of Health & Welfare (2004), *Heart, stroke and vascular diseases – Australian facts 2004 – risk factors*

The teenage anti-acne diet

The link between diet and acne has long been considered a myth, but an Australian study suggests otherwise.



In *Vital* 33, October 2006, we reported on the exciting new study conducted by RMIT University in collaboration with the Department of Dermatology at the Royal Children's and Royal Melbourne hospitals. This study, the first of its kind to investigate the effect of diet on acne symptoms, found that a higher protein–low GI diet including fresh fruit, vegetables, lean red meat, seafood and wholegrains helped to reduce acne by more than 50 per cent in 12 weeks.

The study is now available online in the *Journal of the American Academy of Dermatology* and will also be published in the *American Journal of Clinical Nutrition*, this year.

Together with the help of the *Australian Women's Weekly*, the Australasian College of Dermatologists and RMIT University, we developed the 16-page booklet, *The Teenage Anti-acne Diet*. *The Teenage Anti-acne Diet* helps to turn the research into a practical diet and lifestyle plan that can be used alone or with anti-acne treatments to improve acne and overall quality of life. The booklet provides parents of teens with a holistic lifestyle plan for skin health including healthy eating plans, inspiring recipes, quick meal ideas and helpful tips on exercise and basic skin care.

If you would like to receive additional copies of *The Teenage Anti-acne Diet*, please complete the enclosed response device.