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## Seeing clearly with antioxidants

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## Seeing clearly with antioxidants

### Abstract

While the evidence pointing to the cause of AMD has been mixed, a few studies have explored the role of diets. A large randomised control trial<sup>1</sup> that looked at people with the onset of AMD showed that high-dose vitamins C and E, zinc and beta-carotene supplementation may slow AMD progression in relatively advanced early AMD cases by up to 25 per cent. Recently, another study<sup>2</sup> showed evidence that an above-median dietary intake of these same nutrients was associated with a 35 per cent reduction in AMD risk.

### Keywords

seeing, antioxidants, clearly

### Disciplines

Arts and Humanities | Life Sciences | Medicine and Health Sciences | Social and Behavioral Sciences

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# VITAL

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NEWS, VIEWS & INFORMATION FOR NUTRITION PROFESSIONALS

BROUGHT TO YOU BY NUTRITION COMMUNICATIONS, MEAT & LIVESTOCK AUSTRALIA

SEPTEMBER

Meat 'alternatives': do they meet nutritional requirements?	2
Seeing clearly with antioxidants	4
Elderly – higher protein needs	5
Secrets to living a longer life	6
New website: <a href="http://www.redmeatandnutrition.com.au">www.redmeatandnutrition.com.au</a>	6





Fransiska Hluschniow  
NUTRITION COMMUNICATIONS  
MANAGER,  
NUTRITION MLA

Welcome to our spring issue of *Vital*.

In the light of conflicting media coverage, it can be quite confusing to work out if eating meat is healthy or not. For some, it becomes all too much and in the end, we feel reassured by our current food guide to substitute meat with 'plant alternatives'. But has anyone ever looked at the actual nutritional consequences this has? In this issue of *Vital*, we report on a dietary modelling study led by Professor Katrine Baghurst which explores the question of nutritional equivalence between animal and plant sources of protein.

Age-related macular degeneration (AMD) is the leading cause of blindness in Australia; however the treatment options are limited which means that prevention is vital. Dr Vicki Flood shares with us the results of her cohort study, involving 3654 Australians, where she investigated the potential role of specific antioxidants on reducing the risk of AMD.

The requirements for protein outlined in the *Nutrient Reference Values for Australia and New Zealand*, are approximately 20 per cent higher in those over the age of 70 compared with younger people. Professor Caryl Nowson explains how increasing protein intake in the elderly can be quite challenging but provides some helpful tips to make it easier.

We review the latest book by ABC's national medical reporter, Sophie Scott which looks at the secrets to living a longer life.

Finally, read all about our new website for healthcare professionals - [www.redmeatandnutrition.com.au](http://www.redmeatandnutrition.com.au)

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

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# Meat 'alternatives': do they meet nutritional requirements?

*The Dietary Guidelines for Australians<sup>1</sup> state that the 'meats and/or alternatives' group are valuable sources of protein as well as being major providers of iron, zinc, vitamin B12 and long-chain omega-3s. Now a new study suggests that when plant sources of protein are chosen the above key nutrients may actually be compromised. The results have important implications for nutrition education and the development of the new food guide.*



Professor Katrine Baghurst,  
ADJUNCT PROFESSOR, DEPARTMENT  
OF MEDICINE AT THE UNIVERSITY OF  
ADELAIDE

In 2006, a report outlining the *Nutrient Reference Values for Australia and New Zealand (NRVs)*, including *Recommended Dietary Intakes*, was released by the National Health and Medical Research Council (NHMRC)<sup>2</sup>. The report established requirements for iron, zinc, vitamin B12 and long-chain omega-3s for different segments of the population. Interestingly the report set the requirements for iron and zinc, 80 and 50 per cent higher respectively for vegetarians, highlighting the differences in iron and zinc bioavailability between animal and plant foods.

The NHMRC recommendations, caused Professor Katrine Baghurst, Adjunct Professor, Department of Medicine at the University of Adelaide to query the nutritional implications of substituting meats with plant alternatives as suggested by the 'meats and alternatives' food group in the current dietary guidelines and food guide – the Australian Guide to Healthy Eating (AGHE)<sup>3</sup>.

Professor Baghurst along with leading nutritionist Mr Bill Shrapnel, recently conducted a comprehensive dietary

modelling study to explore the issue<sup>4</sup>. They investigated the nutritional implications of a range of healthy dietary patterns suggested in the AGHE, with a focus on the 'meats and alternatives' food group.

The study modelled two series of five diets. The first diet in each series contained five serves of cereals (including breads, cereals, rice, pasta, noodles), five of vegetables; two of fruits; two of dairy; one of 'meats and alternatives'; a half serve of 'extras' – both at 7000kJ. In the following four diets in Series A, another serve of cereals and 'extras', were progressively added to make each diet 1000kJ more than the previous one. In Series B, serves of 'meats and alternatives' and 'extras' were progressively added to the following four diets, to make each diet 1000kJ higher than the previous diet.

Within each diet, substitutions within the 'meats and alternatives' group were then made, for example, in Series A, a single serve of red meat was exchanged for a single serve of chicken, fish, legumes, nuts, seeds and so on. Each of the 10 diets were analysed for iron, zinc, vitamin B12 and long-chain omega-3s.

Computer simulation analysed the nutrient intakes for men, women and pregnant women within each of the diets. The analysis found a marked lack of nutritional equivalence between meat, poultry and fish with their plant-based counterparts. Diets with the plant alternatives did not meet the relevant NRVs for vitamin B12 and long-chain omega-3s for any of the groups assessed; nor for zinc in men and pregnant women; or iron in women and pregnant women.

## Study Results

The study showed the following implications for substituting food of animal-origin with that of plant-origin in the 'meats and alternatives' food group.

### Iron

The dietary modelling exercise highlighted the importance of iron bioavailability in meeting the Estimated Average Requirement (EAR) for women and pregnant women. Diets with single and multiple serves of food of animal-origin consistently provided a higher proportion of the EAR for iron than that of plant-origin.

"We found that amongst foods of animal-origin lean red meat was the best provider of iron. The iron content of legumes was highly variable and less bioavailable than that found in animal sources. Peanuts, nuts and seeds were poorer sources of iron compared to lean red meat," Professor Baghurst reported.

### Zinc

Although there was not a major difference in the total zinc contents of diets incorporating serves of food of animal or plant-origin from the 'meats and alternatives' group, there was a major difference relative to meeting the EAR for zinc. For example, inclusion of a single serve of red meat or pork comfortably exceeded the EAR for zinc for men at relevant energy levels; however it was more difficult to achieve with plant sources, even when the number of serves was increased. This may be related to high phytate intakes in plant-based diets, which inhibits the absorption of zinc.

"Based on these findings, the inclusion of food of animal-origin from the 'meats and alternatives' food group appears essential if the EAR for zinc for men and pregnant women is to be achieved," Professor Baghurst said.

### Long-chain omega-3s

The implications of the lack of long-chain omega-3s in plant-based alternatives were evident in this study with diets comprising food of plant-origin providing no long-chain omega-3s compared to diets with a single serve of food of animal-origin supplying 41-265mg. Fish was found to be the richest source of long-chain omega-3s. Red meat was also a valuable source, with a serve providing about half of the long-chain omega-3s of a serve of fish (made up of 50 per cent snapper - a lower-fat fish and 50 per cent tuna - an oily fish).

### Vitamin B12

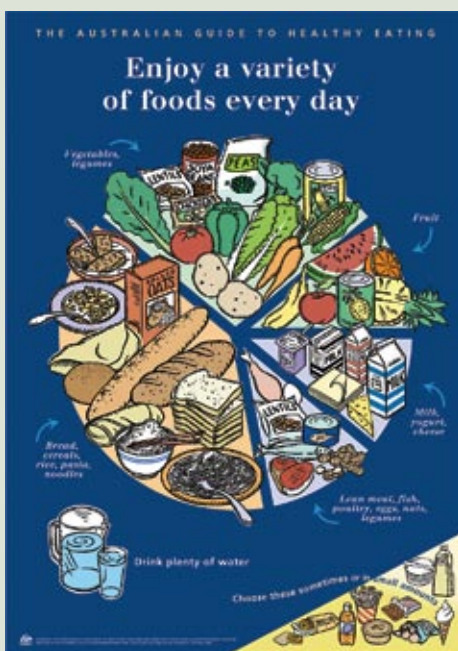
As plant sources of protein do not contain vitamin B12, diets which did not include meat, poultry or fish achieved only 75 per cent of the EAR for vitamin B12, this coming entirely from dairy.

### The problem of equivalence

The study suggests that, while nuts, seeds and legumes provide some valuable nutrients, including protein, the requirements for the key nutrients delivered by the 'meats and alternatives' group – iron, zinc, vitamin B12 and long-chain omega-3s - are unlikely to be met if plant sources are consumed in preference to animal sources.

**"While plant-based alternatives provide protein, with some exceptions, they are generally poorer sources of bioavailable iron and zinc and do not contain vitamin B12 or long-chain omega-3 fatty acids."**

"While plant-based alternatives provide protein, with some exceptions, they are generally poorer sources of bioavailable iron and zinc and do not contain vitamin B12 or long-chain omega-3 fatty acids," says Professor Baghurst. These findings are not consistent with the Australian Guide to Healthy Eating, which states that "foods are grouped together primarily on the basis of nutritional similarity<sup>3</sup>."



### A new food guide

This makes the logic of grouping meats with plant sources questionable. Professor Baghurst says that if nutritional similarity

is to be the guiding principle determining food-group composition, as stated by the Australian Guide to Healthy Eating, the placement of legumes, nuts and seeds in future food guides may need to be reviewed. "A re-examination of equivalence between 'meats and alternatives' in food guides is required in view of new recommendations for intakes of long-chain omega-3 fatty acids and the issue of bioavailability in relation to iron and zinc," Professor Baghurst concluded.

**"A re-examination of equivalence between 'meats and alternatives' in food guides is required in view of new recommendations for intakes of long-chain omega-3 fatty acids and the issue of bioavailability in relation to iron and zinc."**

### References:

1. National Health and Medical Research Council. Food for Health: *Dietary Guidelines for Australian Adults*. Canberra, 2003.
2. National Health and Medical Research Council. Department of Health and Ageing, Commonwealth of Australia; Ministry of Health New Zealand: *Nutrient Reference Values for Australia and New Zealand including Recommended Dietary Intakes*. Canberra, 2006.
3. Department of Health and Family Services. *The Australian Guide to Healthy Eating*. Canberra: 1998.
4. Shrapnel B and Baghurst K, (2007) 'Lack of nutritional equivalence in the 'meats and alternatives' group of the Australian Guide to Healthy Eating', *Nutrition & Dietetics*; in press.

## Key points

- There is a marked lack of nutritional equivalence between foods of animal-origin and plant-origin in the 'meat and alternatives' group.
- Diets exclusively incorporating serves of plant-origin from the 'meats and alternatives' group may not meet the NRVs for vitamin B12 and long-chain omega-3s; zinc for men and pregnant women; and iron for women and pregnant women.
- The placement of nuts, seeds and legumes in future food guides may need to be reviewed.

# Seeing clearly with antioxidants

Age-related macular degeneration (AMD) refers to degenerative diseases of the retina that cause progressive loss of central vision. AMD usually affects people over the age of 50 and treatment options are limited. This is a concern as it is the leading cause of blindness in Australia.



Dr Vicki Flood,  
NUTRITIONAL  
EPIDEMIOLOGIST, CENTRE  
FOR VISION RESEARCH,  
WESTMEAD HOSPITAL,  
UNIVERSITY OF SYDNEY

While the evidence pointing to the cause of AMD has been mixed, a few studies have explored the role of diets. A large randomised control trial<sup>1</sup> that looked at people with the onset of AMD showed that high-dose vitamins C and E, zinc and beta-carotene supplementation may slow AMD progression in relatively advanced early AMD cases by up to 25 per cent. Recently, another study<sup>2</sup> showed evidence that an above-median dietary intake of these same nutrients was associated with a 35 per cent reduction in AMD risk.

Now a new paper<sup>3</sup> available online in *Ophthalmology*, the journal of the American Academy of Ophthalmology, investigates the association between dietary antioxidants from daily foods and supplements (particularly vitamins C and E, zinc and beta-carotene) and the incidence of AMD in older Australians without AMD at baseline over a ten-year period.

The population-based longitudinal study, named The Blue Mountains Eye Study - led by Professor Paul Mitchell, assessed the relationship between baseline dietary and supplement intakes of antioxidants and the long-term risk of AMD.

Eye examinations were carried out on baseline participants, with re-examinations and retinal photographs taken five and ten years later. The most interesting result from the study was the protective influences from zinc against AMD. Those with a zinc intake in the highest decile (greater than 15.8mg/day) were significantly less likely to develop early or any AMD than the remaining participants.

"We found that red meat was the highest contributor of dietary zinc," says Dr Vicki

Flood, from University of Sydney's Centre for Vision Research and the Human Nutrition Unit, and the study's principal nutritionist.

"Total red meat intake in this study contributed almost 37 per cent of dietary zinc intake for men, and 33 per cent for women – more than double the contribution provided by vegetables (16 per cent), dairy (15-16 per cent) and breads and cereals (15-16 per cent). On top of that, we know that zinc from meat is more readily absorbed by the body than from other sources." Lean red meat (beef and lamb), liver and oysters are particularly good sources.

Further results showed that those with a lutein and zeaxanthin intake of more than 942µg/day (top tertile of intake) were also less likely to develop AMD. "Lutein and zeaxanthin are found in vegetables and fruit, particularly green beans, silverbeet, broccoli – but also eggs," Dr Flood says. This is further supported by the finding that those with the highest vegetable intake were less likely to develop any AMD.

"In our research, omega-3 fatty acids were also shown to be protective against AMD, with a 60 per cent reduced risk of early AMD at five years among people with the highest omega-3 fatty acid intake compared to those with the lowest<sup>4</sup>. In the Australian diet, fish, eggs and lean red meat are good sources of long-chain omega-3 fatty acids."

**"regular serves of lean red meat – three to four times a week – fish, and five daily serves of vegetables are likely to be protective against the onset of AMD. It is very difficult to obtain these high zinc intakes from vegetable and cereal sources alone."**

Dr Flood says the study suggests that a balanced diet that includes "regular serves of lean red meat – three to four times a week – fish, and five daily serves of vegetables are likely to be protective against the onset of AMD. It is very difficult to obtain these high zinc intakes from vegetable and cereal sources alone."

## References:

1. Age-Related Eye Disease Study Research Group, (2001), 'A randomised placebo-controlled, clinical trial of high-dose supplementation with vitamin C and E, beta-carotene, and zinc for age-related macular degeneration and vision loss: AREDS report no. 8,' *Archives of Ophthalmology*; 119: 1417-36.
2. van Leeuwen R et al, (2005), 'Dietary intake of antioxidants and risk of age-related macular degeneration,' *Journal of the American Medical Association*; 294: 3101-7.
3. Tan JS et al, (2007), 'Dietary antioxidants and the long-term incidence of age-related macular degeneration,' *American Academy of Ophthalmology*; in press.
4. Chua B et al, (2006), 'Dietary fatty acids and the 5-year incidence of Age-Related Maculopathy', *Archives of Ophthalmology*; 124: 981-86.

## The Study

### Subjects

A population-based cohort study of 3654 urban Australians, 49+ years.

### Study design

The association of baseline dietary antioxidant intake with the ten-year incidence of AMD was examined.

- Baseline eye exams. Five-year and ten-year follow-up examinations, with stereoscopic retinal photography taken once.
- Information about food frequency and supplemental intakes, demographics, family history, medication use, working life and illnesses was taken.
- Fasting blood specimens were drawn for clinical assessment.

### Study results

- Subjects with a zinc intake of 15.8mg/day or more were significantly less likely to develop AMD.
- Subjects with a dietary lutein and zeaxanthin intake of more than 942µg/day, and the highest intake of vegetables, were less likely to develop AMD.

## Key points

- 15.8mg/day or more of dietary zinc can be protective against AMD.
- Red meat provides more than twice the amount of zinc than vegetables, dairy and breads and cereals in the average Australian diet.
- High intakes of lutein and zeaxanthin – found in vegetables – are protective against AMD.

# Elderly - higher protein needs

The elderly are the most nutritionally vulnerable group in Australia. While their lower energy requirements lead to lower kilojoule intakes, their need for essential nutrients, in particular protein is vital. Yet, the National Nutrition Survey<sup>1</sup> shows over-65s consume a third less protein-rich foods compared to those aged 25-44 years.



Professor Caryl Nowson,  
**PROFESSOR OF NUTRITION AND AGEING, DEAKIN UNIVERSITY**

The figures are a concern, since the elderly have a reduced capacity to maintain an appropriate nitrogen balance in the body. "Protein is your source of nitrogen in the body. If you are losing nitrogen, you are losing muscle mass. Therefore nitrogen balance is crucial," says Caryl Nowson, Professor of Nutrition and Ageing at Deakin University. "Adults, who are weight stable, are in nitrogen balance. But studies of elderly people have shown that when consuming the same amount of protein as younger people (matched for sex and body weight) they actually lose muscle mass. Studies have shown that the elderly have a 20 per cent greater need for dietary protein compared with those half their age."

Professor Nowson says elderly people may have reduced absorption, or difficulties metabolising protein efficiently – which is why they need more. "In residential care settings, many elderly people suffer from a lack of energy, and even have malnutrition. Published reports show 10-50 per cent of the elderly in these settings, have a low BMI (Body Mass Index)."

In this group, a lack of protein in the diet is associated with a number of health and quality of life issues, including an increased risk of hip fracture, anaemia, reduced brain function, and delayed recovery from surgery<sup>2</sup>.

Professor Nowson believes reduced appetite and a lack of awareness of the increased need for protein in later life may be behind the reduced consumption levels.

More education is needed to reduce the impact to health and wellbeing. "As we age, we become less mobile, frailer and experience more health issues, all of which makes accessing a healthy diet containing plenty of protein-rich foods more difficult to achieve," she says. "To help prevent key nutrient deficiencies in old age, we need to find ways to educate and support our elderly and make it easier for them to include foods rich in protein as part of their usual diet. Educating the elderly, their carers and families could be as simple as assisting them with their shopping and cooking." Professor Nowson says even these small changes could have significant health and quality of life improvements.

#### References:

1. McLennan W et al, (1999), 'National Nutrition Survey; Foods eaten in Australia, 1995, ABS Catalogue No. 4804.0,' Australian Bureau of Statistics.
2. Donini LM et al, (2003), 'Eating habits and appetite control in the elderly: the anorexia of aging,' *International Psychogeriatric*; 15: 73-87.

## Key points

- The elderly consume less protein than people half their age, but actually require 20 per cent more to obtain nitrogen balance.
- Lack of dietary protein is associated with health issues such as an increased risk of hip fracture, anaemia, reduced brain function, and slow post-surgery recovery.
- Awareness of the increased need for protein in later life, through education of the elderly, their carers and families, may be required.

## 3 lean red meat cuts to offer the elderly



### Mince it

Add these minced cuts of lean meat to different vegetables to make a variety of dishes from bolognese sauce to healthy patties to meatballs and meatloaf:  
Beef – silverside/topside, knuckle/round, rump, tenderloin/fillet, striploin/sirloin, cube roll/scotch fillet or blade.  
Lamb – leg, tenderloin/fillet or eye of loin.



### Dice it

Dice these lean cuts for tender and easy to chew casseroles:  
Beef – silverside/topside, knuckle/round, rump or blade.  
Lamb – leg or shoulder



### Strip it

Cut these lean cuts into thin strips for simple and nutritious stir-fries:  
Beef – silverside/topside, knuckle/round, rump, tenderloin/fillet, striploin/sirloin, cube roll/scotch fillet, blade steaks.  
Lamb – leg, tenderloin/fillet, eye of short loin/backstrap, knuckle/round, topside steaks.

For recipes using these cuts visit  
[www.themainmeal.com.au](http://www.themainmeal.com.au)

# Secrets to living a longer life

*A new book shares with us the secrets to being healthy and happy as we age.*

Drawing on ground-breaking research from leading experts on ageing, *Live a Longer Life* answers all of our questions about slowing down the ageing process while lengthening our quality of life.

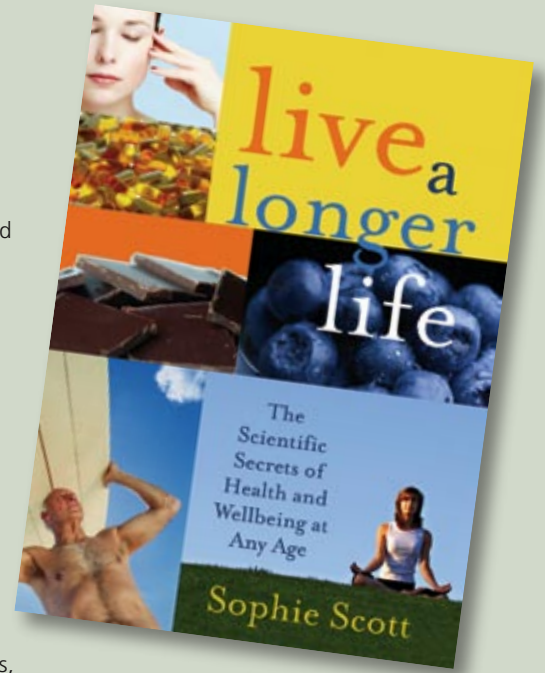
In this book, highly respected and award-winning journalist, Sophie Scott, ABC's national medical reporter, taps into what makes some people so youthful and energetic well into their middle-aged and elderly years. Sophie uses the latest scientific studies from all areas of healthy ageing and shows how small changes can add as much as 15 years to your life.

"I wanted to find out what the average person can do to be healthy and happy for as long as possible," she says. "What I

discovered was that healthy ageing is not simply about having parents who live long – though genes do help. It's about taking control and making small but significant changes to boost your chances of a long and healthy life."

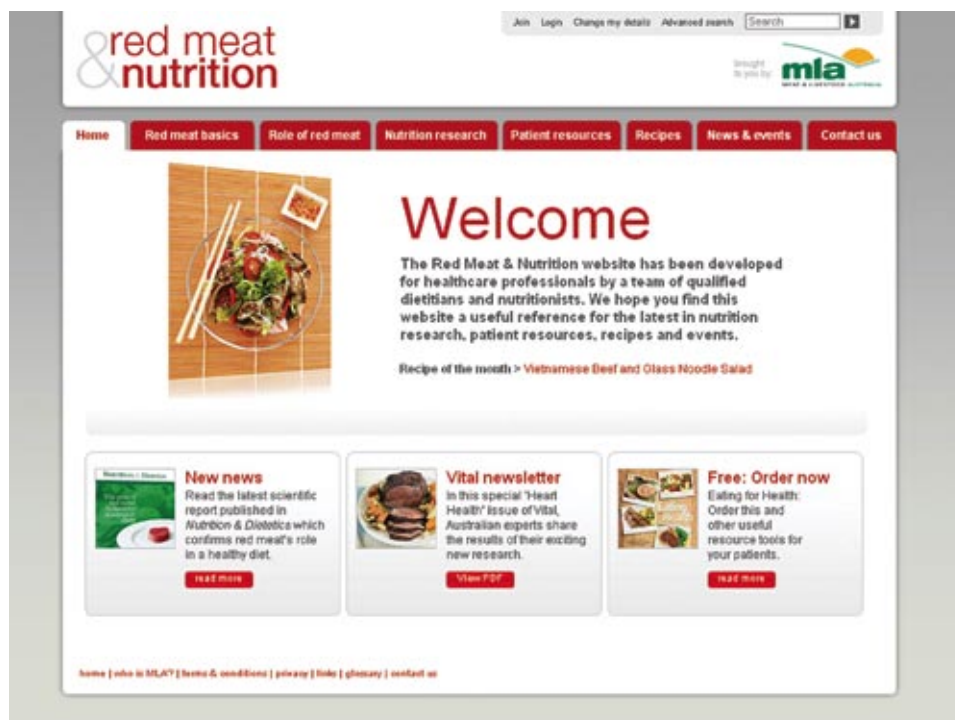
This is a self-help book written for every adult. It covers all factors contributing to longevity and quality of life – from nutrition and dietary supplements to exercise, brain health, a healthy sex life, and anti-ageing products. Helpful case studies, recipes and menus, and essential exercises are also included.

*Live a Longer Life* is available from ABC Shops, ABC Centres and selected bookstores, rrp: \$32.95.



## New website: [www.redmeatandnutrition.com.au](http://www.redmeatandnutrition.com.au)

*Our new website [www.redmeatandnutrition.com.au](http://www.redmeatandnutrition.com.au), is designed with health professionals in mind. We know you like to keep abreast of what's happening in the world of nutrition, so through this site we'll be sharing with you the latest research on red meat's role in health and informing you of what's happening in the media.*



You've also told us how valuable you find our patient handouts on iron, weight management, healthy eating and teenage acne. By logging onto [www.redmeatandnutrition.com.au](http://www.redmeatandnutrition.com.au) you'll be able to place an order online to be mailed the hard copies.

An exciting section of the website is the Nutrient Composition Database, where you will be able to search for specific cuts of lean red meat and find out exactly what nutrients it contains and in what quantities.

There is so much more to be found on [www.redmeatandnutrition.com.au](http://www.redmeatandnutrition.com.au) so we hope to see you logging on soon.