Student Masterclass

Benefits of Omega-3 fatty acids
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The cardioprotective properties of the long-chain omega-3 fatty acids found in fish oils (EPA and DHA) have become clearer in recent years. Intakes of 500-1000 mg/d, either from foods or from supplements (as recommended by the American Heart Association) have been generally associated with significantly reduced risk for coronary heart disease events, in particular, sudden cardiac death. Low intakes or blood levels of eicosapentaenoic and docosahexaenoic acids (EPA+DHA) are independently associated with increased risk of death from coronary heart disease (CHD). In randomised secondary prevention trials, fish or fish oil have been demonstrated to reduce total and CHD mortality at intakes of about 1 g/d. The evidence for beneficial effects of the long-chain omega-3 FA from fish is stronger than the evidence for benefit from the short-chain precursor, alpha-linolenic acid, from plants. These fatty acids appear to have anti-arrhythmic properties which are unrelated to their effects on blood lipids. The mechanism by which low doses of omega-3 FA (500-1000 mg/d) reduce risk for fatal events is not clear, but may involve reducing the heart rate. Similarly, the biochemical basis for their beneficial effects are as yet unknown, but possibilities include alteration of membrane structure and function, modulation of transcription factors, increased plaque stability, and changes in eicosanoid metabolism.

Red blood cell (RBC) fatty acid composition reflects long-term intake of EPA+DHA. It is proposed that the RBC EPA+DHA (hereafter called the Omega-3 Index) maybe a new risk factor for death from CHD. When the relationship between this putative marker and risk for CHD death was evaluated using published primary and secondary prevention studies, an Omega-3 Index of approximately 8% was associated with the greatest cardioprotection, whereas an Index of less than 4% was associated with the least. The Omega-3 Index is a validated surrogate of cardiac EPA+DHA in humans. Preliminary data are now suggesting that the Omega-3 Index may represent a novel, physiologically-relevant, easily-modified, independent and graded risk factor for both CHD events and for death from CHD that could have significant clinical utility.

Omega-3 fatty acids: sources, intake recommendations and health claims
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Background - Widespread recognition of health benefits of omega-3 fatty acids is driving demand for new food sources.

Review - Australia and New Zealand have newly introduced dietary intake recommendations for pre-formed long-chain omega-3 (LC n-3), viz. EPA, DPA and DHA. The adequate intake for these nutrients (women: 90mg/d; men: 160mg/d) is in addition to rather than a substitute for the already established requirements for α-linolenic acid (ALA) and linoleic acid, the respective n-3 and n-6 dietary precursor fatty acids from plant sources. It is an acknowledgement that, with 6% or less conversion of ALA to EPA, ALA intakes alone are unlikely to satisfy the physiological need for LC n-3, especially when aiming for the suggested dietary targets (women: 430mg/d; men: 610mg/d) to prevent chronic disease. Consistent with this recommendation, Food Standards Australia & New Zealand permit an exclusive nutrition claim for qualifying food sources of LC n-3 and are proposing to allow a heart health claim for such foods; this should encourage greater consumption of foods rich in LC n-3. Seafoods and red meat are currently the main dietary sources of these health giving nutrients and are progressing offer greater choice.

Conclusion - Regulatory developments will facilitate the adoption of new dietary intake recommendations for LC n-3.

References