



AECL Research Update November 2012

EGG INTAKE INCREASES LUTEIN AND ZEAXANTHIN IN ADULTS WITH METABOLIC SYNDROME

Source: Blesso CN, Andersen CJ, Bolling BW, Fernandez ML. Egg intake improves carotenoid status by increasing plasma HDL cholesterol in adults with metabolic syndrome. *Food Funct* 2012 Nov 5 [Epub ahead of print].

This study investigated the effects of whole egg feeding on blood levels of carotenoids (lutein and zeaxanthin) in adults with the metabolic syndrome since previous research has shown increases in other populations with egg feeding. Study participants consumed 3 whole eggs per day or the equivalent amount of yolk free egg substitute as part of a carbohydrate restricted diet for 12 weeks. After 12 weeks those who had consumed the eggs had significant increases in blood levels of lutein, zeaxanthin and beta-carotene while those consuming the egg substitute only had increases in beta-carotene. The egg group also had significant enrichment of HDL and LDL cholesterol fractions with lutein and zeaxanthin which suggests better transport of lutein and zeaxanthin via HDL particles to key tissues such as the retina of the eye (providing protection from AMD) and lutein may protect LDL particles from oxidation (oxidised LDL increases risk of heart disease). Daily intake of 3 whole eggs (in the presence of carbohydrate restriction) increased both blood levels and lipoprotein (HDL and LDL cholesterol) levels of lutein and zeaxanthin which suggests that eggs may represent an important food source to improve carotenoid status in a population at high risk of heart disease and diabetes.

KEY FINDING: Consuming 3 eggs per day improved carotenoid status in adults with the metabolic syndrome.

APPLICATION: Eggs appear to be a good food vehicle for improving carotenoid status in those at risk of heart disease and diabetes.

[Suitable for eDM]
Levels of Evidence:II

LUTEIN AND ZEAXANTHIN MAY AID COGNITIVE FUNCTION

Source: Johnson EJ. A possible role for lutein and zeaxanthin in cognitive function in the elderly. *Am J Clin Nutr* November 2012 *ajcn*.034611

Based on previous research, this review suggests that dietary lutein and zeaxanthin may play a role in maintaining cognitive health. Mostly known for their positive impact on eye health, lutein and zeaxanthin also accumulate in the human brain. An examination of a relation between cognition and lutein and zeaxanthin concentrations in the brain tissue of decedents from a population-based study in centenarians found that zeaxanthin concentrations in brain tissue were significantly related to measures of global cognitive function, memory retention, verbal fluency, and dementia severity after adjustment for age, sex, education, hypertension, and diabetes. Furthermore, in a trial in older women that involved lutein supplementation (12 mg/d), alone or in combination with DHA (800 mg/d), verbal fluency scores improved significantly in the DHA, lutein, and combined-treatment groups. Memory scores and rate of learning improved significantly in the combined-treatment group, who also showed a trend toward more efficient learning. While all of this evidence is observational in nature, it is suggestive of a role for lutein and zeaxanthin in cognitive function which warrants further study.

RESEARCH UPDATE



KEY FINDING: Some observational research exists which suggests lutein and zeaxanthin may assist in cognitive health.

APPLICATION: Lutein and Zeaxanthin may have health benefits beyond eye health. Eggs contain lutein and zeaxanthin.

[Suitable for eDM]

Levels of Evidence: III-2

RISK FACTORS FOR EGG ALLERGY

Source: Koplin JJ, Dharmage SC, Ponsonby AL, Tang ML, Lowe AJ et al. Environmental and demographic risk factors for egg allergy in a population-based study of infants. *Allergy*. 2012 Nov;67(11):1415-22. doi: 10.1111/all.12015.

This Australian study investigated environmental and demographic factors related to egg allergy. As part of the HealthNuts allergy study, 5276 infants underwent skin prick testing to egg white at 12 months of age. Information on environmental and demographic factors was collected. Researchers found that children with older siblings and those with a pet dog at home were less likely to develop egg allergy by 1 year of age. Caesarean section delivery, antibiotic use in infancy, childcare attendance and maternal age were not associated with egg allergy. History of allergic disease in an immediate family member and having parents born in East Asia were strong risk factors for infantile egg allergy.

KEY FINDING: Children with older siblings and those with a pet dog are less likely to develop egg allergy. History of allergic disease in immediate family or having parents born in East Asia were found to be strong risk factors for egg allergy.

APPLICATION: Provides more information regarding egg allergy in an Australian population. Builds on previous research which suggests timing of introduction of egg is strongly associated with egg allergy.

[Suitable for eDM]

Levels of Evidence:III-2

EGG WHITE PROTEIN SUPPLEMENTATION DOES NOT IMPROVE MUSCLE STRENGTH

Source: Hida A, Hasegawa Y, Mekata Y, Usuda M, Masuda Y et al. Effects of Egg White Protein Supplementation on Muscle Strength and Serum Free Amino Acid Concentrations. *Nutrients* 2012, 4(10), 1504-1517; doi:10.3390/nu4101504

This study evaluated the effects of consuming egg white protein (compared to carbohydrate intake) prior to exercise on fat free mass, muscle strength and blood levels of amino acids and other protein metabolites in 30 female athletes. Individuals maintained their usual diet and either consumed a protein (15g egg white protein) or carbohydrate (17.5g maltodextrin) supplement. During an 8 week period the supplements were consumed daily at the same time prior to training. During the study, lean muscle and muscle strength increased in both groups. Blood levels of urea and citruline (protein metabolites) increased significantly only in the protein group. These findings do not suggest that compared to carbohydrate supplementation, egg white supplementation has any extra effect on body composition or muscle strength. Longer studies or higher protein intakes may be required to show an effect of egg white supplementation.

KEY FINDING: 15grams of egg white daily did not increase fat free mass or impact on strength training when compared to a carbohydrate supplement in female athletes.

APPLICATION: This study does not support a role for egg white supplementation in increasing fat free mass or strength. Longer, better designed studies or higher protein intakes may be needed to demonstrate a positive result.

Levels of Evidence:III-1

VITAMIN D DEFICIENCY IN AUSTRALIA – POSSIBLY WORSE THAN FIRST THOUGHT!

Source: Boyages S, Bilinski K. Seasonal reduction in vitamin D level persists into spring in NSW Australia: implications for monitoring and replacement therapy. *Clinical Endocrinology* 77 (4): 515-523, October 2012

This study assessed vitamin D levels from all primary tests conducted over a 2 year period in NSW. The researchers obtained results from 24 819 samples. Vitamin D deficiency was defined as levels below 50nM. Median vitamin D level was 54nM (ranging from 63 nM in summer to 44nM in spring and was lowest in inpatient (hospital) women and highest in ambulatory men. Average vitamin D levels peaked in January and were at their lowest in August/September. During summer, 36% of subjects had a deficient level, increasing to 58% in spring. Factors associated with lower vitamin D levels included being tested in spring, being a hospital patient, female, aged 20-39 or over 79 years, socioeconomically disadvantaged and from a major city. This study suggests that the extent of vitamin D deficiency is greater than expected and suggests supplementation and monitoring of vitamin D levels may need to be modified in Australia.

Note: While these figures are higher than other recent reports on vitamin D deficiency in Australia, this may be due to the number of tests conducted on sicker or hospitalised patients. Levels in ambulatory subjects were similar to recent reports.

KEY FINDING: During summer 36% of subjects had vitamin D deficiency which increased to 58% in Spring.

APPLICATION: Vitamin D deficiency is prevalent in Australia, especially amongst hospitalised patients.

Increasing the amount of vitamin D in the food supply could be one way of improving vitamin D status.

Investigating increasing vitamin D content of eggs could be one avenue.

[Suitable for eDM]

Level of evidence:III-3

OMEGA 3 ALA AND HEART DISEASE

Source: Pan A, Chen M, Chodhury R, Wu JHY, Sun Q et al. α -Linolenic acid and risk of cardiovascular disease: a systematic review and meta-analysis. *Am J Clin Nutr*, December 2012 *ajcn*.044040.

This research was a meta-analysis of evidence to investigate the relationship between omega 3 ALA and heart disease risk. Twenty-seven studies (including 251, 049 individuals) up to January 2012 were included in the analysis. Overall the researchers found a 14% reduced risk of heart disease with omega 3 ALA exposure. The results were generally consistent for dietary and biomarker (blood or adipose tissue level) studies but weren't statistically significant in biomarker studies. Further, well designed research is needed to confirm the effects of omega 3 ALA on heart disease risk but this research suggests it may have a moderate positive effect.

KEY FINDING: Higher omega 3 ALA exposure is linked with a moderate reduction in heart disease risk.

APPLICATION: Eggs contain approximately 66mg omega 3 ALA per serve, which is 80% of the adequate intake (AI) for women and 50% of the adequate intake (AI) for men.

[Suitable for eDM]

Levels of Evidence: III-2

PROTEIN AND BLOOD PRESSURE

Source: Rebholz CM, Friedman EE, Powers LJ, Arroyave WD, He J et al. *Dietary Protein Intake and Blood Pressure: A Meta-Analysis of Randomized Controlled Trials. Am. J. Epidemiol. (2012) 176 (suppl 7): S27-S43.*

This research is an analysis of trials which evaluated the association between dietary protein intake and blood pressure. Research up until April 2011 was analysed which included 40 trials (with a total of 3 277 individuals). Compared with carbohydrate, dietary protein intake was associated with significant reductions in mean systolic and diastolic blood pressure. Both vegetable protein and animal protein were associated with a significant reduction in blood pressure. Blood pressure reduction was not significantly different when vegetable protein was compared directly with animal protein. These findings indicate that partially replacing dietary carbohydrate with protein may be important for the prevention and treatment of high blood pressure.

KEY FINDING: Compared with carbohydrate, protein intake is associated with significant reductions in blood pressure.

APPLICATION: Eggs can provide a significant source of protein in the diet.

[Suitable for eDM]
Levels of Evidence: III-2

HIGH PROTEIN DIETS FOR BETTER WEIGHT LOSS

Source: Wycherley TP, Moran LJ, Clifton PM, Noakes M, Brinkworth GD. *Effects of energy-restricted high-protein, low-fat compared with standard-protein, low-fat diets: a meta-analysis of randomized controlled trials. Am J Clin Nutr December 2012 ajcn.044321*

This review and analysis of research trials compared energy-restricted high protein, low fat diets with standard protein, low fat diets on weight loss, body composition, resting energy expenditure, satiety and appetite and heart disease risk factors. The review included 24 trials with a total of 1063 individuals and an average length of 12 weeks. The researchers found that compared with a standard protein diet, a high protein diet produced better reductions in body weight, fat mass and triglycerides. Changes in fasting plasma glucose, fasting insulin, blood pressure, and total, LDL, and HDL cholesterol were not different for the two diet types. Of the 5 studies that measured satiety, 3 found greater satiety on the high protein diet. This review found that high protein diets provide modest benefits for reductions in body weight, fat mass, and triglyceride.

Level of protein in diets: Average protein content of high protein diets was 30.5% of energy and average protein content of standard protein diets was 17.5% of energy.

KEY FINDING: High protein, low fat diets resulted in better reductions in body weight, fat mass and triglycerides compared to standard protein, low fat diets.

APPLICATION: Eggs can contribute to a higher protein diet and therefore may play a role in effective short term weight management.

[Suitable for eDM]
Levels of Evidence: I

NEW AUSTRALIAN HEALTH SURVEY RESULTS RELEASED

The first set of results from the ongoing Australian Health Survey 2011-2013 were released on 29th October 2012. Below is an overview of the main findings. For further information and statistics go to: www.abs.gov.au/australianhealthsurvey

- In 2011-12 over half (55.6%) of all Australians aged 15 years and over considered themselves to be in very good or excellent health, while 4.0% rated their health as poor.
- Of the National Health Priority Areas, the top Long-term health conditions experienced in Australia in 2011-12 were:
 - arthritis - 3.3 million people (14.8%)
 - mental and behavioural condition - 3.0 million people (13.6%)
 - asthma - 2.3 million people (10.2%)
 - heart disease - 1.0 million people (4.7%)
- Prevalence of overweight and obesity in adults aged 18 years and over has continued to rise to 63.4% in 2011-12 from 61.2% in 2007-08 and 56.3% in 1995. However the prevalence of overweight and obesity in children aged 5-17 has remained stable at 25.3% in 2011-12.
- Between 1995 and 2011-12 the average height for men increased by 0.8 cm for men and 0.4 cm for women. Between 1995 and 2011-12 the average weight for men increased by 3.9 kg for men and 4.1 kg for women.
- In 2012-12, 60.3% of men aged 18 years and over had a waist circumference that put them at an increased risk of developing chronic disease, while 66.6% of women had an increased level of risk.
- In 2011-12, just over 3.1 million people (21.5%) aged 18 years and over had measured high blood pressure (systolic or diastolic blood pressure equal to or greater than 140/90 mmHg).
- In 2011-12, 4.0% of the Australian population (875,400 people) reported having some type of diabetes (excluding persons with gestational diabetes). The prevalence of diabetes remained stable between 2007-08 and 2011-12 (both 4.0%).

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