Canadian Journal of Cardiology 27 (2011) 264.e5 www.onlinecjc.ca

Not All Eggs Are Created Equal: The Effect on Health Depends on the Composition

To the Editor:

A recent review addressed the increasing tendency to accept daily egg as optional in healthy diets, particularly in patients with or at risk for vascular disease. It emphasized that "diet is not all about fasting blood lipids," but rather the post-prandial effects of high cholesterol, ie, increased LDL oxidation (37% with 2 eggs/day), increased post-prandial lipemia (following >140mg cholesterol/meal), and potentiated adverse effects of dietary saturated fat (ie, bacon and butter, compared to egg consumed with salad oil). Eggs may further induce inflammation per observed elevations of CRP and amyloid A, with worsened macrophage accumulation in adipose tissue. The Physician's Health Study showed a 2-fold increase in CVD and all-cause mortality following onset of diabetes, and that egg consumption independently increased rates of new-onset diabetes.

It is worth noting that most of these deleterious effects could be addressed by egg composition modifications. Two/day eggs with reduced n-6 PUFA and increased n-9 MUFA and antioxidants (vitamin E, carotenoids, selenium) reversed egg-induced increased LDL oxidation to levels of 2-4 eggs/week (Figure 1).[1] One/day n-3 PUFA-fortified egg improved triglyceride and HDL levels,[2] ApoB:ApoA1 ratio, and fasting plasma glucose.[3] Similarly, 2/day eggs modified for reduced n-6 PUFA and enhanced n-9 MUFA and antioxidants reduced fasting glucose compared to 2/day regular western high n-6-PUFA eggs. Being an effective antioxidant delivery system, as shown by increased blood vitamin E and carotenoids,[1] and the finding that n-3 PUFA-fortified egg also reduced CRP,[4] suggests that "designer" eggs may provide protection against oxidative stress, inflammation, and acute effects of high glycemic load, recently linked to increased inflammation and reduced blood antioxidants, potentially associated with diabetes risk.

The above emphasize that not all eggs are created/prepared equal, and further, egg is not purely cholesterol, but rather a high nutritional value food with a unique capacity to transform and concentrate protective nutrients (ie, DHA, antioxidants) that can modify metabolic/physiological effects. Moreover, eggs' high "satiety index" makes them an important candidate against obesity, and much lower carbon footprint than chicken, beef, or pork yields environmental advantages.

Designing protective compositions and preparation, ie, based on advantageous Mediterranean/Greek-type eggs and dietary principles – high n-3 PUFA, n-9 MUFA, and antioxidants, with low n-6 PUFA – could significantly influence egg-related benefits vs risks. Modifications more suited to requirements of subpopulations could differentially widen recommendations to accept vs reject eggs. Most of us will benefit, though consumption may remain advised against in some metabolically/genetically-sensitive and/or hyperlipidemic individuals.

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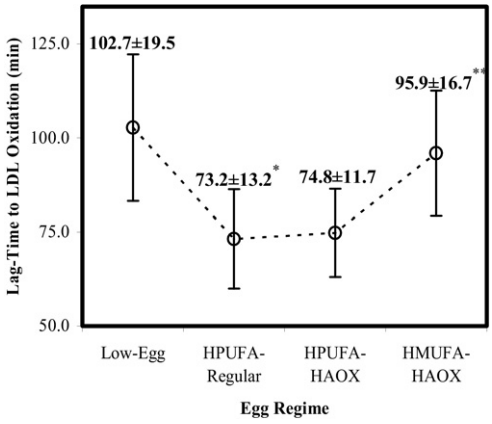

Figure 1. Lag-time to plasma LDL oxidation following low-egg (2-4/week) or high-egg (2/day) regular high n-6 PUFA (HPUFA-Regular), high n-6 PUFA+high-antioxidant (HPUFA-HAOX), or high n-9 MUFA+high-antioxidant (HMUFA-HAOX) 3-week regimes (n=17)[1]. $^{*}P < 0.01$ (vs. low-egg); $^{**}P < 0.01$ (vs. regular egg).

References

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doi:10.1016/j.cjca.2010.11.010