Meat and Eggs can be Healthy …. It is just a Balanced Ratio of Essential Fatty Acids Away!

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About the essential Columbus lipid balance in the human diet

Dietary cholesterol and saturated fats – the former CSI (C: Cholesterol, S: Saturated fats, I: Index) – have proven non-reliable predictors of CVD developments. In some studies they were shown good predictors, in others, they could not hold up with the observations. Clearly, the CSI is not an independent primary risk factor in the diet-heart hypothesis. *In fine*, this conclusion does not appear as a surprise as none of these two food ingredients, cholesterol or saturated fatty acids, is essential to human.

Essential to human are some trace elements, minerals and vitamins, and some fatty acids. Should any of these essential ingredients be missing in the diet and the body soon or later will fall ill. Essential fatty acids of the omega-6 and omega-3 families have this unique characteristic that they compete against each other for the same metabolic pathways; their ratio, upon which human genome was established, is therefore critical to their physiological roles and functions.

Among their many biological functions related to homeostasis and long term health, the dietary essential fatty acids and, more specifically, their ratio, dictate how blood lipoproteins protect or affect blood vessels integrity during their journey from liver to peripheral tissues and vice versa, The last 40 years of scientific literature – covering large clinical trials and epidemiological studies – are in favour of a diet-heart relationship that holds true, only to the extent of which this ratio deviates from its original Paleothropic, game-type or wild-type make-up (ω6:ω3=±1) in our diet.

A return to a balanced dietary essential fatty acid ratio appears, clinically and epidemiologically, as one of the most promising approach towards tackling the alarming problem of non-communicable degenerative diseases becoming endemic in modern and modernizing societies.

The Columbus® Concept stands for the return to the original balanced dietary profile: P:S= ω6: ω3=1:1 in the human diet. The Columbus® Egg is a model for healthy food of animal origin.

"Land-based animals can be made just as healthy as marine animals by returning ω3-rich greens and seeds into their diet.
As a corollary, marine animals can be made just as harmful as current land-based animals by feeding them ω6-rich grains…"

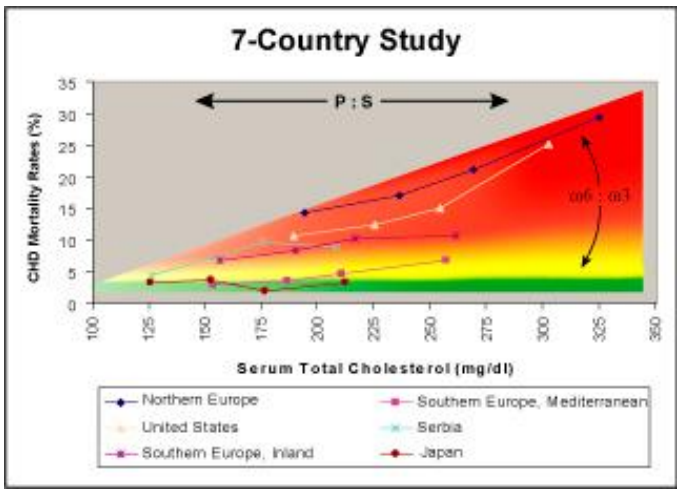


Figure 1 Dietary saturated fats and/or blood cholesterol are confounding factors in the diet-heart relationship.

The graph displays the twenty-five-year coronary heart disease (CHD) mortality rates per baseline serum cholesterol quartile, adjusted for age, cigarette smoking, and systolic blood pressure, in 16 ethnic groups of 7 industrialized countries (5 European countries, the United States, and Japan). Reproduced from Verschuren *et al.*, 1995.

It appears that the population absolute CHD mortality rate (ordinate) and the individual relative rate (slope) of CHD within each population differed substantially among cultures and that those (Northern Europe, United States) characterized by dietary patterns high (20 to 10:1) in ω6:ω3 ratios exhibit much higher absolute rate and relative risk of CHD than populations (Southern Europe, Mediterranean, Japan) maintained on dietary patterns low (5 to 1:1) in ω6:ω3 ratios. Neither dietary saturated fats nor blood cholesterol appear as independent factor in this 25-yr follow-up study. Instead, all these multi-ethnic absolute rates and relative risks of CHD seem to respond to a single mathematical equation such as:

$$\mathbf{CHD = 2.5 + (TC - 100) \times \alpha TAN(\omega 6{:}\omega 3)}$$

Where α is a weight factor that reflects the power of the dietary and/or blood ω6:ω3 ratio to precipitate death by CHD as the only independent factor.

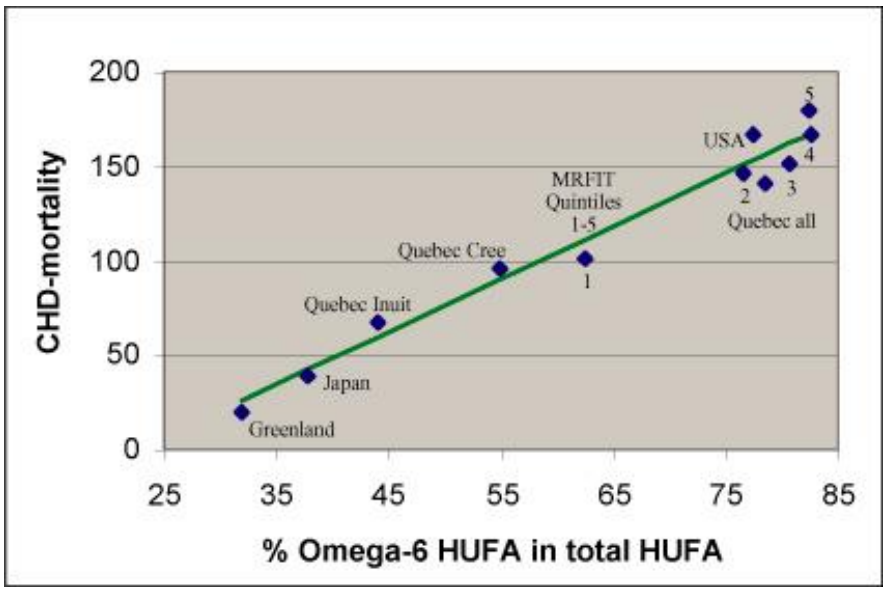


Figure 2 Coronary heart disease (CHD) mortality rate is predicted from tissue relative content of ω6-LCPs.

LCPs denote highly unsaturated fatty acids (HUFA) with carbon chain length of 20 or more and the number of double bonds of 3 or more. Reproduced from Lands, 2003.

It appears that there indeed is a strong association of population absolute rates of cardiovascular mortality to the relative proportion of omega-6 LCPs in their tissue total (omega-3 + omega-6) LCPs. In fact, a Greenlander with only ±30% omega-6 LCPs has ± 10 times less chance of dying from CHD than an American with ± 80% omega-6 LCPs in their tissue total LCPs. Linear extrapolation shows that the lowest risk of CHD is reached at a relative proportion of ± 25% of omega-6 LCPs in tissue total LCPs.

Could the Golden Game Standards (GGS) in terms of omega-6:omega-3 fatty acid ratio in fat depots and peripheral tissues be the best cardiovascular health guarantee?

	ω6:ω3		ω6:(ω6+ω3)	
GGS	**EFAs**	**LCPs**	**EFAs**	**LCPs**
Fat depots	**1:1**	-	**50%**	-
Tissues	-	**1:3**	-	**25%**

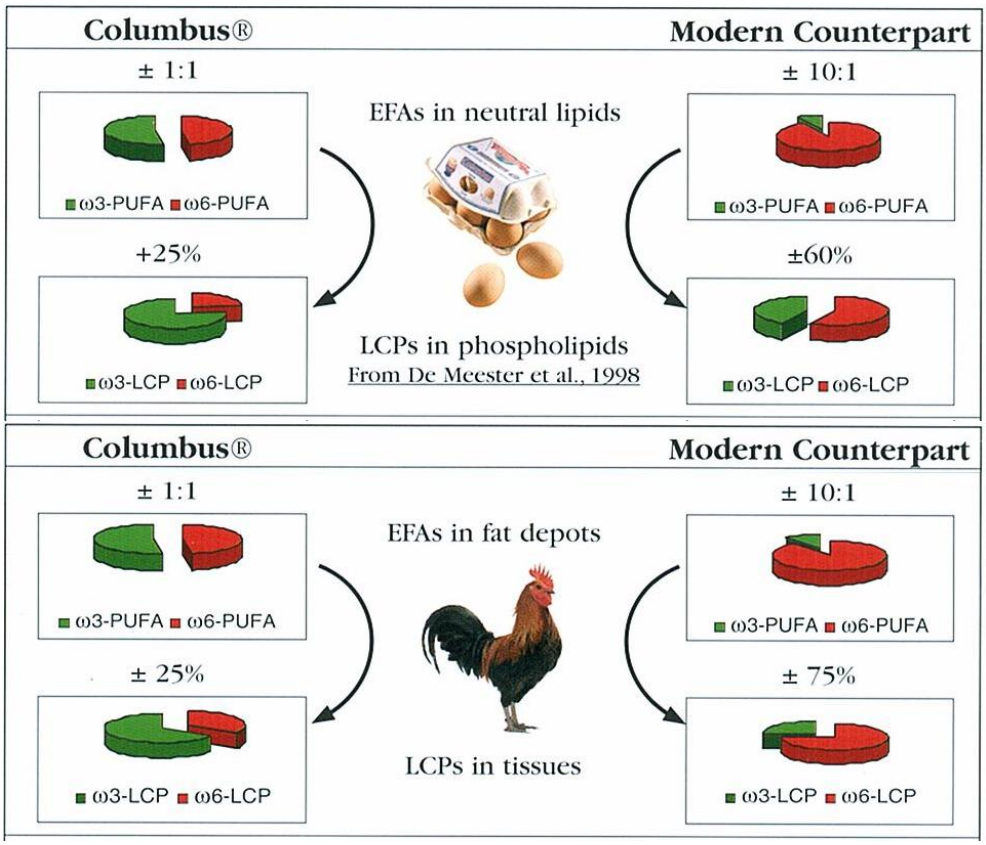
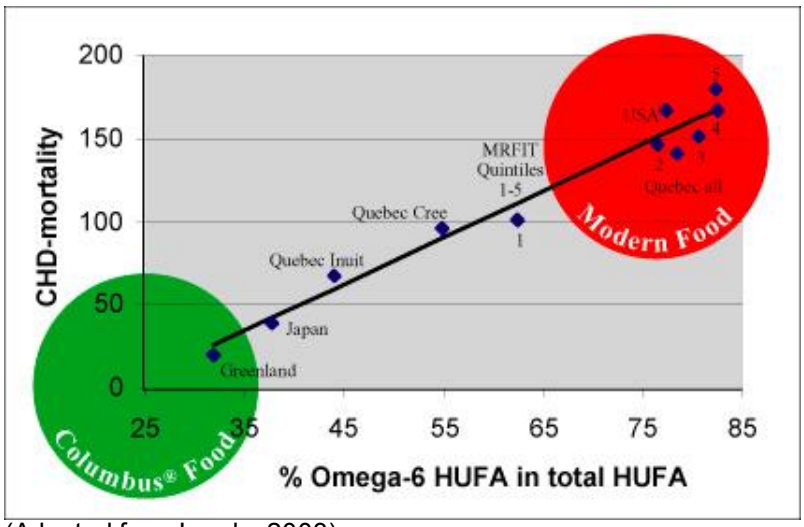


Figure 3 Columbus® meat and eggs comply with the Golden Game Standard and dramatically differ from their modern counterparts.

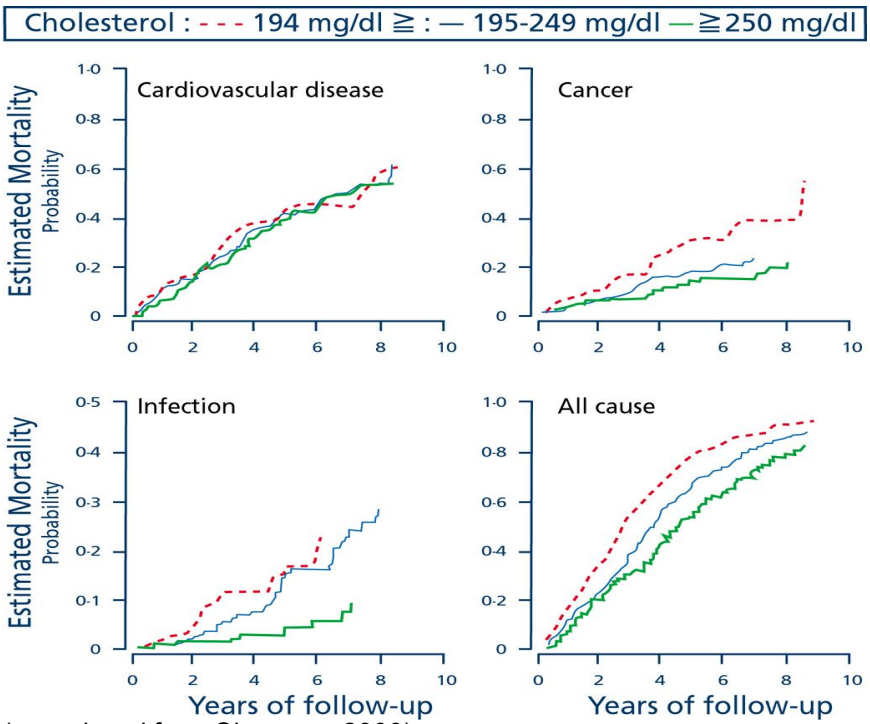


(Adapted from Lands, 2003)

Figure 4 The Golden Game Standard for Columbus® meat and eggs seems to reflect the tissue LCPs composition of Greenlanders with ± 25% omega-6 LCPs in total tissue LCPs. At the opposite, the modern counterparts for meat and eggs represent ± 75% omega-6 LCPs in total tissue LCPs, strikingly similar to the tissue LCPs composition of contemporary Western Europeans & Americans.

This graph tends to show that land-based animals can be made just as healthy as marine animals by returning ω3-rich greens and seeds into their diet which, in turn, creates the wild-type food that has prevailed during the evolution of mankind until roughly the industrial revolution of the mid 19 th century. It also shows that marine animals could eventually be made just as potentially harmful as current land-based animals by feeding them ω6-rich grains.

Which food would you go for provided you would be given the choice?

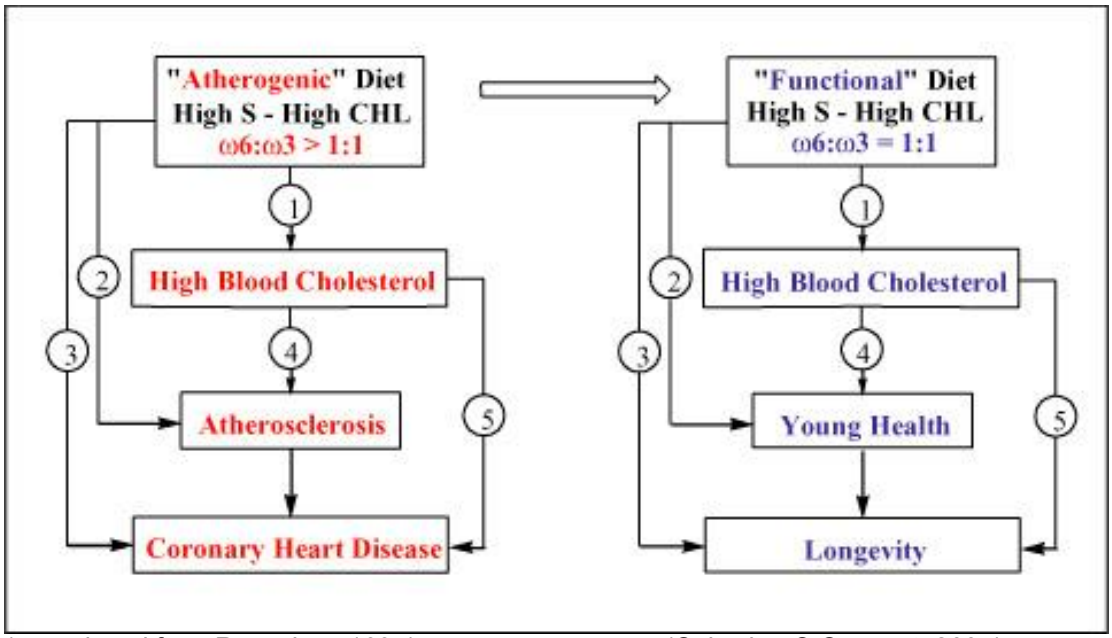


(reproduced from Okuyama, 2000)

Figure 5 Hypercholesterolemia is a marker, but no independent risk factor for CHD in modern populations. Those with higher cholesterol values survive longer, possibly due to decreased cancer mortality, decreased mortality from infectious diseases, and/or decreased apoplexy.

Among the oldest old followed for 10 years in the Netherlands (over 85 years old), no significant correlation was found between serum cholesterol level and CHD mortality (Weverling-Rijsburger *et al.*, 1997). Instead, both cancer mortality and mortality from infectious diseases were higher when serum cholesterol was lower, and all causes of mortality were negatively correlated with serum cholesterol level. A similar conclusion has been obtained when people older than 70 years were followed for 10 years in the USA (Krumholz *et al.*, 1994).

ω6:ω3 ratio of dietary fatty acids, not hypercholesterolemia, is the only lipidic independent risk factor for atherosclerosis and coronary heart disease.



(reproduced from Ravnskov, 1995) (Columbus® Concept, 2004)

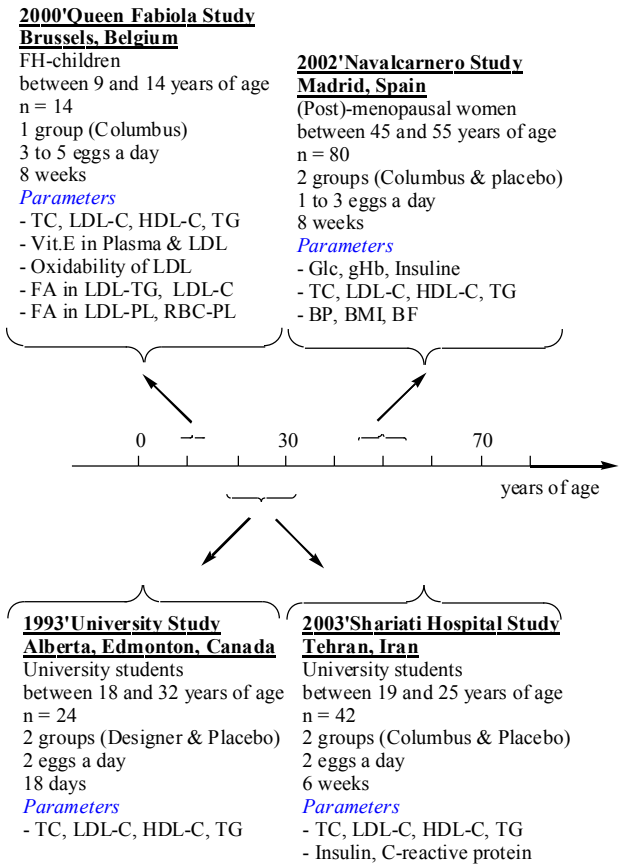
Figure 6 The former "atherogenic" diet should perhaps be reconsidered as a potential "functional" diet provided it complies with the Columbus® Concept, i.e. balanced dietary essential fatty acid ratio.

The former diet-heart relationship (high saturated fatty acids, high cholesterol intake) may soon be sensed as moving from "atherogenic" to "functional". In fact, it is definitely proven that a high CSI (Cholesterol- Saturated Fat) index does result in higher blood cholesterol level, but it now turns out that a high blood cholesterol level in association with balanced dietary essential fatty acid ratio's might be beneficial under certain circumstances in adults and probably most of the time in infants and aging people. The concepts of young health and longevity might have to be revised in terms of blood lipid distribution. In the meantime, it does not seem reasonable to support the present recommendation that hypercholesterolemia must be systematically treated, be it nutritionally and/or medically.

Columbus® Egg at work

Four pilot clinical studies have been performed with Columbus Egg on four groups of patients differing from each other by their age and their geographical locations.

Pilot Clinical Studies **Columbus Egg** - Protocols



Although nutritionally equivalent by all classical means – Columbus ® eggs do differ from standard eggs in the way they influence body's blood response upon their consumption.

Influence on plasma lipids.

Year	1993		2000		2002		2003	
Country	Alberta		Belgium		Spain		Iran	
Egg	S.E.	D.E.	S.E.	C.E.	S.E.	C.E.	S.E.	C.E.
# eggs/day	±2	±2	0	±0.5	±0.5	±1	±2	±2
TC	n.s.	n.s.	-	n.s.	n.s.	n.s.	+12% (0.03)	n.s.
LDL	+12% (0.05)	n.s.	-	n.s.	n.s.	n.s.	+21% (0.01)	n.s.
HDL	n.s.	+8% (0.05)	-	n.s.	n.s.	n.s.	n.s.	+13% (0.03)
TG	n.s.	-40% (0.01)	-	n.s.	n.s.	-9.6% (0.05)	n.s.	-23% (0.04)

(S.E.: standard egg; D.E.: Designer Egg; C.E.: Columbus® Egg;
n.s.: no statistical significance; -: not measured)

Tentative conclusions:

1. One egg a day is OK (McNamara, 2000) is confirmed. Up to that level (Belgium, Spain), standard egg does not affect blood lipids significantly. Above that daily rate (Alberta, Iran), standard egg starts to negatively influence classical blood lipid parameters (TC, LDL-C) – in red in the Table.
2. Columbus® Egg positively influences classical blood lipid parameters (TG, HDL-C) and the beneficial influence is dose-dependent: the effects are already seen at a daily ingestion rate of one egg a day (Spain) and are amplified at that of two eggs a day (Alberta, Iran) – in green in the Table.

Influence on glycemia.

Year	1993		2000		2002		2003	
Country	Alberta		Belgium		Spain		Iran	
Egg	S.E.	D.E.	S.E.	C.E.	S.E.	C.E.	S.E.	C.E.
# eggs/day	± 2	± 2	0	± 0.5	± 0.5	± 1	± 2	± 2
Glucose	-	-	-	-	n.s.	n.s.	n.s.	n.s.
Insulin	-	-	-	-	n.s.	-20% (0.001)	n.s.	-28% (0.01)
gHb	-	-	-	-	n.s.	+ 5% (0.01)	n.s.	n.s.

(S.E.: standard egg; D.E.: Designer Egg; C.E.: Columbus® Egg; gHb: glycosylated haemoglobin; n.s.: no statistical significance; -: not measured)

Tentative conclusions:

1. Standard egg does not influence glycemia up to an ingestion rate of two eggs a day.
2. Columbus® Egg positively influences glycemia through its potent effect on fasting insulin, as seen in post-menopausal women (Spain) and in young university students (Iran). The effect is clearly observed as starting at an ingestion rate of one egg a day – in green in the Table. This beneficial effect on circulating insulin has no influence on glucose, but has a minor, but significant, effect on glycosylated haemoglobin (gHb) in post-menopausal women after 8-weeks on the ´one Columbus® Egg a day` diet.

Influence on secondary cardio-vascular parameters.

Year	1993		2000		2002		2003	
Country	Alberta		Belgium		Spain		Iran	
Egg	S.E.	D.E.	S.E.	C.E.	S.E.	C.E.	S.E.	C.E.
# eggs/day	±2	±2	0	±0.5	±0.5	±1	±2	±2
Weight	-	-	-	-	n.s.	-1% (0.01)	-	-
Waist	-	-	-	-	n.s.	+2.5% (0.01)	-	-
Hip	-	-	-	-	n.s.	-3% (0.001)	-	-
SBP	-	-	-	-	n.s.	-6% (0.01)	n.s.	-3% (0.03)
CRP	-	-	-	-	-	-	n.s.	-13% (0.01)

(S.E.: standard egg; D.E.: Designer Egg; C.E.: Columbus® Egg; SBP: systolic blood pressure; CRP: C-reactive protein; n.s.: no statistical significance; -: not measured)

Tentative conclusions:

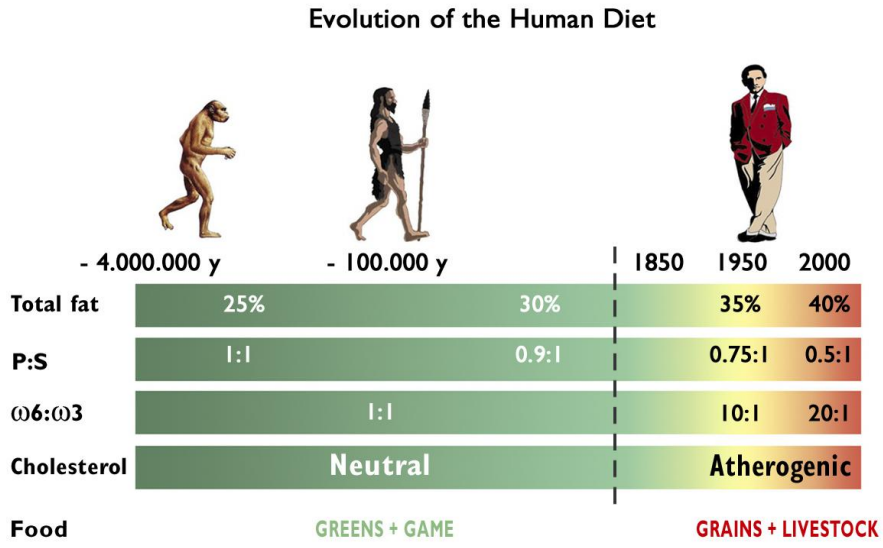
1. Standard egg does not influence secondary CVD-risks up to an ingestion rate of two eggs a day.
2. Columbus® Egg positively influences secondary CVD-risks through its positive effect on systolic blood pressure (no effect on the diastolic counterpart), as seen in post-menopausal women (Spain) and in young university students (Iran). The effect is clearly observed as starting at an ingestion rate of one egg a day – in green in the Table. This beneficial effect on systolic blood pressure is accompanied by minor, but significant, positive anthropometric changes (weight, waist and hip perimeters) in post-menopausal women after 8-weeks on the ´one Columbus® Egg a day` diet and by a substantial drop in CRP pro-inflammatory parameters in young university students on the `two Columbus® Egg a day` diet.

Golden standard clinical trials are on-going to confirm the results accumulated during the four pilot clinical studies carried out so far. This is a requirement to further progress in the field. However, one has to recognize that Columbus® egg outperforms expectations in a number of clinical parameters classically presented as dietary cardiovascular risks, i.e., it seems to:

- not affect plasma total cholesterol (TC),
- trigger a beneficial redistribution between LDL- and HDL-cholesterol,
- significantly reduce fasting insulin and glycemia,
- effectively reduce systolic blood pressure,
- improve anthropometric parameters (weight, waist and hip perimeters),
- reduce pro-inflammatory indexes (CRP, LDL-CHL/E, ω6:ω3 ratio), and
- help FH-children with their statin treatment.

When tested for, these effects were observed for so widely different groups of patients (phenotypes) as FH-children (between 9 and 15 years of age), healthy university students (between 18 and 32 years of age), and postmenopausal women (between 45 and 55 years of age).

It may therefore be concluded that Columbus® Egg is a safe staple food for the greatest majority of people and that it may help in many circumstances to improve health conditions. It just belongs to man's genetic heritage.



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