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*As most realize, the number of diet types and philosophies is large. We have Paleolithic diets based on the notion that our genome was mostly fixed long before the advent of agriculture which goes back only about 10,000 years. We also have vegetarian diets with variations based on such issues as dairy products. Then there are the low-carbohydrate and very low-carbohydrate diets, and the opposite, the low-fat diet, which had its origin shortly after the Second World War in the hypotheses that fat causes heart disease and cancer. Both were later found to have no supporting evidence. There is also the DASH diet designed with hypertensives in mind. This is not a complete list. Finally we have the Mediterranean diet, a term which is not definitive and is frequently modified by the term traditional to describe the traditional diets on Crete and Southern Italy and Spain. It is this latter diet that is the main feature of this issue.*

*The principal motivation for going on a diet is probably weight loss, although there may be a conscious or unconscious association with health benefits. The diet developed by Roy Taylor at Newcastle University discussed in the October 2014 issue appears to cure type 2 diabetes in 8 weeks and should be a powerful motivator for the specific diet used to achieve this remarkable result. Some may try low or very low carbohydrate diets to move from diabetes to prediabetes or to lower their prediabetes markers. Some overweight individuals who have had heart attacks will probably be motivated if their doctor makes a strong case for lowering weight. Over the years opinions have varied as to the type of diet to try, and the decision frequently meant choosing which of the three macronutrients to significantly lower, fat, protein or carbohydrate and which ones to then of necessity raise. Thus there is a large body of confusing and contradictory data. Studies involving comparisons between diets always have significant problems associated with small sample sizes, underrepresentation of men, limited generalizability, lack of blinded ascertainment of outcome, lack of data on adherence to the assigned diets, and a large loss of subjects during follow-up. For studies lasting over a year, one can predict with a high level of certainty that when the study report is examined, the groups being compared will converge after a maximum weight loss to a much smaller final result.*

*In an important study reported in 2009, Sacks et al (N Engl J Med 2009 February 26;360(9):859-73) compared weight-loss diets with different compositions of fat, protein and carbohydrates. Over 800 overweight subjects were involved in this study. As expected, in this 2-year study the maximum weight loss occurred at about 12 months followed by weight regain of part of what had been lost. Among the 80% of*

participants who finished the study the average weight loss was 4 kg and the initial mean weights were about 92 to 94 kg. However, the calorie restriction was not as great as, for example, in some of the very low-carbohydrate ketogenic diets where a beneficial impact was seen on glucose metabolism in the context of diabetes. The important conclusion was that the dietary pattern, in this case the distribution of protein, fat and carbohydrates in terms of percentage of energy intake, was not important in weight loss. The Mediterranean diet also represents a dietary pattern. It is not particularly radical, but as will be discussed, produces remarkable health benefits which include weight loss.

Other major topics in this issue include saunas and mortality and a very serious issue, the apparent dangers of acetaminophen. A number of other subjects of general interest are also briefly discussed.

Wishing you and your family good health,

**William R. Ware, PhD, Editor**

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## **THE MEDITERRANEAN DIET BENEFITS**

### ***MEDITERRANEAN DIET AND CARDIOVASCULAR DISEASE***

It is quite remarkable that when studies are done that seek associations between food patterns and health benefit, what frequently emerges are results that point to the Mediterranean diet. Thus this diet is the most frequently cited in guidelines as representing the favored healthy dietary pattern. Some of the diets that come out at the other end of the spectrum are no surprise, i.e. junk food diets, which are unfortunately rather common and the standard American diet also called SAD.

The Mediterranean diet does not single out specific components or limits calories, but rather emphasizes plant food, olive oil as the principal source of fat, limited dairy products, moderate amounts of fish, low amounts of meat, plenty of fresh fruit daily and modest amounts of wine, generally red, with the main meals.

Interest in the Mediterranean diet dates back to the Seven Countries Study in the 1980s when the researchers noted that in contrast to the rest of the developed world, the farmers of Crete consumed some of the largest amounts of fat and nevertheless had the lowest cardiovascular mortality.<sup>1</sup> Reminiscent of the French Paradox. However, this study has come under

considerable criticism over the years. A highly significant study which examined the heart-diet relationship in this context was the famous Lyon Diet Heart Study published in 1999.<sup>2</sup> This was a randomized, controlled study of the Mediterranean diet and the rate of cardiovascular complications after a heart attack, i.e. secondary prevention. The control was what was termed the prudent Western diet. For the endpoint that combined cardiac death or nonfatal heart attack, the *absolute* risk reduction was 12%. When the endpoint was expanded to include unstable angina, stroke, heart failure and embolisms, the absolute risk reduction was 14% (taken from the survival graphs). The associated numbers needed to treat (NNT) to prevent one event over 5 years were 8 and 7, respectively. As has been discussed in IHN a number of times, the use of statins in secondary prevention generally yields a NNT of about 50 over typically 4 years.

A large randomized trial (PREDIMED) examined the question of the benefit of the Mediterranean diet on primary prevention of cardiovascular disease.<sup>3</sup> The Mediterranean diet was augmented by either extra olive oil or nuts and the control was a group simply advised to eat a low fat diet. The absolute reduction in heart attack, stroke, or death from cardiovascular causes was 2.3% with the added olive oil and 2% with nuts. Yielding numbers needed to treat of 43 and 50 respectively. By comparison, statins for primary prevention for these endpoints yield around a 1% absolute risk reduction, i.e. a NNT of about 100. For total mortality, the absolute risk reduction was 1% whereas statins are generally found to have no effect. The researchers point out that in this study, the difference between the trial and the control diets was not that large. Thus if they had used as a control the standard American diet there might have been a considerably larger effect.

In a 2015 review of this subject which examined the individual components of the diet, it was concluded that no specific component has been shown to be as beneficial as the dietary pattern itself.<sup>1</sup> It is also interesting that in the Lyon Diet Heart Study, the consumption of fat was slightly lower in the Mediterranean group as compared to the control diet, and was around 30% of energy intake. In addition, the Mediterranean lifestyle is a possible source of unmeasured benefit. This includes social support, sharing of meals, having lengthy meals and post-lunch siestas.

#### *MEDITERRANEAN DIET AND TYPE 2 DIABETES*

A number of follow-up studies have examined the association between the extent of adherence to the Mediterranean diet and the prevention of diabetes. Most have found a positive association, in some cases strong although the calculation of absolute effects is generally difficult if not impossible. Greatest benefit is seen when the subjects were overweight. The randomized trial (PREDIMED) described above which augmented the Mediterranean diet with olive oil or nuts also looked at the impact on the incidence of diabetes. All participants had elevated risk of cardiovascular disease based on risk factors. Yearly oral glucose tolerance tests were used to diagnose diabetes. The control group was on a low fat diet. The authors present a cumulative diabetes free survival plot based on statistical analysis that controlled for confounding. From this the absolute risk reduction can be estimated. Over 5 years on either the Mediterranean diet plus nuts or olive oil intervention, the risk of developing type 2 diabetes was reduced by 5.4% which means approximately 19 had to follow the intervention rather than the control diet to achieve the prevention of one case.<sup>4</sup> Comparison with two other similar studies revealed that The PREDMID trial achieved the largest effect size as measured by the relative risk.<sup>5</sup> The authors speculate that this may be due to the enhanced unsaturated fat component achieved with either the nuts or olive oil. This was not a calorie restriction diet and the subjects were overweight but the three groups at baseline had similar triglyceride levels and of course were not diabetic.

The PREDIMED group of studies also included examining the association between iron loads and the risk of developing diabetes.<sup>6</sup> It was found that blood ferritin levels considered to be normal for both men and women in fact carried enhanced diabetes risk. This interesting subject is discussed in detail in the October 2013 issue of IHN.

In a recent review, Georgoulis *et al* discuss possible mechanism whereby the Mediterranean diet decreases the risk of developing type 2 diabetes.<sup>7</sup>

- There is considerable evidence, including a meta-analysis, that the Mediterranean diet resulted in greater weight loss than control diets, mostly low, especially when accompanied by calorie restriction, physical activity or when adopted for more than six months.
- The fact that the Mediterranean diet is highly palatable and well tolerated by dieters enables it to be having a beneficial effect of weight reduction and maintenance, an important aspect of prevention since for some it implies low fat storage, especially in the liver and pancreas.
- The combination of nutrients favors prevention of type 2 diabetes. These include fruits, vegetables, legumes, nuts whole-grain cereals and olive oil. In addition there is a high intake of monosaturated fatty acids and a low intake of trans-fatty acids as well as a high intake of fiber and antioxidants. These nutrients have been found to exert a positive effect on insulin sensitivity and pancreatic beta-cell function which reduces the probability of developing diabetes.
- The dietary pattern is strongly anti-inflammatory and anti-oxidative. Both impact modifiable factors for the development of type 2 diabetes.

Thus the benefits of the Mediterranean diet in diabetes must be considered an important component of its role as a popular choice as a healthy diet.

#### *MEDITERRANEAN DIET AND CANCER RISK*

As part of the Lyon Diet Heart Study, the association between the diet and the risk of developing cancer was investigated.<sup>8</sup> Over 600 subjects were randomized to either the diet or an American prudent diet. During 4 years of follow-up, there were 7 cancer deaths (4 control 3 diet) and 24 cancers (17 vs. 7). When early cancer diagnosis within the first 2 years of the study was excluded a total of 14 cancers were found (12 vs. 2). Based on either the raw event data or the use of the control event rate and the risk ratio adjusted for confounding factors, the number needed to treat with the Lyon Diet to prevent one cancer was 29 for all cancers diagnosed during the trial. Using just raw event data, the corresponding number after eliminating early diagnosis cases was 30 although the number of diet cases was too small to yield a significant number.

A recent systematic review and meta-analysis included 21 cohort studies and 12 case-control studies with over 1.4 million subjects.<sup>9</sup> Risk ratios reflecting significant reduction in cancer mortality and risk associated with the highest adherence to the Mediterranean diet pattern (with the lowest as a reference) were found for colorectal cancer (0.86), prostate (0.96) and mouth, nose, throat, esophagus and windpipe cancer (0.44). Non-significant results were found for breast, gastric and pancreatic cancer. The authors cite a study supporting the hypothesis that the protective associations observed may be due to the olive oil since a meta-analysis of 19 studies found a 0.66 times lower odds of having any type of cancer when comparing the highest vs. the lowest consumption.

The Lyon Diet Study is the only randomized, controlled trial to have reported as this is being written, but there is another arm of the PREDIMED study which has looked at cancer but has not yet been published.

**MEDITERRANEAN DIET, MILD COGNITIVE IMPAIRMENT, AND ALZHEIMER'S DISEASE**

There have been only a limited number of studies that met the inclusion criteria for a recent meta-analysis.<sup>10</sup> Here we focus on two that presented sufficient data for ascertaining absolute risk reductions. In one, Scarmeas *et al* examined the progression of normal cognition to mild cognitive impairment (MCI) and MCI to Alzheimer's disease.<sup>11</sup> The other looked at the progression of normal cognition to Alzheimer's disease.<sup>12</sup> In both studies from the same group, a scale was created to reflect adherence to the Mediterranean diet which ran from 0 to 9. The participants were then stratified into a low (score 0-3), middle (4-5) and high (6-9) tertiles. The endpoints of MCI or AD were then obtained for the three tertiles over a 10-year period. Ascertainment of mental status was done by a group of neurologists and neuropsychologists using a variety of recognized and accepted tools. Follow-up intervals were approximately 1.5 years.

In the table below the results are presented in terms of absolute risk reduction and number needed to treat when the comparison was between the low and high tertiles of adherence to the Mediterranean diet.

**TABLE. Risk of progression from normal cognition or mild cognitive impairment (MCI) to Alzheimer's disease (AD) and from normal cognition to MCI for subjects in the high vs. low tertile groups according to the adherence of the diet for 5 or 10 years.**

ENDPOINT	FOLLOW-UP (YRS)	ARR	NNT	SUBJECTS
Normal to MCI <sup>11</sup>	5	0.11	9	1875
	10	0.19	5	
Normal to AD <sup>12</sup>	5	0.06	16	2258
	10	0.165	6	
MCI to AD <sup>11</sup>	5	0.1	10	482
	10	0.21	5	

The absolute risk reductions (ARR) were obtained from 10-year survival curves based on so-called Cox proportional analysis. It is clear that the effect is dramatic with very small numbers needed to treat to prevent either end point. Another study by Feart *et al* also published in 2009 does not allow the assessment of absolute results but the general conclusion was that higher adherence to the Mediterranean diet was associated with slower cognitive decline according to the Mini-Mental state Exam but not consistently with other cognitive tests, but higher adherence failed to yield statistically significant results for progression to AD.<sup>13</sup> The somewhat different results of this study and the two presented above may reflect differences in assessment.

**SAUNAS AND MORTALITY**

In the March and May 2014 issues of IHN, the health benefits associated with saunas was discussed. Not only are saunas beneficial for detoxification, but they are implicated in benefits associated with cardiovascular disease, musculoskeletal disorders, depression, respiratory

diseases and peripheral neuropathy. The risks appear negligible with the most common but rare adverse event directly attributable to taking a sauna being sudden cardiac death. In the 1970s Finland, the land of the sauna, sudden cardiac deaths occurred at the rate of 1 per 0.4 million sauna baths for men over 60, for 50-59 year-olds, 1 per 2.4 million, and for 40-49 year olds, 1 per 9 million. The other severe adverse effects are due to accidents such as burns or drowning during a cool-off swim. Alcohol consumption can be a contributing factor due to the enhanced risk of hypotension (dangerously low blood pressure) which can cause fainting and subsequent injury. However, even heavy alcohol drinking does not appear to provoke cardiac dysrhythmias in healthy young men. However, when adverse effects are observed, they are most often among those with underlying, although not necessarily diagnosed, cardiovascular disease.<sup>14</sup> The very frequent use of saunas by all ages in the Scandinavian countries attests to its safety.

A paper has just appeared which examines the association between sauna bathing and fatal cardiovascular and all-cause mortality events in the context of both primary and secondary prevention when traditional Finnish saunas are used.<sup>15</sup> These saunas are generally at 80° to 100°C. The humidity is controlled by throwing water on hot rocks but is generally low at 10-20%. Thus these are really dry saunas. A population representative group of 2315 men (40-60 years) were given baseline exams between 1984 and 1989 and then followed for about 21 years. A total of 601, 1513 and 201 men had saunas 1, 2-3 and 4-7 times a week, respectively. 24% of those enrolled had coronary heart disease, 56% a family history of heart disease, 34% a history of hypertension and 48% a family history of hypertension and 18% had arrhythmias. Obviously, a significant number of those enrolled had elevated risk for the endpoints studied.

It was found that compared to those who had one sauna per week, sudden cardiac death, coronary heart disease fatal events, cardiovascular fatal events, and all-cause mortality were all reduced as measured by the percentage of events in each sauna group with the lowest event rate associated with the most frequent use of the saunas. Cumulative survival plots were provided for the sudden cardiac death results when one vs. an average of 4.7 saunas per week were compared, an absolute risk reduction of 0.08% was observed (NNT = 35) whereas when the duration of the sauna was used, comparing < 11 minutes with > 19 minutes was compared, the absolute risk reduction was 0.11 (NNT = 10). NNT is the number needed to receive the indicated protocol to prevent one event in the above case over about 21 years. For preventive interventions in medicine, these represent a very effective therapy.

Consistent with the above percentages which decreased with the frequency of saunas, the hazard ratios roughly equivalent to the odds of an event, decreased as the duration of the sauna increased and when 1 sauna was compared with 4-7 times per week. For sudden cardiac death, fatal coronary heart disease, fatal cardiovascular disease and all-cause mortality, the hazard ratios were 0.37, 0.52, 0.50 and 0.60, respectively. These are large effect sizes and were independent of conventional risk factors, as seen after statistical analysis. It is noteworthy that even though historically there were concerns about saunas having harmful effects for cardiovascular events, in fact it appears that saunas are protective. The authors provide citations to back up their assertion that even patients who have recovered from a heart attack and patients with stable angina or heart failure can enjoy sauna bathing without any significant adverse events. They do point out that individuals prone to orthostatic hypotension (lightheadedness or fainting after standing up) should be cautious about using saunas because of the potential for a significant decrease in blood pressure which typically occurs immediately after the sauna. They also regard alcohol consumption as a major contributing factor to sauna-induced sudden cardiac death.

The traditional Finnish sauna is different than the steam-room saunas and thus the above results may not apply. While the authors do not mention infrared saunas, these appear to come close to the Finnish saunas except that the humidity may be somewhat lower. Many of the benefits of saunas described in IHN involve infrared heating of the body which, just like the Finnish sauna, increases the skin temperature and should have similar physiological effects.

### ***BOTTOM LINE***

Saunas seem like a great idea with multiple health benefits. As discussed in the May 2014 IHN, home saunas that use red infrared lamps can be set up for about \$100 and you editor finds that this approach works just fine even when used in an initially cool bathroom. He adds a small infrared heater for his back to the lamps in front and never exceeds 30 minutes or an oral temperature change greater than 2°C.

## **GROWING CONCERN OVER DANGERS OF ACETAMENOPHEN**

Acetaminophen (Tylenol, paracetamol) was first introduced as an over-the-counter analgesic in 1950s by McNeil Laboratories which shortly thereafter became a division of Johnson & Johnson. It became a best-selling drug for pain and fever. Most pharmacies have a foot or more of shelf space assigned to this popular product. The idea that it might not be as safe as universally believed is probably beyond the imagination of most. A major risk of excessive acetaminophen intake is liver damage which can be acute. Alcohol aggravates the toxicity and makes acetaminophen and alcohol a potentially deadly combination. In the worst-case scenario acute brain swelling can produce unconsciousness and death. These acute situations are generally encountered with accidental large overdoses or suicide attempts. The minimum adult dose associated with significant risk of liver toxicity is 7-10 g. Acetaminophen containing narcotic painkillers (Tylenol #3 and #4 with codeine and Percocet with oxycodone) generally contain only 325 mg per pill. Extra strength Tylenol contains 500 mg. Thus accidental overdose should be rare. The standard overdose treatment is N-acetyl cysteine, a common over-the-counter supplement used, among other things, for detoxification.

Readers may recall a recent discussion in IHN of the possibility that acetaminophen is associated with the proposed vaccine-autism connection through its use to treat vaccine induced fever, especially after MMR vaccination and thus it is the acetaminophen, not the vaccination that appears to be the culprit. However, there is more to the story of acetaminophen toxicity than this.<sup>16-18</sup>

A recent paper very recently appeared which presented a review of evidence for a number of adverse effects of acetaminophen intake at levels well below that for overdose.<sup>19</sup> Among the large number of studies found in the authors' literature search, they selected only a few to include in their systematic review. Of greatest interest are those that examined dose dependence. It was found that mortality risk elevation, cardiovascular adverse event rates, gastrointestinal adverse events, and kidney dysfunction all exhibited increases with the dose of acetaminophen which became statistically significant at high doses. Typical maximum risk increases were of the size of factors of 1.5 to 2 when the highest vs. low or no exposure were compared. Finding significant dose dependence is important when making the case for significant risk.

To gain perspective, it is instructive to examine one of the studies which were conducted by the group at Harvard Medical School which also conducted the famous Nurses' Study and the

Health Professionals follow-up study.<sup>16</sup> In the study on acetaminophen over 70,000 women were followed for about 12 years for the endpoint of cardiovascular events. Dose was determined by the frequency of use in days per month compared to no use. For non-users, 3.6% had cardiovascular events, whereas those using acetaminophen 22 or more times per month experienced 6.2%. This yields an absolute increase of 2.6% or the number needed to be on the high dose regime to cause one event over 12 years of about 40. When the results fully adjusted for confounding were used, the NNH was about 80, computed from the risk ratio and the non-use event rate. The NNH of 80 implies an absolute risk of just over 1% with 98.7% having no adverse cardiovascular events. Thus statistically significant risk appears to be there, it is small, and everyone admits that it is difficult to account for all confounding in such studies.

However, in the presence of pain, the incentive to do something is compelling. The alternatives at this level of aggressiveness are non-steroidal anti-inflammatory drugs NSAIDs such as ibuprofen and naproxen and of course aspirin. The same study from Harvard found similar enhanced risks of cardiovascular events for NSAIDs but not for aspirin. However, with aspirin, one must balance the benefits vs. the risk of gastrointestinal adverse events and at high doses, a number of other serious side effects which is challenging on an individual basis. At the next level there are the narcotic drugs, either alone or mixed with either aspirin or acetaminophen. These have a much larger downside but greater effectiveness. Among natural anti-inflammatories, curcumin would stand high on the list, especially if it is in a highly bioavailable form. An anti-inflammatory diet which emphasizes fish, nuts, fruits, vegetables, healthy oils like olive and coconut is another option, as well as bromelain found in pineapple but also sold as a supplement.

### ***BOTTOM LINE***

Chronic pain is very common, especially as one ages and suffers from such disorders as arthritis, and unless addressed can severely impact the quality of life and interfere with healthy sleep patterns. Therefore the incentive to do something is compelling, but one must be aware of the risks of drug interventions which all seem to carry risk of adverse events. Natural alternatives offer a solution if they are found to work. Cancer pain and palliative care pain management of course must be judged by different standards of risk vs. benefit.

## **NEWS BRIEFS**

### **CHONDROITIN AND GLUCOSAMINE APPEAR TO WORK AFTER ALL**

This combined alternative treatment of for the pain of osteoarthritis has been around for a long time and generally debunked by mainstream medicine, partly because of a 2006 study which found the combination failed to reduce pain in knee arthritis.<sup>20</sup> Ignored however was a result from a subgroup in this study that that found for individuals with severe pain, this combination worked as well or even somewhat better than Celebrex (celecoxib) with 54% of patients experiencing a 50% or greater reduction in a standard pain score compared to 34% of the placebo group and 48% of the Celebrex group. A significant improvement in a standard joint function score was found only with the combination treatment vs. the placebo.

A recent randomized trial of the combination alternative treatment vs. Celebrex has now confirmed these results in patients with severe knee pain and osteoarthritis.<sup>21</sup> The combination was found comparable to Celebrex in reducing pain, stiffness, functional limitations and joint swelling after 6 months. It was also observed that the combination required longer than Celebrex to become effective with the convergence was complete at 6 months. The doses were



400 mg of chondroitin and 500 mg of glucosamine 2 times a day or 200 mg of Celebrex plus 5 placebos to maintain the blinded aspect of the trial. An important aspect of these results is that the combination therapy had no adverse side effects, where Celebrex along with the entire class of non-steroidal anti-inflammatory drugs are associated with a number of gastrointestinal and cardiovascular risks.

### **FLUORIDE IN DRINKING WATER AND HYPOTHYROIDISM**

Community water fluoridation goes back to the 1950's. The merits of this have been debated ever since. The level is typically 0.7 to 1.0 mg/L. To this is added that absorbed from toothpaste unless one uses the fluoride free product. Studies have suggested that fluoride is associated with hypothyroidism which is biologically plausible since it is a member of the halogen family which includes bromine and iodine, and it binds to iodine receptors. In fact, historically fluoride was used as a treatment to reduce thyroid activity. An interesting study in the UK further addresses this concern.<sup>22</sup> Two large residential areas were identified, one with and one without fluoridation. In each area general medical practitioners were recruited and the association between the incidences of hypothyroidism determined. In all, almost 800 practices were involved. Practices in the fluoridated areas were twice as likely to report high hypothyroidism prevalence as those in the non-fluoridated area. These results highlight a significant public health issue since hypothyroidism is far from a trivial disorder.

### **ELEVATED BLOOD GLUCOSE AND RISK OF PANCREATIC CANCER**

Pancreatic cancer is bad news. Unless caught early, which is uncommon, it is almost impossible to cure, progresses rapidly and has a high mortality rate. Epidemiological (e.g. follow-up) studies support an association between type 2 diabetes and the risk for pancreatic cancer and the biological plausibility of this connection has been carefully investigated, and the suspected increase in risk appears associated with elevated circulating blood sugar.

A study has now investigated the association between pancreatic cancer and blood sugar levels over a range that includes prediabetics, i.e. 5.6 to 6.9 mmol/L (100 to 124 mg/dL).<sup>23</sup> In this study, a meta-analysis was used which included 9 studies and over 2400 patients with pancreatic cancer. It was found that there was a linear association between fasting blood glucose and risk of pancreatic cancer over the range that included prediabetics and diabetics. For every 0.56 mmol/L {10 mg/dL} increase in fasting blood glucose there was a 14% increase in the cancer rate. The authors point out that since the glucose levels in prediabetics can be influenced by lifestyle changes, early detection of crossing the threshold into this state coupled with aggressive action to reverse to normal glucose metabolism could have an impact on the incidence of pancreatic cancer. They do not mention the work of Roy Taylor discussed where diabetes was cured by very severe short-term calorie restriction, and of course this will also cure prediabetes. Yet Taylor's clinical trial was published in 2011 and the study discussed here in 2015. They also missed 4 other papers from Taylor's group that concerned this same intervention.

### **EGGS AND RISK OF TYPE 2 DIABETES**

When the fat-is-bad, cholesterol-is-bad movement got off the ground and became established dogma 50 some years ago, egg consumption dropped dramatically and the fried egg became a symbol of an unhealthy diet. As has been discussed in IHN, neither hypothesis is now considered to have merit. A study has just been published which examined the association between egg consumption and the risk of type 2 diabetes. This is in the context that saturated fat is risk factor for diabetes. It was found that when the highest egg consumption was compared to the lowest, higher egg intake was associated with lower risk of type 2 diabetes. Not

only was there a significant risk reduction, but there was an inverse association between fasting blood glucose and egg consumption. It is noteworthy that eggs provide a large number of healthy micro- and macronutrients, and now that the dangers of the fat and cholesterol have been seriously challenged, one can enjoy their eggs for breakfast without any feeling of guilt.<sup>24</sup>

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