

## CHOLESTEROL, HEART ATTACKS AND STATINS

***My blood (LDL or total) cholesterol has gone up on the diet. Does this mean that I am at increased risk of developing a heart attack and so need to take a cholesterol-lowering statin drug?***

The evidence is that the average response of the blood (LDL or total) cholesterol concentration to an increased fat intake (in the absence of a high carbohydrate diet) on the Banting diet, measured in thousands of patients, is NO CHANGE. Yet we know that values do go up in some subjects. So in an equal number the value must go down, which most people would consider to be good. How can an “unhealthy” diet produce changes that are either very unhealthy or very healthy? It does not make immediate sense so we need to dig a bit deeper.

There are 2 models for how heart disease develops – the cholesterol theory and the insulin theory. The cholesterol theory holds that cholesterol in the blood rises when one eats a high fat diet and this clogs the arteries causing heart attack. The treatment is therefore simple – avoid all fat from the diet.

The insulin theory holds the opposite – that it is carbohydrate in the diet that causes heart disease, most especially in those with the condition of insulin resistance (IR). When those with IR eat a high carbohydrate diet, they will likely develop the Metabolic Syndrome (MS) described below.

What we know is that the cholesterol theory of heart disease has never been proven. The best evidence that the science behind this theory is “junk” can be found in Nina Teicholtz’ new book, *The Big Fat Surprise*. It seems that we have been seriously misled by science, industry and politics to accept a theory for which there is no good evidence. Then there is an entire \$40 million dollar a year industry – the cholesterol lowering (statin) drug industry – that seeks to insure that we continue to accept this unproven theory without question.

According to the cholesterol theory, the only factors in your blood which you need to worry about are either your total or your LDL-cholesterol concentrations – anything that makes either go up is bad, anything that causes either to go down is good. Statin drugs reduce both and so are good as is a low fat diet. The only trouble is that even the most religiously followed low fat diet will drop the total cholesterol by a homeopathic amount (about 0.2mmol/L), which would be too little to make any difference even if cholesterol was the true cause of arterial “clogging”.

According to the insulin theory, it is consistently elevated blood insulin concentrations that cause the constellation of conditions we recognise as the Metabolic Syndrome (MS) and it is the MS that puts one at risk of heart attack because it is the direct cause of the other features of MS that lead to heart attack.

Note that MS develops in those with IR who eat high carbohydrate diets for more than a few decades.

The key features of MS are abdominal obesity, type 2 diabetes, hypertension, gout and atherogenic dyslipidaemia, which includes elevated blood triglyceride concentrations, increased triglyceride remnant lipoproteins, increased apolipoprotein B (apoB) concentrations, increased numbers of small dense LDL-cholesterol particles and lower blood HDL-cholesterol concentrations. Other blood markers of heart attack risk in those with MS include elevated blood glucose, insulin and glycated haemoglobin (HbA1c) concentrations.

All these abnormalities reverse on a high fat diet, but are worsened on a high carbohydrate diet. In addition, those with MS will lose weight and their blood pressure falls when they restrict their carbohydrate intakes. The end result is that persons with MS improve their health dramatically when they begin to eat a low carbohydrate diet EVEN IF THEIR TOTAL CHOLESTEROL RISES somewhat. That is because it is NOT cholesterol that puts us at risk of heart disease. Rather it is that constellation of abnormalities that occur in those with MS (as listed above) and which usually improve dramatically when a diet with low carbohydrate intake is ingested.

In addition we now understand that there are at least 2 components of the so-called "bad" LDL-cholesterol. The two components are (i) small dense LDL-cholesterol particles, which contribute significantly to arterial damage and heart disease. These might be called the Bad Bad Cholesterol! And (ii) the large fluffy LDL-cholesterol particles, which do not contribute at all to heart attack risk. We might call these Good Bad Cholesterol!

Also, it is clear that it is the total number of LDL particles in the bloodstream that increase heart attack risk. So if the blood LDL cholesterol concentration rises, this can be because of an increase in the number of Bad Bad Cholesterol particles, which would be BAD, or it can be because of an increase in the number of Good Bad Cholesterol particles, which would not be so bad. In fact the blood LDL cholesterol value might INCREASE despite a REDUCTION in the number of cholesterol particles if the increase is due to an increase in the Good Bad Cholesterol particles.

So you see, it is impossible to interpret the meaning of a change in the blood cholesterol concentration without knowing what happened to the cholesterol particle numbers and also all the other variables known to modify heart attack risk.

So my answer is the following: If you adopt a low carbohydrate diet you must monitor all the variables discussed above to know if the diet is helping you. If the vast majority of these variables improve, then logically it does not matter what

happens to your total LDL cholesterol, since it is entirely possible that this change was brought about by an increase in large fluffy Good Bad Cholesterol particles with a reduction in the small dense Bad Bad Cholesterol particles, producing an overall reduction in cholesterol particle numbers.

So here is the Table you need to understand:

VARIABLE	What it should be	What a low carb diet does	What a low fat high carbohydrate diet does in those with IR or MS
Body weight	What it was at 20 year old	Reduces	Increases
Blood pressure	Low - below 125/75	Reduces	Increases
Blood glucose concentration	Low - below 5.0mmol/L	Reduces	Increases
Blood insulin concentration	Low	Reduces	Increases
Blood glycated haemoglobin (%)	Below 5.5%	Reduces	Increases
Blood triglyceride concentration	Below 0.75mmol/L	Reduces	Increases
Blood HDL-cholesterol concentration	Above 2.0mmol/L	Raises	Lowers
Number of small dense LDL-cholesterol particles in blood	Low	Reduces	Increases
Number of large fluffy LDL-cholesterol particles	Most of the LDL-cholesterol must be in these particles	Raises	Reduces
Total number of LDL-cholesterol particles in blood	Low	Unknown	Increases
Blood apoB concentration	Low	Reduces	Increases

I think it is fairly obvious which diet those with IR and the MS should be eating if they want to reduce their risk of heart attack and optimise their health.

So that is it.

Both your health and your risk of heart disease is about many factors other than simply your blood cholesterol concentration.

Please distribute this email to anyone you think might benefit from reading it.

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June 2014