

## Enemies of health: Fat and cholesterol

### An Osteopathic teachers view...

Last week I had to travel to Amsterdam to teach at the Osteopathic School. Sitting in the train and wearing my mouth mask I wandered away with my thoughts about Covid-19 and how this tiny virus is made an international enemy of health. This virus is one of the trillions of viruses and bacteria that live on this earth much longer than us and evolved to a symbiosis with the human body. And then other so called 'enemies of the state' popped up in my brain: Fat and cholesterol. This were the topics I had to teach in Amsterdam those days in a course about Physiology, fats and Metabolic systems.

#### **I started the course with a few questions about fats and cholesterol:**

The first question: What are good and bad fats?

The second question: If a patient asks your advice for a good natural supplement to lower his/her cholesterol; what would be your answer as an osteopathic professional?

Answers to the first question about 'bad fats' were saturated fats, animal fats, trans fatty acids, eggs, etc. 'Good fats' were named poly-unsaturated fats, vegetable oils, avocados, etc.

Then I asked them to think about the question itself. Is there a 'good' and 'bad' in these molecules of Nature and in the human body? Why do we call it 'good and bad fats'? And where does this label come from?

Shouldn't we first just look at physiology and the metabolism, how the body works and what it needs?

So we cleared our minds and started with studying the fats or lipids in the different dimensions of the human body. These dimensions are important because they say something about how the body formed itself, from the smallest molecules up to the cells and tissues, systems, organs and so on...

The first place to study metabolism is on the most common and basic level or dimension of Life. According to Nobel Prize winner Christian de Duve that's the single cell.

Phylogenetically when we look at the emerging of the first cells we can see that the primary lipids organized themselves in a phospholipid double layer. This was a consequence of its watery environment and the repulsion of water. The phospholipids behave as an amphiphilic structure. This means that one part is hydrophile (phosphor heads) and the other part is hydrophobic (fatty acids tails). So we can say that water was an essential element (environment) for the lipids to self-organize and the first cells to emerge.

If we look at our multicellular body, we see that all the cells are made of this phospholipid double layer (of course the membranes are more complex and contain also proteins, receptors, etc. but for now we will look at lipids). The lipids are a combination of saturated and unsaturated fatty acids. Both are vital in their role for the fluidity, stability and continues movement of the cell membrane and its metabolic functions (fluidic mosaic model).

Another vital role in the cellular dimension is combustive material. Fatty acids are burned in the citric acid cycle to produce ATP or energy. For cellular respiration fats are a vital element.

In the dimension of the tissues, we see that fatty acids play a role in the local communication system (paracrine). These local communication takes place in the intercellular fluid of the connective tissue. The lipids or tissue hormones are called 'eicosanoids' and an example is Prostaglandin. For example: They are important mediators for the local inflammatory reaction.

If we look at the circulatory system and for example the heart, we see that the cardiac cells burn approximately 70% of fatty acids to deliver the needed energy.

In the organ dimension we see that the kidneys are surrounded by fatty tissue. This is called brown fat and is extremely important for thermoregulation and support.

These are just a few examples of the essential things lipids do in our body.

In this way the 'good' and 'bad' fats are put in another perspective for the students.

**Then the second question: If a patient asks you if you know a good natural supplement to lower his/her cholesterol; what is your answer?**

On this point a few students were awake but I still got answers like to move more, eat less fats or sugars, more vegetables, supplements like red rice, etc. These answers are all fine in a way, but isn't better to ask some new questions: Why do you want to lower your cholesterol? What does it do in the body? Is it really dangerous to have a high level of cholesterol? And if something is of the charts in your blood, shouldn't your question be why does the body do that? What is the cause of this change?

So again, we studied the cholesterol metabolism and tried to do that without any interpretation.

A hard exercise because lots of ideas or interpretations continuously pop up.

Some important features about cholesterol in different dimensions:

- Cell dimension: In eukaryotes cholesterol lays between the hydrophobic membrane lipids. Together with the lipids it has its role in the fluidity and stability of the cell membrane. It can act both ways. It makes the cell membrane less or more fluidic and permeable. It influences cellular dynamics, transport mechanisms, secretion, etc.
- In the circulatory system cholesterol has its 'bad name' because of the so-called plaques and cardiovascular disease. But it's very tricky to take this as a simple truth and reduce this to 'the cause' of arteriosclerosis. Cholesterol is transported throughout the whole body in a systemic way. The plaques are only found in specific areas (bifurcation's) of the vascular system. So, there are many other factors that must also play a role in this mechanism. For example: Turbulent flow and shear forces on endothelial cells, the 3 venous systems, lymphatics and immune system, inflammatory processes, vasa vasorum, etc.
- Organ dimension: The liver plays an important role in the metabolism of cholesterol. It produces cholesterol in response to what comes in from digestion. That means if you eat or absorb more cholesterol, your liver produces less, and vice versa. Surely this is not because of the potential danger of cholesterol. The influence of lowering cholesterol (if you insist on doing something that strange) is estimated around 7%. Can somebody please explain to me why we have so many products to do this? A dozen of Margarines to choose from, eggs without cholesterol, light-products, plant sterols to prevent the absorption of cholesterol in the intestine, etc. Sounds like rubbish to me or 'making good money' with the illusion of health.
- What is nowadays a 'dangerous cholesterol-level' for heart disease was 10 years ago no problem at all.
- Cholesterol is also needed to make Vitamin D, bile acids, hormones like testosterone, cortisol, aldosterone, estrogens. Important stuff you could say...

The purpose of the course in Amsterdam was to change the mindset of the students.

Do not answer the question from your teacher without rethinking and reframing the answer and go back to the basics of life and health. For me that's looking at all the dimensions of metabolism, and start at the level of the cell.

Thinking about it, I have probably put myself in an awkward position because the students will question everything I say from now. But for me as an Osteopathic teacher the same is true. My ideas or memes can and must also be questioned as to where they come from and be criticized. A sort of continuous dynamic and changing state in a classroom. Kind of refreshing actually...

And as they will work as an Osteopath in the nearby future, the only right thing to do in my opinion with a patient is forget about the focus on one part of the body. Health is never reduced to 'one bad guy' like fats, cholesterol, a virus, sugar, high blood pressure or whatsoever. An open mind for the whole patient and its whole complexity is what really matters.

Like AT Still said: 'Find health, anyone can find disease'...

Jeroen De Block  
Teacher at College Sutherland Amsterdam (Physiology and Anatomy).

1 July 2020



Fritz Kahn: Fatabsorption in the small intestine.

