Managing Inflammation with Dietary Fats and Other Nutrients

Transcript

Hello and welcome. This is Dr. Ritamarie Loscalzo and we are here today to talk about the role of the fats that you eat in your diet and inflammation that happens in your body. As you may know, inflammation is the cause of most diseases. Inflammation is at the heart of any disease that ends in *itis*; like gastritis, arthritis and encephalitis. They all mean there is inflammation going on.

Today I want to talk to you about why the fats that you eat and the way your body processes the fats that you eat, is very important for your body to maintain and control inflammation.

Before we get started I want to let you know that the information that I'm sharing here is not meant to be medical advice. It's not meant to be a diagnosis. It's meant to be an educational sharing from my understanding and from my research, to you. But I always encourage you, especially if you are under the care of a doctor or physician, to review the information with your doctor before you make any decisions about changing your diet and lifestyle.

Let's talk a little bit about fats. Fat that you eat becomes the membranes of your cell; every single cell of your body within the membranes contains fats.

If you eat a lot of processed fats; hydrogenated fats, saturated fats, from foods that have been altered or chemically changed, you are known to become those fats. Instead of your cell membrane being this magical membrane that allows nutrients to enter the cell and toxins to get out of the cell, that membrane becomes stiff and clogged up, which doesn't allow the beautiful flow in and out.

Inflammation can happen in that cell membrane, and this first slide is depicting a picture of the cell membrane. This cell in particular is called a mast cell. And mast cells get involved when your body is inflamed; when you get sinus congestion, when you get respiratory congestion in your lungs. The mast cells produce a lot of the chemical called histamine, and that happens as a result of this cascade that we are going to look at in more detail.

It's called the Arachidonic Acid Cascade. You will see in the picture the arachidonic acid starts at the top and then it leads down to two sides, leukotrienes and thromboxanes, which are pro-inflammatory agents. What that means is these are chemicals that incite inflammation in your body.

We are going to look in more detail at this cascade and show you how it is traditionally managed with medications, and how you can get control of this cycle by controlling the fats that you eat and the nutrients that you take in that help the fats get converted to what they need to be. Let's take a look at the inflammatory cascade. What you see at the very bottom are fires.

Inflammation is like a fire burning in your body. On the left hand side we have the leukotrienes and on the right hand side the thromboxanes. There is going to be a lot of technical language used in this presentation. You don't need to memorize it or know what it is. I want you to get an overall view of the picture. At the top, if you've got your handouts printed out, you can go ahead and write.

On the left hand side where it says linoleic acid, an omega-6 fat; that's the omega-6 side of the pathway. If you go to the right hand side where it says alpha-linolenic acid that's the omega-3 side. We always want to have a nice balance between omega-3 fats and omega-6 fats.

The omega-3 side tends to be anti-inflammatory. The alpha-linolenic acid and the linoleic acid are what we call essential fatty acids. These are fats you body can't produce and your body needs. The ideal is that we have an anti-inflammatory chemical being produced as a result of both of these sides. Let's look at the right hand side, which is the omega-3.

Through the action of an enzyme, called delta-6-desaturase, your alpha-linolenic acid gets converted to a substance called EPA. EPA is Eicosapentaenoic acid and you may have heard of EPA when it comes to fish oil supplements, brain chemistry and inflammation. It helps your body to control inflammation by being converted to something called PG3 which prostaglandin 3, and prostaglandin 1.

When you have enough of this EPA being converted from alpha-linolenic acid (your essential omega-3 fat) it displaces another fat called arachidonic acid, which is inflammatory. Arachidonic acid is typically found in things like meat, cheese, eggs and peanuts; mainly animal foods. Peanut is the one big source that's not an animal food that contains a lot of arachidonic acid.

Arachidonic acid can directly be converted down to these very inflammatory chemicals called leukotrienes and thromboxanes. And these are enzymes.

Anything that ends in ASE, like lipoxygenase and cyclo-oxygenase, are also enzymes and our body uses a lot of enzymes to catalyze reactions. We've got the omega-3 side, alpha-linolenic acid, using the enzyme delta-6-desaturase.

I'm pointing this out because we are going to talk about how we can use the actions of delta-6-desaturase to help you control inflammation.

The delta-6-desaturase takes the alpha-linolenic acid, converts it down to EPA, then down to these prostaglandins, which displaces the arachidonic acid and helps to put out the fire. Basically we think of the EPA as one of our firefighters.

On the omega-6 side similar things happen where the linoleic acid gets converted to something called gamma linoleic acid (GLA) and that's a fat that is also found in hemp seeds, borage oil, evening primrose oil and blackcurrant oil.

That gets converted down to DGLA, which when things are going well and your omega-6 and your omega-3 are balanced, gets converted into PG1 (prostaglandin 1) and that helps you create a fire fighter as well and put out the fire. But what happens when we eat too much dietary omega-6 fat compared to what we eat as omega-3 fats, is the GLA is converted to DGLA, which then can get converted into arachidonic acid and fuels the fire.

We are going to look at the nutritional modulation and the drug modulation, so you'll get a sense of how you control this by choosing the right dietary fats. Let's look at the drug modulation first. People will typical take things called NSAIDs (non-steroidal anti-inflammatory drugs) or steroids to control inflammation, very commonly prescribed.

Let's see how they work. NSAIDs and steroids can both decrease or inhibit the action of delta-6-desaturase, so that your alpha-linolenic acid does not get converted down to EPA. It also inhibits the conversion of arachidonic acid down to thromboxane P3, which then reduces the inflammation.

Same thing on the other side; the NSAIDs reduce the formation of the arachidonic acid from alpha-linolenic acid. What's happening, in addition to it putting out the fire by interrupting the conversion from arachidonic acid down to the thromboxane, is it's also killing your fire fighters. It's inhibiting the conversion to EPA (your anti-inflammatory chemical) and GLA (an anti-inflammatory chemical).

Steroids on the other hand interrupt the process in addition to both of those places, right from the conversion from the food form of the arachidonic acid into the arachidonic acid itself. They are more potent in that by inhibiting up here you also don't get the production of the leukotrienes. Let's take a look at how this compares to the nutritional modulation.

As you can see, we have a lot more boxes on this slide. I'm going to go into a little bit about those boxes and how you can control things.

Again we have this enzyme called delta-6-desaturase, and in order for this enzyme to work so that that the alpha-linolenic acid gets converted to EPA, and the linoleic acid gets converted to GLA, we need these nutrients: vitamin B3, vitamin B6, vitamin B12, vitamin C, vitamin E, zinc, magnesium and biotin.

The other things that inhibit delta-6-desaturase are: trans fats, alcohol, coffee and food additives. If you have a lot of these in your diet you will inhibit the delta-6-desaturase, which means you will inhibit the conversion from alpha-linolenic acid to EPA and DHA, and from linoleic acid down to GLA.

Where do we find these fats? Remember on the right hand side is an omega-3 fat; we find alpha-linolenic acid in flax seeds, chia seeds, hemp seeds and walnuts. We find linoleic acid, the omega-6, in sunflower, sesame, almond, pumpkin, other seeds, other nuts like Brazil nuts and hazelnuts, and corn oil and soybean oil. It's a lot easier to get linoleic acid and as a result most people have a much larger ratio of omega-6 to omega-3 than is really safe and recommended.

It is estimated that people in the US have an average of 12 to 20 times the amount of omega-6 in their diet to omega-3. What this creates is an excess of omega-6, which means that there is too much of this going down to GLA. There is too much going down to DGLA, and a lot more of the DGLA gets converted to arachidonic acid rather than to this anti-inflammatory PGE1.

Your GLA can actually be found in things like borage oil, blackcurrant oil, evening primrose oil and also a fair amount in hemp seeds and chlorella. On the other side the EPA and DHA is very abundant in fish and algae and you can take supplements of EPA and DHA either from fish oils or from algae oils.

When this is humming along, you've got enough of these omega-3 fats; flax seeds, chia seeds, hemp seeds and walnuts in your diet, and enough of the algae or fish in your diet, so that your fire fighters are strong. You've got plenty of EPA; it displaces the arachidonic acid and puts out the fire.

If you've got a ratio of omega-6 to omega-3 of about 3 to 1, then you are going to have it nicely humming along on the omega-6 side. The GLA gets converted to DGLA, which is converted to the prostaglandin. This then supports your firefighter, which then puts out the fire. You can also affect this pathway, in addition to controlling the fats you eat, by taking certain herbs and supplements.

Of course it's really important that you get all these: B vitamins, vitamin C and E, zinc, magnesium and biotin, so that delta-6-desaturase can work to convert your dietary intake into your EPA or DHA.

You can also take a supplement of vitamin E and curcumin, which is found in the Indian spice turmeric, an awesome anti-inflammatory. That will prevent the conversion of your food forms like meats and cheese, into the arachidonic acid so you have a decrease in your inflammation.

In addition bioflavonoids, which are abundant in plant foods, citrus foods, green foods, ginger, and vitamin E and EPA (which is up here) and zinc, also inhibit the conversion of arachidonic acid both to thromboxanes and leukotrienes. What does this all mean to you?

If you decide to control inflammation with drugs by taking steroids or NSAIDs, they not only put the fire out, but they kill our firefighters. As soon as you stop taking them the inflammation comes back full force and you don't have the ability to control the inflammation on your own. Whereas when you control this nutritionally, you are supporting your firefighters as well as putting out the fire, so you've got the best of both worlds.

In summary, we need to be in balance between our anti-inflammatory chemicals, foods and lifestyle, and our pro-inflammatory meaning promoting inflammation. On the inflammatory side, we've got red meat, eggs, dairy, peanuts, processed foods and oils, alcohol and coffee.

On the anti-inflammatory side we have essential fatty acids, fish oils, vitamin E, bioflavonoids, vitamin and mineral co-factors which are abundant in your green leafy vegetables, fresh fruits and veggies, seeds and sprouts. In addition, you have help because your body has its own built in cleanup crew like your lungs, lymph, kidneys, liver, digestive enzymes and all your anti-oxidant nutrients.

You can also get extra support from the outside using acupuncture, homeopathic medicine, botanical medicine, body work manipulation, exercise, physical therapy, and lots of other things to support this process. As you can see you have control of the inflammation in your body by controlling the fats you eat, adding some extra herbs and nutrients, and eating plenty of really high nutrient dense green foods including greens from the sea.