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Welcome to the fat emperor podcast. I'm your host. Ivor Cummins. We're supported by the Irish Heart Disease Awareness charity (www.IHDA.ie), which advocates a simple CT Scan to reveal your CAC score. So Know Your Score - and take action to prevent that premature heart attack. Everything you need to know, will be right here!

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Hello and welcome to another fat emperor podcast short, where we help explain some of the science around health. And today we're going to talk about some blood tests basics, actually the blood test marker GGT also called Gamma Glutamyl Transferase or Gamma GT. And basically this is a liver enzyme. So we're going to start off with talking a little bit about the liver. So the intro is the "liver as the seat of modern chronic disease" - because the liver is so important in so many processes and basically if you look at it simply, many things in our diet, our nutrition and lifestyle can cause the liver to become dysfunctional. We have excessive sugars or refined carbs. Certainly we have genetic tendency can make you very predisposed towards liver injury from your diet and other inputs and sub-optimum vitamins and minerals have a place, and certainly an excessive amount of Omega6 vegetable oils can be challenging the liver, or if you're very low in Omega3 fish oil type components.

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So these things over time, if you indulge or overindulge, can lead to the liver becoming somewhat insulin resistant and to you becoming hyperinsulinemic. And the two are very tied together. So it's almost, it could be put simply as the hyperinsulinemia drives the insulin resistance and the insulin resistance in turn over time encourages the hyperinsulinemia. So it's the combination of both. That's very challenging for future health morbidity, mortality, and fatty liver is the thing that occurs when you are pushing things too far and you're heading into a very dangerous place. And when you develop fatty liver, you'll almost certainly see a rise in your GGT (gamma glutamyl transferase). And it's a simple, cheap blood test. So it's a really good thing to keep an eye on. Now when you're pushing your liver and your body into insulin resistance, you will begin to get atherogenic dyslipidemia. And this sounds like a big word, but it's really just bad Cholesterol:HDL ratios, bad triglyceride:HDL ratios, elevated particle counts of LDL, elevated triglycerides. So not so much the LDL classic measure - that won't tell you much. But the other ones I mentioned, are part of atherogenic dyslipidemia. And it's basically when your cholesterol profile is beginning to adopt a high risk appearance, shall we say. The other thing that is that the atherogenic dyslipidemia is a pretty good predictor for heart disease in the future or a heart attack; one reason is that this dyslipidemia is a very good reflection of if you have significant insulin resistance in your body. So in some ways the cholesterol panel and the dyslipidemia are more telling you about your insulin sensitivity or resistance than anything else. The other problems when your liver becomes insulin resistant is that it will tend to occur along with visceral fat accumulation in your organs.

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So we have many people who are slim apparently, but they're really TOFI - they're thin outside, fat inside. And that means they have visceral fat in their organs, very commonly combined with fat in the liver and that visceral fat has

its own issues and they connect back to the liver and also connect to the atherogenic dyslipidemia. So think of lots of cycles here where the cause and effect arrows are multiple in direction, and everything is connected together into one bad situation centered on your liver. The other thing with liver hyperinsulin is that you will get higher blood insulin, you will get higher blood glucose over time. As you lose control, you will also tend to get elevated blood pressure. So most idiopathic or essential hypertension (where they don't know the cause of the high blood pressure) - it's mostly related to hyperinsulinemia and processes related to that.

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So that's another way to drop your blood pressure, is get your insulin right down. In any case, all of these things I've just discussed, lead directly to cardiovascular disease and many other diseases over time. And the key point is that GGT is a great marker for any or all of what I described going on in your liver. So it's one to really watch. Ideally it'll be around 15 units. If you're above 30 units, you've got to start asking some questions and certainly if you're in the forties and fifties that's something that has to be addressed. So GGT connects very closely to atherosclerotic plaque, the inflammatory disease of your arteries leading to heart disease - and a recent paper on (I'll attach it here afterwards) - it pulls GGT out as a marker of underlying liver diseases for example fatty liver; as a marker of metabolic or insulin resistance syndrome, as I said, as a marker of increased oxidative stress.

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Basically GGT is both connected to making your body's primary antioxidant, which is called Glutathione. And it also, when it's elevated, GGT can break down Glutathione, or an elevated GGT can indicate that you are demanding more Glutathione and there was not enough in the system to deal with some kind of insult your body is receiving. So in every road you go, if GGT is high, it means there's a serious underlying problem. The last thing is that GGT activity, co-locates with oxidized LDL in the atherosclerotic plaque. So if you actually analyze atherosclerotic plaques themselves in your arteries, you'll find that GGT is in there with oxidized LDL. And while it's not fully worked out, they know that it takes part in the atherosclerotic process directly and it's intimately connected to the oxidized LDL, which is the really bad LDL. It's the real bad cholesterol if you will. So GGT is very intimately involved in a lot of bad things and it's a marker you should really watch

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When you look at GGT and long-term survival studies, you see some pretty dramatic hazard ratios or risk multipliers. So for instance, for all-cause mortality, having a GGT and the upper fifth of the population levels puts you at at twice the risk for all cause mortality, 2.3 times higher risk for cancer, death and cardiovascular death is also up to 1.7 times the risk. So GGT is very predictive of future mortality. More shocking are the figures for hepatic or liver cancer or Hepatoma's. So a GGT in the top fifth of the population means a 15 to 18 times higher risk for liver cancer and death from liver cancer. And that's obviously a very serious disease in the USA and a lot of people die from it. So imagine 15 to 18 times higher risk if you have a GGT in Just the top fifth - not even the top 1% of the population.

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So GGT is also one to watch when looking at risk for type two diabetes in your future. Now we see from a study here that if your BMI is low and you have a low GGT, that's the baseline risk of 1.0. But if you have a high GGT in the top quarter of the population, with a low BMI below 25 - then you have three times the risk of diabetes in the coming years. Where it gets really interesting is if you have a higher BMI around 30 you actually still have a very low risk, same as a slim person - but only if your GGT is low. But for a person with a BMI of 30 if their GGT is in the top quarter of the population, they have 15 times the risk of future diabetes. And if you're above 35 BMI with a low GGT, you've still got no extra risk! But if you have a high GGT in the top quarter, you have a 19 times risk of future diabetes.

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So the conclusion of this paper was quite correctly that obesity is not really the thing that's strongly predicting future type two diabetes. It's the GGT, the liver enzyme that's really predicting T2D. And if you correct the obesity level for GGT, the obesity doesn't really predict anything. So this makes sense because GGT, as we explained, is a reflection of your insulin resistance, liver inflammation, and it's a reflection of pretty much most or all of the things that relate to your risk for future diabetes. So it's an incredible marker for that too. So keep her GGT low and take action to get it down. "The smartest guys in the room" I call my next slide and that's because I'm talking about the actuaries in the life insurance industry, and those guys don't care about politics or diets or biomarkers are any of the controversy. They just do the mathematics to find out what are the best measures to predict future deaths so that they can make money in their business.

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And they in 2012 came out with a big report. And out of five categories of risk estimation, they put GGT along with another liver enzyme, ALP - they put GGT at the top of the risk-estimation heap for men of all ages, top of the heap for women also from I think 30 to 60 years old age range - and also very high for the other age brackets. So GGT was the most important, most predictive mortality metric from all of their analyses. And I'll just give a quote from their paper, they said that: "liver function tests, particularly GGT had become central to the life insurance underwriting process." So that'll give you an idea of how important GGT is to predict your future and let you know that you should really think about getting it down if it's on the high side.

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So what about fixing GGT - it wouldn't be fair to talk about how threatening this marker is without telling you how you can fix it and get it right down. And luckily it's not too hard. So six years ago I discovered I had very high GGT (over a hundred!) And I was eating a food pyramid diet, healthy whole grains, rice, potatoes along with meat, fish and eggs, probably eating the odd pizza. And I was eating milk chocolate occasionally (in fairness this is not good) and drinking a lot of fruit juice. I didn't realize that fruit juice was a major issue for the liver. And we had vegetable oil and margarine's in the house, which again I didn't realize were a serious problem for the liver. And so my diet wasn't perfect, it was a classic food pyramid diet, it was essentially following the food pyramid in terms of lots of starchy carbs, breads, potatoes, rice in the base of my diet. And I

had to do the research around my high GGT because the docs weren't sure how to fix my GGT. And I went to the research databases. I'm a biochemical guy and I worked it out over a few weeks - that it was excessive carbohydrate causing my high levels.

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So after changing my diet completely to low carb, healthy fats, cutting out all the starches and eating just cauliflower, Broccoli and low carb, low starch above-ground leafy veggies - and of course eating meat, fish and eggs, and more avocado and all of those healthy fats. Olive oil, Lard, and beef tallow replaced the vegetable oils. We immediately threw the vegetable oils in the garbage. And I began to take double cream in my coffee, etc and I changed my orange juice habits to water and I stopped eating sweets and sugars on. I began to eat dark chocolate as a treat or berries, with cream. So I basically switched, inverted the traditional food pyramid, completely turned it upside down and ate a low carb, healthy fats pyramid. So I fixed everything. What do you think happened my GGT - remember I was 112 and 120 in another reading, and after six weeks of this diet alone, I didn't change my drinking or my exercise.

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What happened is that my GGT dropped all the way to 42 - from 112 to 42 - and in another two and a half weeks I happened to get another test. I was in with the doc and I said, we'll go and grab another one. And it had just dropped again to 35. So in eight and a half weeks I collapsed my GGT from over a hundred down to 35 and kept falling, which is amazing really considering I did it all with just a diet change to low carb, healthy fats. And my weight also began to fall off, which was a nice side effect. I wasn't particularly planning on it, but I lost over 30 pounds in the 8 weeks and that was quite delightful. But that was a side effect. My blood pressure also collapsed from the high level it was at, and my cholesterol ratios and blood sugars and everything else got better. So it was a pretty successful experiment.

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Now it's not just me obviously. Dr. David Unwin is treating many patients in the UK with a low carb diet and many type two diabetics actually, who have more profound metabolic issues than I had. And he uses GGT as his ready-reckoner. If a patient comes in and their GGT is going up, he knows they're kind of cheating or have fallen off the wagon. And if their GGT is looking great, he knows that they're compliant. So it helps in the discussions he has with them. But he tracked 120 diabetic patients over a year or two and all their markers got massively better on low carb and avoiding sugar as expected, but their GGT it also dropped from an average of 73 to an average of 40. So they almost halved their GGT over that year-long period. And this is entirely to be expected - even in people with metabolic damage like type two diabetes full-blown. You're going to see huge improvements going to low carb and this really important liver marker of health GGT. So that's pretty much it for this podcast short. And I hope you'll hit the subscribe and the "like" button or sign up to the podcast audio. But until next time where we'll have more health science, and more papers debunked or decoded for you. Goodbye now. - thank you!