

>> So, you see here how many milligrams of cholesterol is in different foods but don't pay attention to those, because again it doesn't matter. Research shows that cholesterol in food does not raise your blood cholesterol levels. We used to teach this but now we realize that it is just not an issue. So saturated fat you do want to pay some attention to. Yeah saturated fat, there is more in butter than margarine, but again it's not that much and I would take butter that's natural any day over margin- margarine. You can see beef has a bit more than, let's say, chicken breast, quite a bit more. Salmon has not too much, but here's a big- big Burger King Whopper with cheese has a lot, okay, between the cheese and the burger. Here you can see there is butter made from omega-3 fed animals. Again, nowadays, the cows, it says here, you know, did you know grass-fed butter is the new superfood. Nowadays, what they're doing with cattle, with cows is they're feeding them omega- I'm sorry, GMO corn and soy and now you have a butter and dairy made from- with mostly omega-6 GMO fat as opposed to a grass fed, you know, cows should be out grazing and eating grass, not GMO corn and soy. So, you can buy pasture butter or grass-fed butter, you can see it here. Here's an example of grass- butter from grass-fed animals. This darker yellow because it has a lot more vitamin A and vitamin D and omega-3 fats versus a cow raised on GMO corn and soy. Same thing with an egg; a grass-fed chicken is going to have a darker yolk and a pale yolk would be those fed GMO corn and soy. Again, scratch that guideline. 4 Here is your artery. This is plaque. Again, we now know that that plaque is from sugars, from oxidized vegetable oils, from trans-fats, fried foods, okay. You get that narrowing, which can lead to a blood clot, strokes, heart attacks, you can see all that here. We have arteries in our veins. This is showing how plaque and a piece can break off and go up into the brain and cause a stroke. Nowadays people are getting strokes and heart attacks in their 30s and 40s, 50s because of how we're eating. Again, here is a nice clean artery, a little plaque, a little more, a little more. Here is fat all around the heart. They're starting to see plaque in elementary school kids because of all the sugar, the soda, the candy, we're starting to see at such a very young age. Okay. Here's a- what they call a stent, you might have heard of this. Here is the plaque. Someone has maybe a blockage and have had heart- heart attack. They put in this mesh material, open it up, clears the artery out. It's a major surgery, and also what they find is that the cholesterol can grow back; it can accumulate back if you don't change your lifestyle it'll just accumulate back. Don't worry about that. How do we digest fats? The digestion starts in the stomach, for the most part, with lipase, just like we had amylase for carbs, we have lipase for lipids or fats in the stomach. The fats then move into the small intestine and then we have pancreatic lipase and bile. As you remember, bile's made in the liver, stored in the gall bladder, and again we break down these triglycerides to monoglycerides that can absorb through the villi of the small intestine. If you don't digest fats well you can go to the health food store and buy a digestive enzyme, I might have mentioned this I believe, that has amylase and lipase and bile acid, proteases and protein and that might help you. Cholesterol gets broken down as well. And once in the blood the fats are then absorbed by the cells. They're either absorbed by muscle cells, which use

them for fuel, for ATP, or they're— if you ate too much foods with fat then they form fat cells. And your book nicely goes through step by step; you eat the fat, it goes into the stomach, you have lipase enzyme here secreted by the pancreas, which also goes into the small intestine, the small intestine secrete a [inaudible] pancreatic lipase. Your liver produces the bile, which right here is stored in the gall bladder and secretes it into the small intestine. So, we have lipase and bile to help digest the protein, and then it's absorbed into the small intestine into the blood. Anything that we do not digest or absorb is going to go into the large intestine, which we are then going to excrete. Here is what our bile and lipase looks like. Here's a big glob of fat that you ate and then you can see here the bile acids break down this big fat into smaller and smaller pieces and you can see also the lipase, you see it went from that big size to these little pieces. These are the villi lining the small intestine where we absorb all of our food. So, we eat the fat, it gets digested, broken down into smaller pieces and that can then be absorbed. Now let's talk about lipoproteins. A lipoprotein, these are the LDL and HDLs. This is a lipid combined with a protein and this is how fats circulate through our blood. You do need to know the difference between LDL and HDL. LDL is the bad or lousy cholesterol; it is mostly made up of fat or cholesterol and LDLs are bad because they take the cholesterol from your liver and deliver it to your arteries and add plaque to your arteries, whereas the HDL, this is mostly protein, it takes the cholesterol out of your arteries, out of your blood and delivers it back to the liver. So, the key is you want more HDLs and not too many LDLs and you can totally control that through your diet. The research shows that your risk of heart disease increases when you have low levels of the HDL, because remember the HDL is a happy— HDL, these are the good ones that clean out your arteries, so if you don't have enough you're at increased risk of heart disease, okay. LDL will, again, the higher your numbers now you've got more of a build-up of cholesterol in your blood vessels, which can then lead to a heart attack or stroke. Here the HDL, like I said, clean up your arteries; the LDL, the bad guys, they add plaque to your arteries. Again, LDL adding the plaque, HDL taking it away. So which foods increase the LDL because that's what you want to avoid? Well saturated fats, again too much of it, trans fats big time, increase your LDL or bad cholesterol, sugar totally increases LDL, and please add the vegetable oils, right. We know that oxidized vegetable oils also increase the LDL. The cholesterol will take out because that's been proven that it does not. And the good, healthy, polyunsaturated fats from the omega-3s and the omega-6s and nuts and fiber all help lower LDL. That's why oatmeal, on the label, it says heart healthy because of the fiber; remember soluble fiber helps to lower cholesterol levels by lowering your LDL levels. So, if you have high LDL in your blood you want to avoid, especially, the trans fats and sugar and the vegetable oils and increase your omega-3 fats and fiber. And this is a very very important slide. You want high HDL, those are the good ones. How do you increase your HDL? And your second homework assignment, your case study will involve questions on this exactly, how to raise your HDL and lower your LDL, so these slides will help with that information. But basically, if you have low LOD— HDL you want to decrease your processed carbs; that's your

bread, crackers, cookies, cakes, because processed carbs lower the HDL. So, if you remove these bad carbs your HDLs will go up. Also, the monounsaturated fats raise your HDL; so, your avocados, olives, olive oil, avocado oil, these all help raise HDL. Moderate alcohol intake can also raise it, particularly red wine, and exercise increases your HDL. And you can add coconut oil; like I mentioned earlier, research has shown that that raises your HDL. So, there's a lot of ways to lower your LDL and raise your HDL naturally without having to take a cholesterol lowering drug. Now there's also some research that there is a link between high fat diets and obesity and your risk for cancer. As a matter of fact, I was just reading an article today that said that pretty soon obesity is going to overtake smoking as the leading cause of 10 cancers. So basically there's a lot of cancers out there, about 10 of them, like breast cancer, colon cancer, pancreatic cancer that is linked to obesity, meaning that more extra fat you carry the more you risk cancer and the research is showing more and more that actually obesity is a huge risk factor for cancer and it looks like it's going to overtake smoking as a leading risk for cancer, because the more fat you have in your body the more toxins and hormones and pesticides you hold on to that can increase your risk. Again, particularly breast cancer, colon cancer, pancreatic cancer and several others, about 10 of them. Food labels, don't worry about this, but when you see something says low fat that just means it has no more than three grams of fat per serving and so forth. You don't need to worry about that as far as the quiz. And again, I'm not in favor of low fat or fat free items. The research does show that fat free and low-fat dairy actually increases your risk of obesity and diabetes because you took out the fat and now there's no cholesterol— more carbs per serving, which increases the risk of diabetes and obesity. And a lot of times they take out the fat and they add sugar or other things to keep it tasty. Here you want to look out, partially hydrogenated vegetable oil, hydrogenated oils, here's the trans fats, so please read these ingredients. Fat replacements, just FYI, years ago they used to have these potato chips called Wow and basically— they were trying to make a lower calorie chip by using something called olestra; it was a fake fat. And they took fat, they bound it to sucrose, which is a sugar. It wasn't digestible so you didn't absorb it and basically you basically pooped it out, which means you didn't get the cal— as many calories. The problem was it caused a lot of GI discomfort in people because it ended up in the large intestine. It also decreased your absorption of fat-soluble vitamins. So, recommendations from American Heart Association, you know, try to keep your total fat intake to 30% of calorie; your nutri-calc will show that, how much you took in. No more than seven to 10% of that fat saturated, no more than one percent trans-fat. Again, please cross out, there is no longer a maximum for cholesterol. To lower your risk of heart disease American heart Association recommends five— at least five servings of fruits and vegetables each day because of all the fiber and the antioxidants that lowers your risk. Nine servings if you have high blood pressure because of the minerals such as potassium which helps lower blood pressure. Two, three-ounce servings of fish per week. That was a test question because of the omega-3 fats. And getting at least 25 grams of soluble fiber, which helps lower your cholesterol levels. Limiting your sodium intake to 2300

milligrams a day, we're going to go over that, increasing potassium, we're going to go over both of these in chapter nine. Limiting sugar, we talked about that, six teaspoons for men, nine— six— no more than six teaspoons a day for women, no more than nine teaspoons a day for men or no more than 10% of your calories from added sugar. Keeping your BMI 18.5 to 24.9 or 25, keeping your weight circumference 35 inches or less for women, 40 inches or less for men; this all helps lower your risk for heart disease. And lastly, if you want information you can go the American Heart Association website or the National Heart Lung Blood Institute. So, if you have any questions on chapter five on fats please email me or come see me in my office, I'll be more than happy to go over some of this information with you.