

>> Hi, everyone. We are going to start chapter 9. This is on both water and minerals. So, let's start off with a few slides on water. You may not realize that probably about 50 to 70% of your body weight is water, water weight, and most of that water is within your muscle tissue. Some of it is in your blood and other areas of your body, which I'll show you in a minute. But 50 to 70%, that's about 10 gallons, depending on your body weight. But muscle tissue contains a lot of water. Fat tissue, adipose tissue, has much less water, maybe about 20%. Water, I think we take for granted, but it's very important. We can survive about two months without eating food, but you can only go a few days without water. I don't know if you guys have been around anybody who's very ill and dying, but once they stopped taking in water, it's a matter of a couple days, and that's it. You can't survive but a few days without water. So, water flows in and out of your body through your cell membranes. It's constantly going in and out of cells. We call this – the fluid inside yourself intracellular fluid, and this – the water outside your cells, extracellular fluid. I remembered that by just remembering exit sounds like extra, so exit to go outside, and that's the water outside. If you're going to hold on to water or let's say your fingers are swollen, you had a salty meal the night before the next day, your fingers are swollen, that is because the sodium tends to stay outside the cells and the extracellular fluids and the water will follow, and so you have extra water outside the cells, and your fingers swell. So, here is showing you most of the fluid in your body is intracellular or inside your cells, and then we have about 37% extracellular. What is all – where is all the water? Like I mentioned, we've got quite a bit in our blood and lymph tissue. We've got a lot between our cells, in our intestinal tract, in your spinal cord, your eyes, your tears, in your joints. And then like I said, inside every cell in your body, your blood cells, bone cells, muscle cells, fat tissue, etcetera, okay? So, by far, you can see where most of it is. And what controls how much water goes in and out of your cells is a balance of different hormones in your body. There are some hormones [inaudible] by the kidneys, also estrogen, and progesterone. As some women can definitely say that different times of their menstrual cycle, they are retaining more water than others. Your kidneys, like I said, controls the water, and also your sodium, potassium balance, which we'll go over in this chapter. It's real important to keep your body temperature regulated properly. When your body temperature tends to go up, let's say on the hot day, you're sitting outside watching a baseball game or something, you'll start to perspire, it's that evaporation of the fluid on your skin that helps cool you off. And we also need water to remove our waste products. It's important to drink enough so that we don't get dehydrated. If you're drinking enough, your urine should be a clear – either yellow or to a clear color. If you are dehydrated, your urine becomes very, very dark. So, this is normal looking, if you can see on the slide, the one on the right, where it's clear to a pale yellow, means you're drinking enough. When it becomes very dark, darker yellow and even usually less of it means you are dehydrated. This may occur let's say a night of drinking alcohol, the next day, you urinate very little, and the little that you urinate is very dark, that is a sign of dehydration, because alcohol is a diuretic. This is how we – where all of our fluids get in the

body. We either drink it, it's in water within the food that we eat, like fruit and vegetables have a lot of water. Also, your body produces some water through its basic metabolism. And then we lose water by perspiring. When we breathe, we lose water, and urination, a little bit in our stool. How much do we need? Please know this for the quiz, nine cups a day for women, 13 men, we went over that once before. Again, there are more accurate ways of calculating your needs, but this is what the textbook wants you to know. Keep in mind that any kind of fluid that has caffeine in it, like coffee, or tea, or soda, Coca Cola, things like that, caffeine does tend to be a diuretic, so you don't want to count those kinds of drinks in with your daily needs. Don't wait until you're thirsty to start drinking, you really should be kind of sipping on water throughout the day because by the time your brain gets the signal that you're thirsty, your body is usually already a little dehydrated, so that signal lags behind your body's actual needs. When you perspire to the point where you lose a little bit of your body weight and fluids, you will start feeling thirsty and maybe a little tired because your cells need water to make ATP. And if you lose a bit more, like 4% of your body weight in fluids, now maybe your muscles will feel kind of weak and you lack endurance. So, this is important, if you're exercising, once you sweat out and you lose several pounds, you're going to start having problems with muscle strength and endurance. You know, I see people working out at the gym and they weighed themselves when they come in and then they sweat a bunch, and they weigh themselves when they leave, let's say they lose a pound or two, that's water weight. That is not fat tissue. I mentioned there are a couple hormones that regulate our water balance, one of them is the antidiuretic hormone. And a diuretic is anything that makes you urinate more. Anti is like the opposite. So, an antidiuretic means you don't urinate, you tend to hold on to your urine. This hormone is released from your pituitary gland, which is in your brain, and it's released when you're a little dehydrated. So, it tells – this hormone will tell your kidneys to stop making urine so that you hold on to more of your urine, so this this is going to get released when you're a little dehydrated. Okay, let's go into the minerals. Please know this for the quiz. There are two main classes of minerals, major minerals and trace minerals. The major mineral means that you acquire more than 100 milligrams a day of it, like calcium, you need about 1,000 to 1200, depending on your age and gender. Trace minerals means you require less than 100 milligrams a day, such as iron and zinc, and there are others as well. Trace minerals are definitely just as important as major minerals, we just need less of them. Now you should be familiar with the term bioavailability. Bioavailability means how available is this mineral to your body. In other words, you drink a glass of milk, let's say it said that has 100 milligrams of calcium, you don't – you don't absorb all 100 milligrams of that calcium, it's not all bioavailable, and we'll talk about why that is later in this chapter. So, bioavailability, how much we actually absorb, and again, we'll talk about what interferes with absorption. And also, please star this, this will definitely on the test. The minerals in animal products are way better absorbed than the minerals in plant products. So – because the plants have a lot of fiber and fiber inhibits absorption. Now we definitely need fiber but just so you know, if

you – let’s say you’re anemic, it would be better to have chicken than spinach. Yes, spinach has a lot of iron, but the fiber in the spinach interferes with your absorption of iron, so the animal parts would be better. Also, keep in mind that our soil quality over the years has gone down with all of the pesticide use, and other fungicides, and all that, and the way farming has gone on in other ways, so an apple from 50 years ago had a lot more minerals than an apple of today. Also, research has shown that organic produce has higher amounts of vitamins, and minerals, and antioxidants actually than non-organic. But soil quality makes a difference. An apple that’s harvested in New York – New York is going to have a different mineral content than say an apple from California, depending on how the soil quality is in both of those states. Also, refined foods have lower minerals, of course, because when you refine a food, let’s say take a whole grain and refine it into a – let’s say whole-grain bread to a white bread, you – they take out a lot of the minerals. So, if you’re eating a lot of white bread, white rice, crackers, and cookies, and things like that, you’re not going to get a lot of minerals. And you’ll notice how much minerals you’re getting on your nutria calc program assignment. Now like I mentioned earlier, fiber does decrease absorption of some minerals because they bind to them and then you end up basically pooping them out. Some minerals compete with each other for absorption, so if you’re taking a calcium supplement or an iron supplement, it is best to take them at separate meals and you do always want to take minerals with food to avoid stomach upset. Now vitamin C – and please know this for the quiz. Vitamin C actually increases your absorption of iron, so if you’re anemic and you’re taking iron, if you take it with vitamin C, you’ll absorb more of it, and vitamin D also helps you absorb your calcium. Okay, let’s start with sodium. We know sodium from salt, from table salt. It is – like I mentioned earlier, it usually hangs out in the extracellular fluid, that’s outside the cell. And because of that, if you have too much sodium, you tend to retain water, and your tissues might swell, your fingers, or ankles, and I’ll talk about how to prevent that later. But most of the sodium that we get in is what is added to our foods, so it’s either added when you cook, it’s added at a restaurant, they add it when they cook, or if you eat processed foods, anything canned or boxed, it’s going to – they put a lot of salt because it increases flavor and thus, tend to preserve the food a bit. Keep in mind that there is naturally occurring sodium in some foods. We do need some sodium the problem is, most Americans are getting way too much because we’re eating a lot of processed foods, and fast foods, and restaurant food. AI means adequate intake, meaning we must get at least – we need 1500 milligrams a day, that’s adequate, that’s a good amount. But unfortunately, most Americans, the average intake is 2300 up to 4700 milligrams a day, so it’s way more than the 1500 milligrams that we need. The Dietary Guidelines for Americans recommend that we consume less than 2300 milligrams a day, even though we only need 1500 milligrams, but they give us some leeway. However, if you already have high blood pressure or you’re African American, because there is a genetic tendency for high blood pressure, or you’re over the age of 50, then you should be only getting 1500 milligrams a day or less. And this kind of shows you where is most of the sodium is, it’s

– most of it is added when we eat it, it's added when they process the food, again, in boxes, anything boxed, canned, frozen foods, frozen dinners, frozen lunches, okay? Maybe about 12% is naturally found in some foods. We do add some to cooking and that's a small amount compared to – it's mostly in the processed foods. Now most people urinate any excess sodium – urinate out any excess sodium that they take in, however, there is a percentage of the population that are what we call sodium sensitive, meaning that they don't urinate out the excess and it tends to raise their blood pressure, which would be African Americans. If you're diabetic, you are more sensitive to sodium, meaning it can raise your blood pressure much easier and if you're overweight. You should know normal blood pressure – normal would be less than 120 over 80. You can easily find out your blood pressure –most supermarkets have a blood pressure monitor machine over by the pharmacy section, you can check it, but you want it less than 120 over 80. If you're between 120 and – over 80 and 140 over 90, that is considered prehypertension, meaning you're on your way to getting hypertension, hypertension is anything over 140 over 90, which of course increases your risk of having a stroke or heart attack. There is something called the Dash Diet, dietary approaches to stop hypertension, you can use this information on your case report if you have one of the cases that deals with this. It's basically similar to the Mediterranean diet, it's eating a lot of fruits and vegetables that have a lot of potassium, which helps to lower blood pressure, and we'll talk about that in a little bit and you can read about the Dash Diet in your textbook. But it is utilized to help lower your blood pressure. I going to stop the podcast here. We'll take – we'll continue –