

Where: PR2 - Topic 1 – Module 1.1 – Video 8 on Video resources: “ How do vitamins work?”

<https://youtu.be/ISZLTJH5IYg>

A, C, E, D, B, K.

No, this isn't some random, out of order alphabet.

These are vitamins, and just like letters build words, they're the building blocks that keep the body running. Vitamins are organic compounds we need to ingest in small amounts to keep functioning.

They're the body's builders, defenders and maintenance workers, helping it to build muscle and bone, make use of nutrients, capture and use energy and heal wounds.

If you need convincing about vitamin value, just consider the plight of olden day sailors, who had no access to vitamin-rich fresh produce. They got scurvy.

But vitamin C, abundant in fruits and vegetables, was the simple antidote to this disease.

While bacteria, fungi and plants produce their own vitamins, our bodies can't, so we have to get them from other sources.

So how does the body get vitamins from out there into here?

That's dependent on the form these compounds take.

Vitamins come in two types: lipid-soluble and water-soluble, and the difference between them determines how the body transports and stores vitamins, and gets rid of the excess.

The water-solubles are vitamin C and B Complex vitamins that are made up of eight different types that each do something unique.

These are dissolved in the watery parts of fruits, vegetables and grains, meaning their passage through the body is relatively straightforward.

Once inside the system, these foods are digested and the vitamins within them are taken up directly by the bloodstream. Because blood plasma is water-based, water-soluble vitamins C and B have their transport cut out for them and can move around freely within the body.

For lipid-soluble vitamins, dissolved in fat and found in foods like dairy, butter and oils, this trip into the blood is a little more adventurous.

These vitamins make it through the stomach and the intestine, where an acidic substance called bile flows in from the liver, breaking up the fat and preparing it for absorption through the intestinal wall. Because fat-soluble vitamins can't make use of the blood's watery nature, they need something else to move them around, and that comes from proteins that attach to the vitamins and act like couriers, transporting fat-solubles into the blood and around the body.

So, this difference between water- or fat-soluble vitamins determines how they get into the blood, but also how they're stored or rejected from the body.

The system's ability to circulate water-soluble vitamins in the bloodstream so easily means that most of them can be passed out equally easily via the kidneys. Because of that, most water-soluble vitamins need to be replenished on a daily basis through the food we eat. But fat-soluble vitamins have staying power because they can be packed into the liver and in fat cells.

The body treats these parts like a pantry, storing the vitamins there and rationing them out when needed, meaning we shouldn't overload on this type of vitamin because the body is generally well stocked.

Once we figured the logistics of transport and storage, the vitamins are left to do the work they came here to do in the first place.

Some, like many of the B Complex vitamins, make up coenzymes, whose job it is to help enzymes release the energy from food. Other B vitamins then help the body to use that energy.

From vitamin C, you get the ability to fight infection and make collagen, a kind of tissue that forms bones and teeth and heals wounds.

Vitamin A helps make white blood cells, key in the body's defense, helps shape bones and improves vision by keeping the cells of the eye in check.

Vitamin D gathers calcium and phosphorus so we can make bones, and vitamin E works as an antioxidant, getting rid of elements in the body that can damage cells. Finally, from Vitamin K, we score the ability to clot blood, since it helps make the proteins that do this job.

Without this vitamin variety, humans face deficiencies that cause a range of problems, like fatigue, nerve damage, heart disorders, or diseases like rickets and scurvy. On the other hand, too much of any vitamin can cause toxicity in the body, so there goes the myth that loading yourself with supplements is a great idea. In reality, it's all about getting the balance right, and hitting that vitamin jackpot.