



WELCOME TO CELL TALK

Let's quickly address the main two types of cells in your human body.

Eukaryotic and prokaryotic.

Prokaryotic cells do not contain a nucleus or any other membrane bound organelle.

Prokaryotes include two groups: bacteria and another group called archaea.

Don't worry, you have 2-3 times the amount of these prokaryotic cells – yes bacteria – than eukaryotic cells and most of them are wonderful!

An eukaryotic cell has a true membrane bound nucleus and membranous organelles that do many different functions.

Many of the main organelles we cover in this short video series.

For this TNC Module 1 Cell Talk Video Series, which this PDF Handout is part of, I am only speaking about **eukaryotic cells**.

Enjoy!

Karen



Cell Talk 1

Your blood feeds your cells. Period.

If the nutrients the cell needs are not in the blood, then your cell will not be able to properly grow and divide as needed. The cells of the human body are dependent on the host to provide what is needed for healthy cell division.

Your blood carries antibodies, hormones, hemoglobin, water, many phytonutrients, minerals, vitamins, bio photons, sugars, cholesterol, neurotransmitters and so much more!

In each cell are **organelles**. These tiny cell “organs” each have incredible responsibilities, and are busy 24/7. Following are short definitions of each one covered in these Cell Talk videos.

You will be studying cells and how they work in some of your TNC reading, and I encourage you to immerse yourself in self-study so that you can continue to enrich your knowledge base!

Ribosomes provide the structure for translation to take place. They catalyze the reaction that links amino acids together to make a new protein.

tRNAs (transfer RNAs) carry amino acids from the foods you eat and from other recycled materials in the body to the ribosome. They act as "bridges," matching a codon in an mRNA with the amino acid it codes for. Basically, it docks the amino acid to the site needed for the Ribosome so it can manufacture new proteins!



Mitochondria are rod-shaped organelles inside of a cell that act as the power generators, converting oxygen and nutrients into adenosine triphosphate (ATP). ATP is the chemical energy that powers the cell's metabolic activities.

Endoplasmic Reticulum (ER) is a network of tubular membranes within the cytoplasm of the cell. There are two types of ER – smooth and rough. The rough ER has Ribosomes attached to the outside, and the smooth ER acts like a storage locked for the proteins used in the cell. Both are actively involved in the transportation of materials.

The Golgi apparatus gathers simple molecules and combines them together to make complex molecules. It takes complex molecules and packages them in vesicles, and either stores them for later use or sends them out of the cell. It packages, processes and delivers proteins throughout the body! It is also the amazing **organelle** that builds lysosomes loaded with very powerful enzymes.

Lysosomes are organelles in the **cytoplasm** (the thick solution that fills each of our cells) of our eukaryotic cells. They act like the septic system of the body, breaking down and removing waste product. They also contain up to 40 different degradative enzymes that can break down invaders as well as help recycle worn out organelles, breaking them down into pieces other cell parts can use!

Peroxisomes are small organelles that are present in the cytoplasm of many cells and contain the enzyme catalase and usually some oxidases.

Mitosis is the process of “divvying up” the genome between the daughter cells. A cell starts in **interphase**, the state of a eukaryotic cell when it is not undergoing division. Every time a cell divides, it must first replicate its entire DNA. As chromosomes are twisting ladders of DNA prongs inside two strands of protein, the cell also replicates its chromosomes. These



two new chromosomes are called sister chromatids and are identical. Before this cell can divide further, it must separate these sisters. To do this, the chromosomes condense. This stage of mitosis is called **prophase**.

Next, the spindle (a large protein network) attaches to each sister chromatid, as the nuclear envelope breaks down. During **metaphase**, the chromosomes are aligned perpendicular to the spindle.

Next is **anaphase**, when “molecular motors” pull the chromosomes away from the metaphase plate to the spindle poles of the cell.

During the last phase, **telophase**, the cells divide, the nuclear envelopes strengthen and reform, and the chromosomes relax. This process takes a different amount of time depending on what cell is dividing. Each phase of division needs to be triggered by the environment! Some cells need to reproduce rapidly in our bodies and can divide in less than 30 minutes whereas other cells won't divide for a year or even much longer. The average cell will divide in 24 hours.

Cells divide at different rates, some take years, some 30 seconds! Hold your breath for three seconds and watch 5 million new cells be born! DNA is ripped apart into 2 strands, one copies exactly and one copies backwards. Reproduction is EVERYTHING! Billions of cells are counting on you RIGHT NOW!



Cell Talk 2

This video emphasizes a bit more of the specific roles of the organelles.

Mitochondria generate energy, and if a cell uses more energy, there are going to be more mitochondria. A fat cell for instance, has many mitochondria, as it is storing energy. A muscle cell has many mitochondria. There can be one mitochondria in a unicellular organism, to hundreds or even thousands in each cell! One liver cell can have 2000 mitochondria! YOUR LIVER IS AMAZING!

The **energy ATP** which is created in the mitochondria, powers our cells to build their cell structure, create their proteins and their organelles as well as give us energy. When you hear someone has low metabolism, you know right away their mitochondria are not functioning at prime levels.

Ribosomes create proteins, and I mean all proteins! The Rough Endoplasmic Reticulum has ribosomes all over the outside giving it a rough appearance. Those ribosomes create proteins that will be used OUTSIDE of the cell.

The smooth ER is a like a holding tank, it stores proteins made by floating ribosomes, or ribosomes not attached to the outside of an ER. The floating ribosomes make proteins that will be used inside the cell.

Ribosomes can double quickly, they need too! Now this can be great for us while we are healing, but consider a study done on E coli, where the ribosomes were doubling every 24 minutes, and within hours there were 72,000 ribosomes. These ribosomes create all the proteins needed to build the E coli, so that equals MORE and stronger E coli! Luckily, the



same thing happens in each of our cells. When we create a nutrient rich environment that is healing and helping cells regenerate in a healthy positive way – our own ribosomes are doubling and helping our cells double and reproduce at massively fast rates.

CELL CONTEXT IS EVERYTHING.

Each **Golgi Apparatus** looks like a stack of flat pancakes! They sort, process and deliver proteins and fats. A cell that makes more proteins to be used in the body has more Golgi Apparatus in them. **Lysosomes** are also created in the GA. Each lysosome can have up to 40 powerful enzymes!

These lysosomes are like the debris removal or septic system of the body. They cleanse the body and also work with the immune system as these enzymes can destroy foreign substances. Lysosomes also recycle old organelles. The organelle that is not functioning is taken apart and the parts are reused!

For instance, if a specific mitochondria has reached the end of its lifespan, then the lysosomes will literally come along and consume it and recycle the entire thing for parts!

There is more you will study and learn about the amazing human cell as you continue the TNC training. Do not get worried that you will not remember it all, just enjoy this time discovering life inside of YOU and how YOU can make a difference to each and every cell with your daily choices!



Cell Talk 3

The **cytoskeleton** of the cell looks just like an intricate spider web. It is just like the picture of the world wide web – where you see blue lines connecting the world from one hemisphere to another. This complex interwoven fibrous network of proteins is the backbone – literally – of each cell.

These hexagonal arrangements that form the structure is located just inside the **plasma membrane**, and is made of cytoskeletal proteins called **Spectrin**. The **spectrin protein** is what builds all of the cytoskeletal structures!

On the surface of the **cell membrane**, you have **docks, ports, or receptors** (all words for the same thing) all over the surface. The membrane has cell receptors which act like antennas and they trap molecules. Once a **molecule** has “docked” in a receptor site, then messenger molecules inside the cell come up to escort the substance down into the cell to be used.

The first messenger molecule is the substance that docks in the membrane. The second messenger molecule is one acting inside of the cell, in the intracellular area. This messenger molecule can alert the cell of the molecule just docking, triggering physiological changes such as proliferation, migration, differentiation, survival, and even cell death – apoptosis.

Microtubules are a key part of the cytoskeleton. These tubular **polymers** can grow as long as 50 micrometres! The outer diameter is about 24 nm and the inner diameter is about 12 nm. They are used for many of the cellular processes, most notably intracellular transportation.



The motor proteins literally walk along the micro tubules to move membrane bound materials up to the membrane, and also to bring substances from the membrane down into the cell. They are simply roadways. They act like a highway system inside each and every one of your 70+ trillion cells! LOVE THOSE CELLS!

Cell Talk 4

Eukaryotic cells absorb nutrients, water and even other cells from their environment, but just how do they do that? The process of cellular absorption is called Endocytosis.

Proteins, carbohydrates, fats, and other molecules in the bloodstream are absorbed into the cell different ways.

During **endocytosis**, the material being absorbed is engulfed by a **plasma membrane** formed by the cell itself. This membrane pocket so to speak, closes and separates the material and absorbs it. Endocytosis came from the word "endo" which means "within," "cyt" meaning "cell," and "-osis" meaning "process."

During **phagocytosis**, another type of endocytosis, large vesicles ingest cellular debris, dust particles, apoptotic (dead) cells, and entire microorganisms at once! Thus the word Phagocytosis. The Greek word "phagein" means "to devour," "kytos" means "cell" and "-osis" means "to process"!

Pinocytosis is the process of cellular drinking. It describes the internalization of extracellular fluid and small **macromolecules** by small vesicles.



As you are built from the three main things, proteins, fats and carbohydrates, it is important to see that the cells themselves are busy at work after each meal you eat! Proteins build, fats deliver messages, and carbohydrates fuel. What you eat matters at the organelle level! If those little organelles do not get the nutrients they need, cellular absorption can be affected. And finally, in this last video we cover a basic fact of human life: You are always broadcasting.

YOU AND EVERY CELL IN YOUR BODY IS VIBRATING. AND, EVERYONE AROUND YOU FEELS IT.

When you alter your cellular context you affect the people you see each day. Those you live with, work with, go to school with, worship with, and even those you see in passing. The membrane receptors of the cells that trigger actions are triggered two ways – by a molecule – such as food, or by a frequency, such as a thought or **EMF**.

Yes, you can increase your vitamin C with electric therapy. You will learn more about bio and electrical therapy such as radionics later in the TNC training.

What you think matters – as every thought or emotion has a set **frequency**. What you see or look at matters, as what you see evokes emotion, passions and pains which all have a frequency. Each color you see does too! Thus, **chromotherapy**! What you say to yourself or others matters, as each word or thought holds **frequency**.



And as you clearly know, what you eat matters, down to the basic building blocks of life: **atoms**, cells and those organelles. Change your cell context – change not only your life, but all those around you will feel it!