

This is the thirteenth newsletter in a series of ONCORG Community Conversations. They're focused on relationships between doctors and patients, and the complexity of treating cancer.

Late July 2026 – What Lies Beneath – The magnificent human body.



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Mr. Thomas is a military veteran who served eight years in the USAF. He also spent eleven years in the automotive industry, ten years in healthcare and eight years with Apple Inc. supporting customer needs.

The Human Body – What lies beneath.

The human body is incredible and we should never take it for granted:

- We have strong bones and Broken bones can heal.
- The most expensive digital camera today can capture 400 megapixels, but the human eye can see 576 megapixels. A **megapixel (MP)** equals one million pixels.
- Your brain produces enough electricity to light a small light bulb.
- Hearing is the fastest human sense. Your brain can recognize a sound 10 times faster than the blink of an eye, in as little as 0.05 seconds.
- Your heart pumps 5.5 liters of blood per minute. So, during an average lifetime, it will pump nearly 1.5 million barrels of blood—enough to fill 200 train cars.
- Blood takes the body's waste to the kidneys and liver to be sorted and trashed.
- When you receive information through one of your senses, the signal travels from your nerves to your brain at over 100 miles per hour.
- Your skin secretes antibacterial substances and serves as the first layer of defense for invading microorganisms. Most bacteria that land on the skin die quickly.
- Your liver is responsible for more than 500 distinct processes. It is so important that if a person has two-thirds of his or her liver removed as a result of trauma or surgery, it will grow back to its original size in as little as 2-3 months. Pretty cool, eh!

I can go on forever but I'm not going to do that. I'd like to focus on what's going on at the cellular or molecular level. Because that's when we learn about the real miracles deep inside of us. So let's talk about What Lies Beneath.

A cell is like a factory or manufacturing facility. And different cells have different functions. Different tasks are completed on a routine basis, some cells guard and protect the body from invaders and some are designed to kill an invader.

The human body contains over 200 distinct cell types, each specialized in shape and function to keep us alive. Cells form tissues and organs, convert nutrients into energy, manufacture essential chemicals, and build the physical structures that support movement, communication, and defense. We have:

Red blood cells: Transport oxygen from the lungs to tissues throughout the body and carry carbon dioxide back to the lungs.

White blood cells: Defend the body against infections, viruses, and foreign invaders as a vital part of the immune system.

Nerve cells (Neurons): Transmit electrical and chemical signals across the body, allowing the brain to communicate with muscles, organs, and sensory receptors.

Muscle cells: Contract and relax to allow bodily movement, pump the heart, and push food through the digestive tract.

Fat cells (Adipocytes): Store excess energy as triglycerides, release hormones, and provide thermal insulation.

Bone cells: Include osteoblasts (which create new bone) and osteoclasts (which dissolve bone for remodeling).

Stem cells: Act as the body's raw materials, with the unique ability to divide and develop into specialized cells to repair tissue.

Cells have a cycle and a life span:

The cell cycle is the ordered series of events cells go through to grow and divide. It is divided into two primary stages: **Interphase** (the preparation phase where the cell grows and copies its DNA) and the **Mitotic (M) Phase** (where the cell divides into two identical daughter cells)

The Body's Enemy:

An oncogene is a mutated gene that promotes the growth of cancer. Before they mutate, these genes are called **proto-oncogenes**, which act like accelerators in a car to help normal cells grow and divide. When they mutate into oncogenes, they cause cells to grow and multiply uncontrollably.

But The Body has natural defenders:

TP53 is a critical tumor suppressor gene that provides instructions for making the p53 protein, widely known as the "guardian of the genome." This is a big deal because it

regulates cell division and repairs damaged DNA. It prevents cells from growing uncontrollably. Mutations in this gene are heavily linked to cancer.

It achieves this through **DNA repair**, **cell cycle arrest**, and **apoptosis** (programmed cell death), which stops the spread of genetic mutations that lead to cancer.

Then we have Immune Cells: It includes both anti-tumor cells (e.g., T-cells, Natural Killer cells) and pro-tumor cells that suppress immune responses (e.g., regulatory T-cells, tumor-associated macrophages)

Body cells kill invaders (pathogens) through a coordinated, multi-step defense system. Phagocytes dissolve them using strong enzymes. Natural Killer cells and Cytotoxic T-cells punch holes in infected cells. B-cells act as factories, producing antibodies that lock onto invaders to neutralize them and mark them for destruction. B-Cells create weaponry.

B cells (B lymphocytes) are white blood cells that protect your body from infection by producing specialized proteins called antibodies. They are a core component of your adaptive immune system, scouting for foreign invaders like bacteria and viruses, and creating long-term immunological memory.

We'll put a stop on this article for now and pick up this conversation in our next article in early August. We'll talk about how all of our body's capabilities are applied. In Late August we'll talk about how cancer cells evade treatment and unfortunately shift their defensive strategies.

This is Commander Rodney Thomas, signing off for today. Be safe out there.

Rodney Thomas

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