**Immunity**

* Pathogens – foreign object that enters the body and can do harm. (bacteria, virus, fungi, parasite (worms)).
* The organism body has various defenses to prevent and fight off these pathogens.
* Defenses can be specific or non-specific

Non-specifics

* Skin – barrier
	+ Oil glands – flushes the pores on your skin
	+ Sweat glands – Creates an acidic environment, as well as flushing (cleaning)
* Skin’s openings are protected by other defenses.
	+ Mouth – saliva secreted and pathogens stick to it and are swallowed. Stomach acids kills almost everything
	+ Nose – hair, mucus – filter out pathogens and excrete them out.
	+ Ears – hair and wax – filter out pathogens.
	+ Eyes – eye lashes, and tears filter and flush out pathogens.
	+ Anus – hair
	+ Urethra – urea is extremely acidic
	+ Vagina – acidic track but also protected by hair
* Lungs have a layer of mucus that is whipped up by cilia on the surface of trachea. Every time you swallow saliva, you also swallow this mucus.
* When pathogen enters, your body responds by a series of actions.
	+ Fever raise to temperature to kill off pathogens
	+ Sneeze, cough, runny nose – lots mucus tries to flush out the pathogen
	+ Vomit, diarrhea flushes the digestive track

(SYMPTOMS OF A SICKNESS)

Specific Defences

Guard against pathogens that the body knows and targets.

Blood -> White blood cells (Various types)

1. Label the pathogen with a chemical marker (put handcuffs on)
2. Find chemical marker and neutralize the pathogen (pathogen unable to function as a result of “handcuffs”)
3. Neutralized pathogen is destroyed (swallowed – phagocytosis)

Step 2 of neutralizing the pathogen takes time and energy from the body. The proteins that are created to bind and neutralize the pathogen are SPECIFIC TO THAT PATHOGEN. These proteins are called “ANTIBODIES” and they are memorized in a inventory.

Vaccinations

(Typically) Injections of the virus protein (lacking in DNA) or parts of the virus proteins.

This allows the body to have time to build antibodies for surface proteins without actually being infected. (you don’t show symptoms, typically)

mRNA vaccine – relies on injecting mRNA that triggers the host cells to make the parts of the pathogen without having to inject the pathogen itself.

The body then reacts to the newly built viral part and build antibodies for it.

Very beneficial in that as soon as we know the pathogens genetic code, we can build mRNA based off of it and produce the vaccine