A close-up shot of Iron Man in his red and gold armor, looking forward with a serious expression. The chest arc reactor is glowing. The background is a dark, industrial-looking interior with some blue light sources.

# **Chapter 11: Protecting Yourself from disease**

# **PATHOGENIC DEFENCES**

**Millions of pathogens surround you everyday. They live on your body and most surfaces they touch**

**Our body has 3 lines of defense to prevent these pathogens from attacking us**

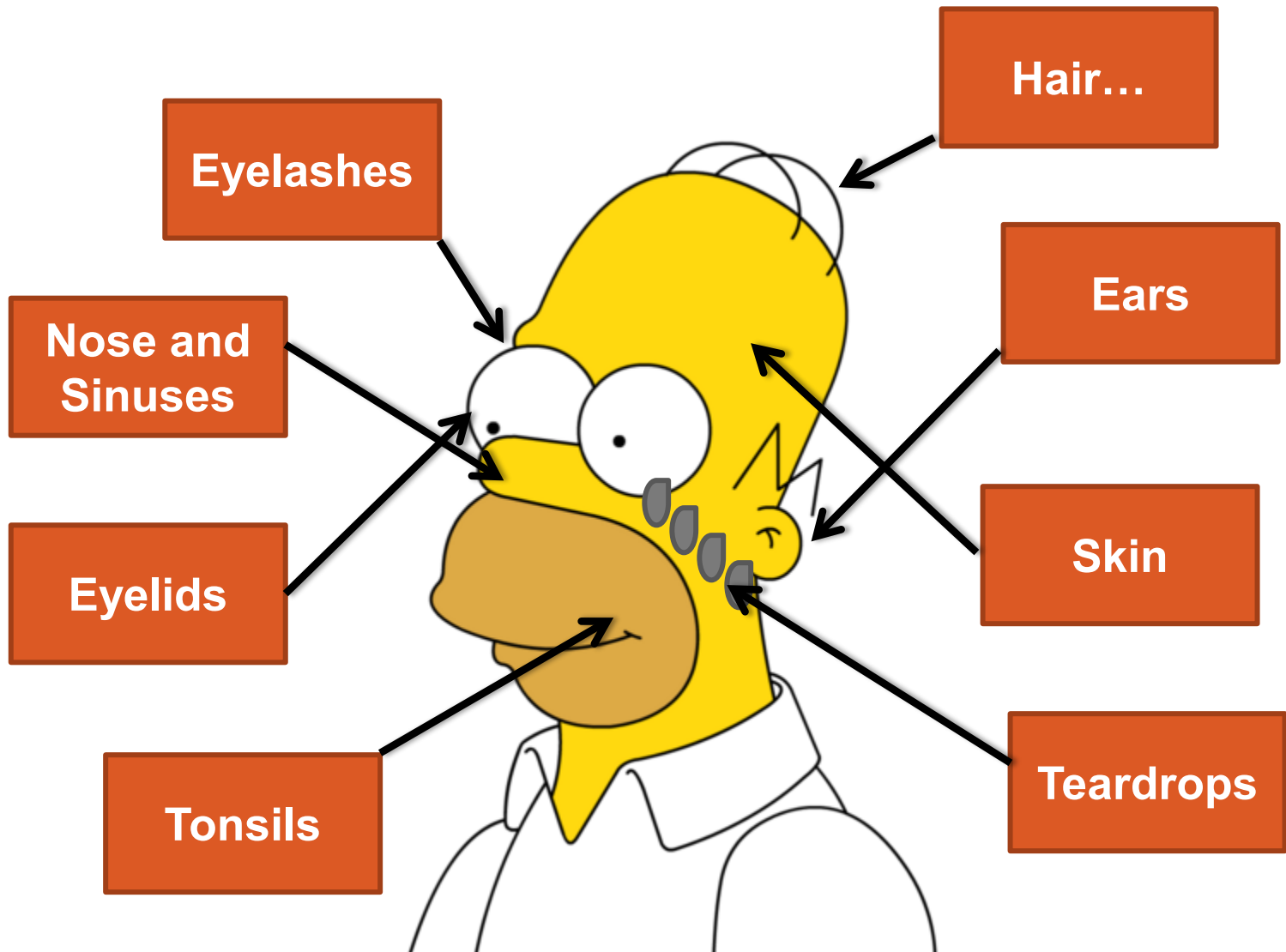
**1. Physical Defences**

**2. Inflammatory Responses**

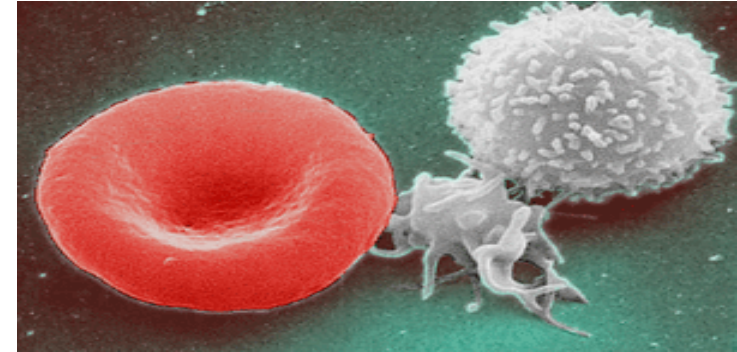
**3. The action of antibodies**



# PHYSICAL DEFENSES

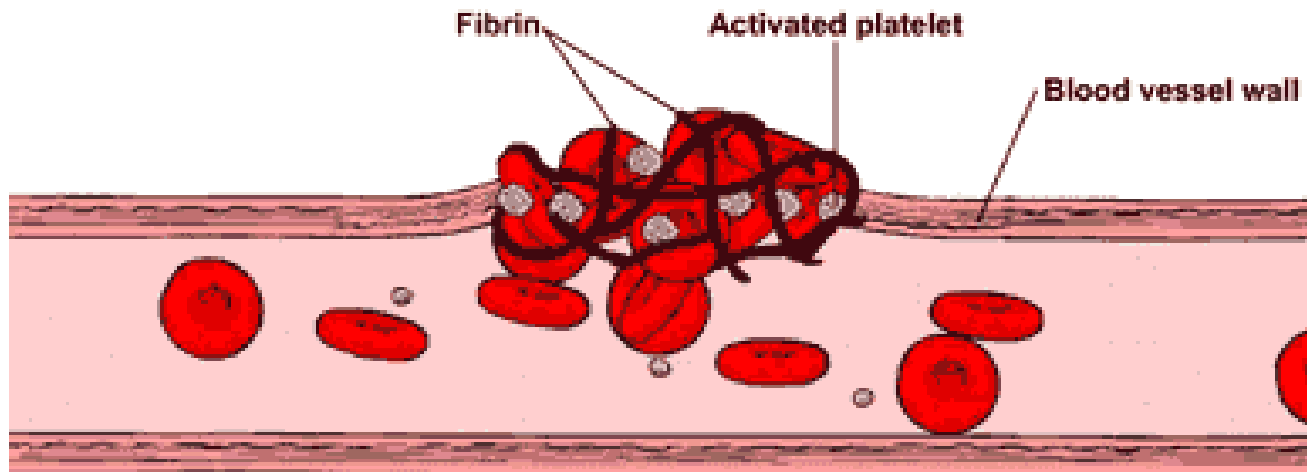


# INFLAMMATORY RESPONSE



After an injury the surrounding blood vessels swell and the area become warm as more blood arrives

If the pathogens get past the physical barriers the body sends white blood cells, that are apart of the immune system, to repel the invader



# **INFLAMMATORY RESPONSE**

**Can also occur when the skin is hit, such as when you fall and hit the ground**

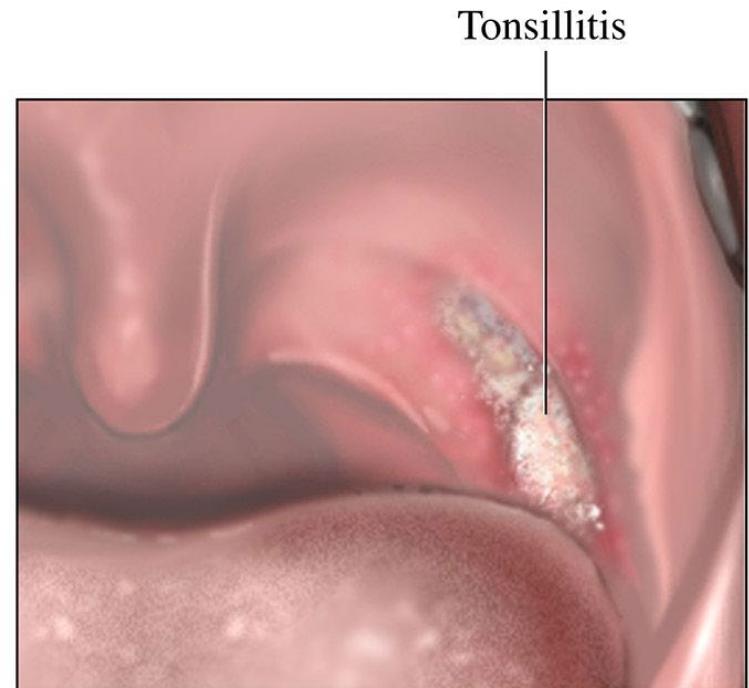
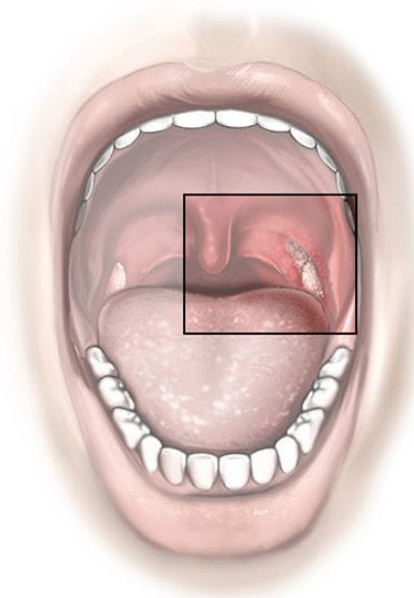
**Blood oozes from the ruptured blood vessels into surrounding tissue. White blood cells engulf damaged cells and aids in the clean up and healing of the injury**



# INFLAMMATORY RESPONSE

Any kind of infection will trigger an inflammatory response

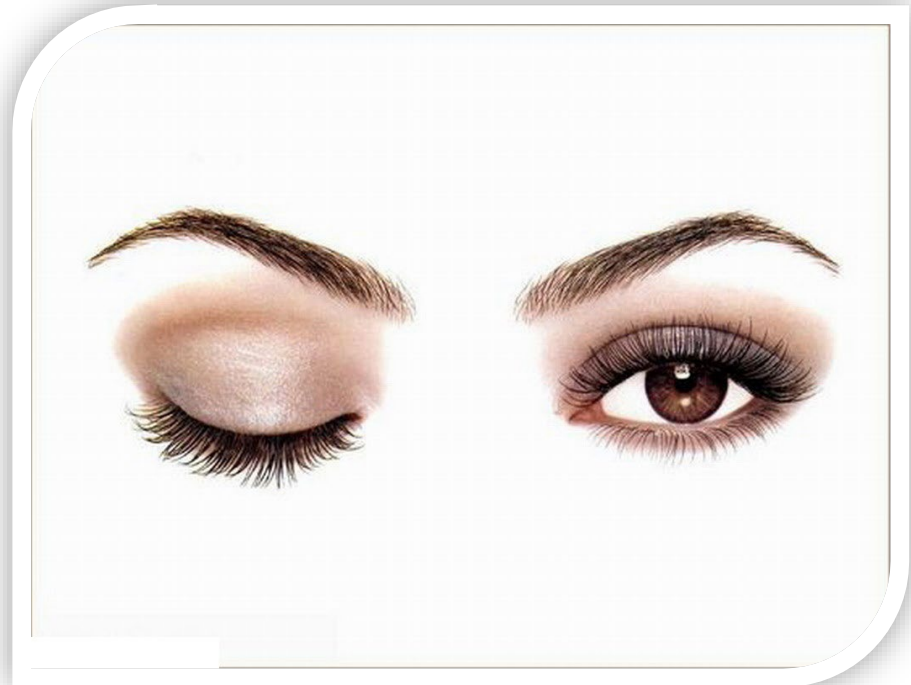
Example: tonsillitis or appendicitis – the ending “itis” means inflammation of



# GENERAL DEFENCE

Physical defence and inflammatory responses are called general defences because the body reacts the same way regardless of what pathogen is invading

Example: eye will blink when contacted

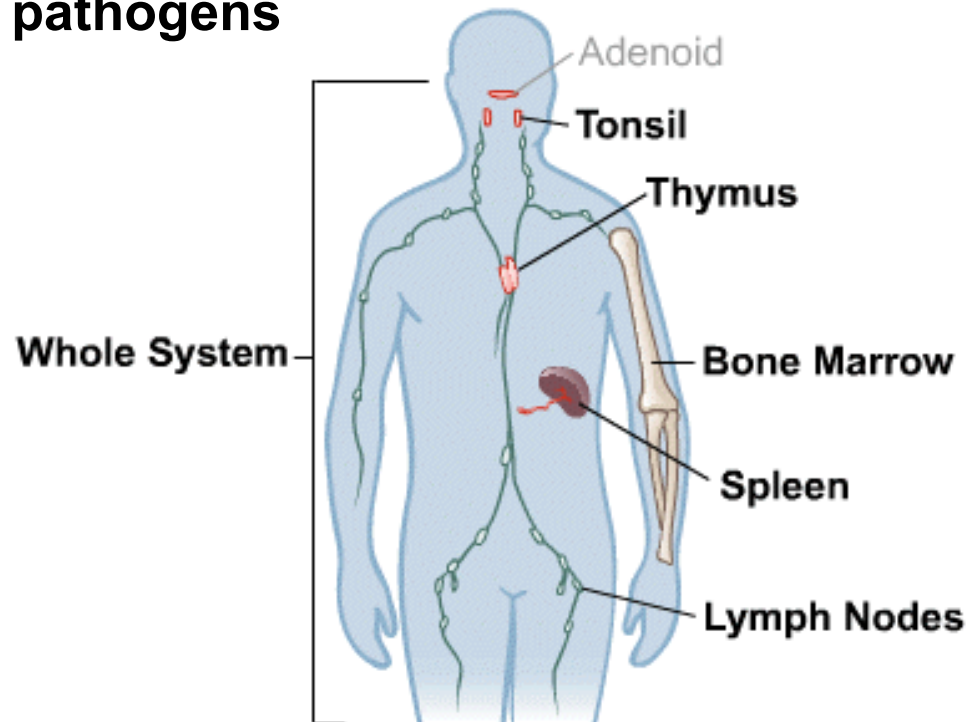


# IMMUNE SYSTEM

The third line of defence

Through the formation of antibodies

This system targets specific pathogens





# IMMUNITY

Built up as you are exposed to the disease

Your body recognizes antigens that are not apart of itself

Antigens are specifically shaped structures that are attached to pathogens

All living things such as viruses, bacteria, and fungi contain pathogens



# IMMUNE RESPONSE

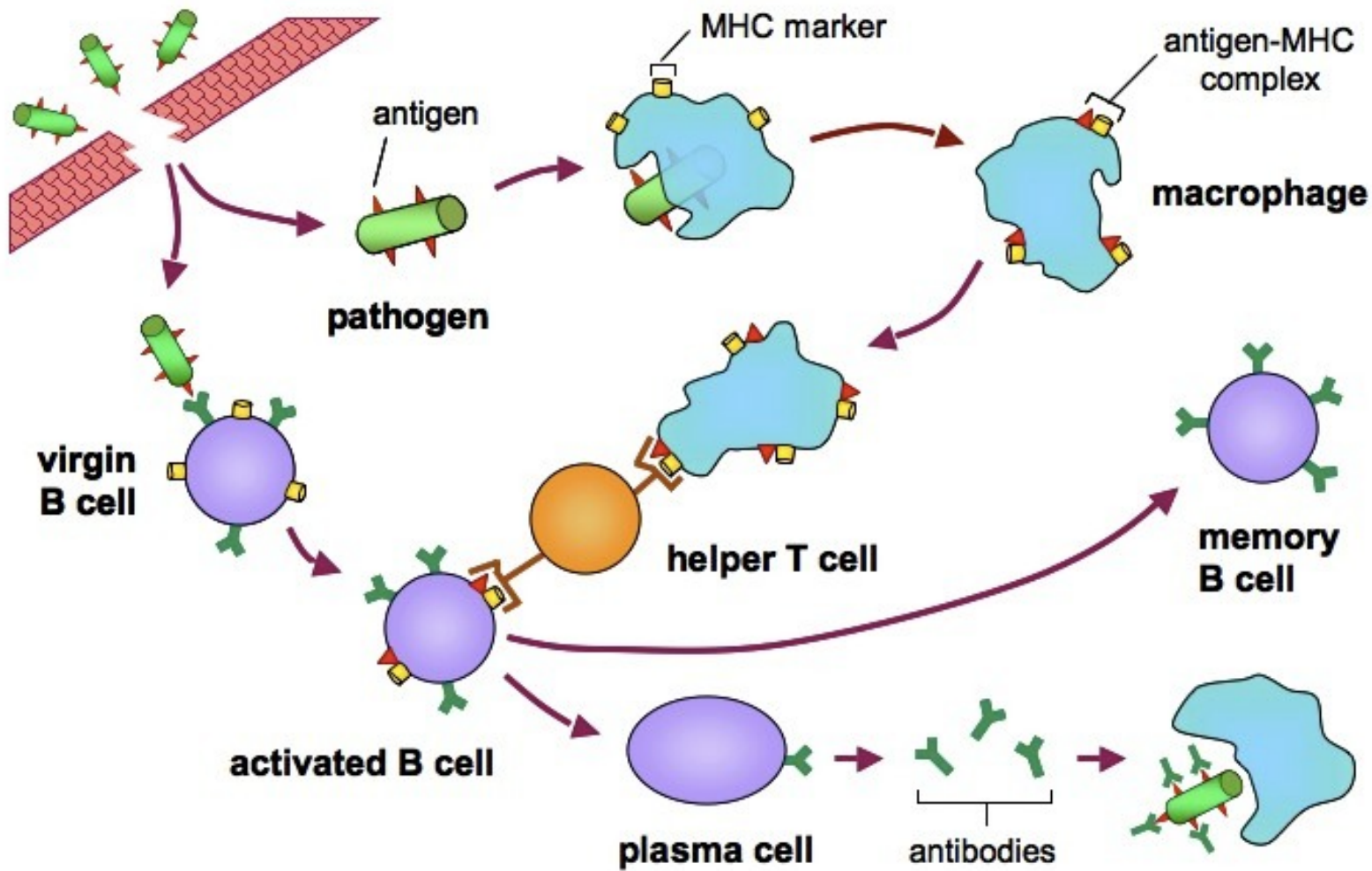
Most responsibility falls on the white blood cells. They created Y shaped protein compounds called antibodies

These antibodies bind to specific antigens. This makes it easier for the antigens to be destroyed

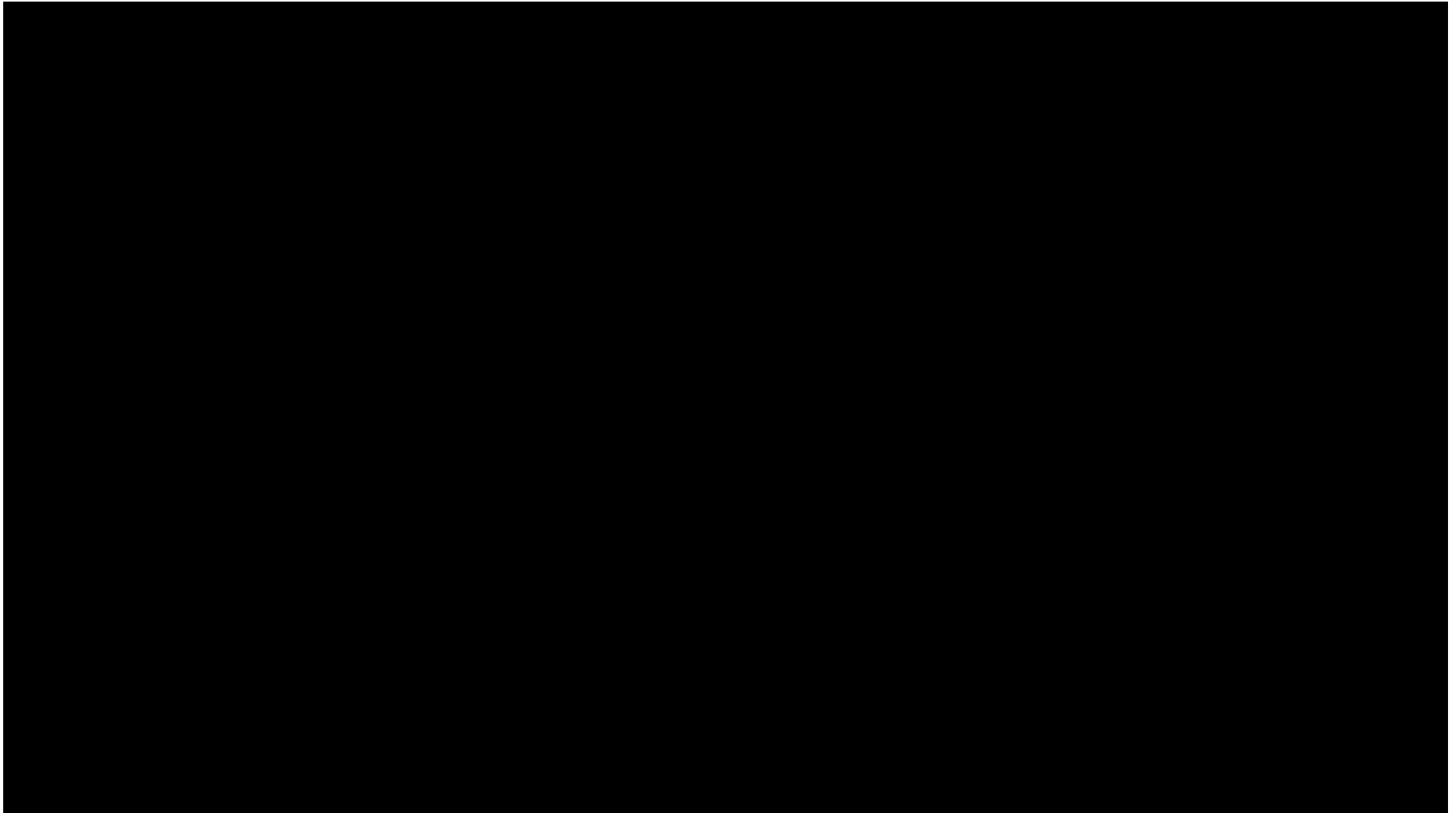


# ON ALERTS

What happens when pathogens get past our first two defenses



# HOW IT WORKS



# TYPES OF IMMUNITY

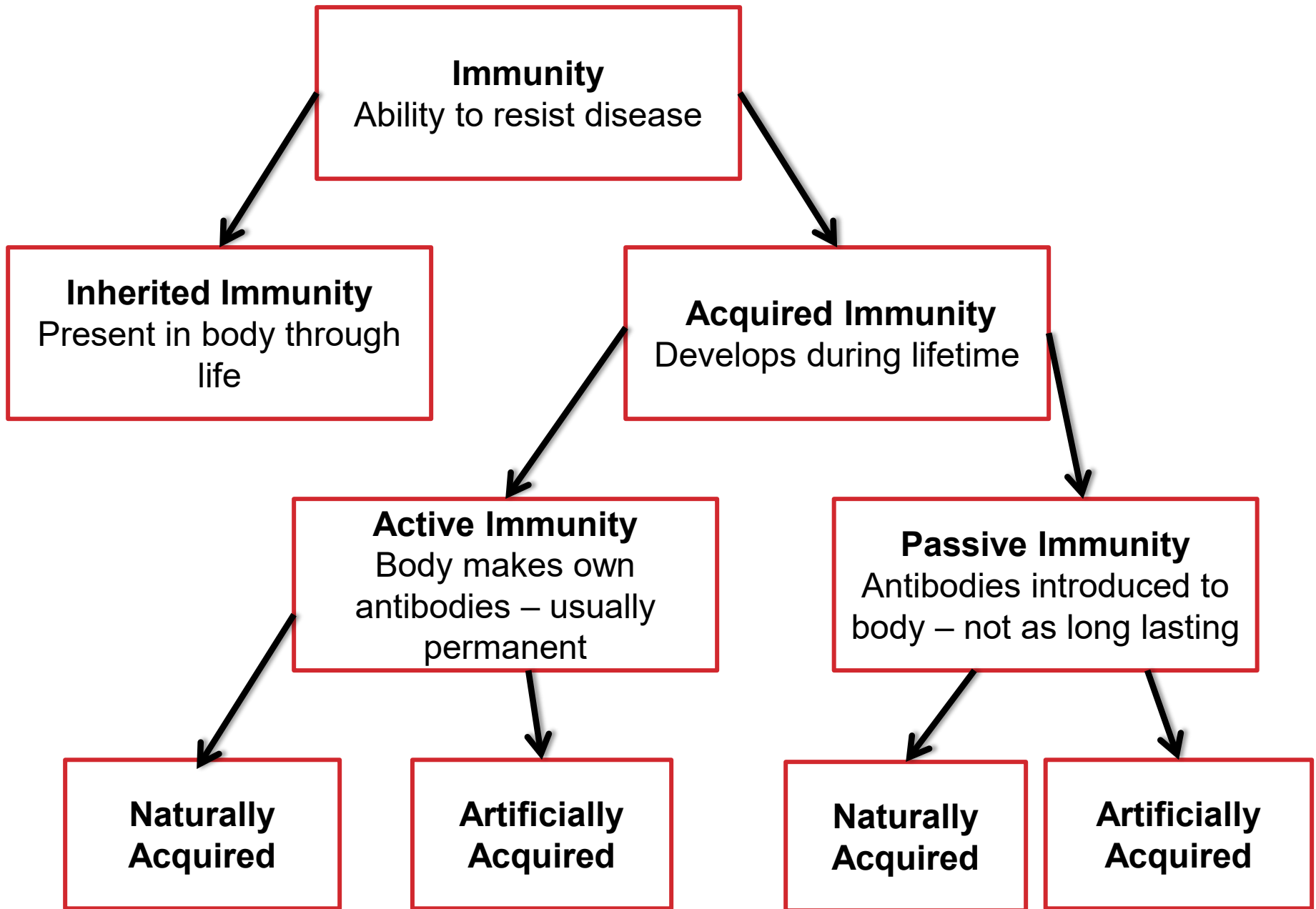
You are born with a certain amount of immunity – inherited immunity

Refers to the resistance that organisms have to most disease – passed on genetically

From birth on you gain acquired immunity

Your body develops active immunity by making antibodies to diseases of which you have been exposed

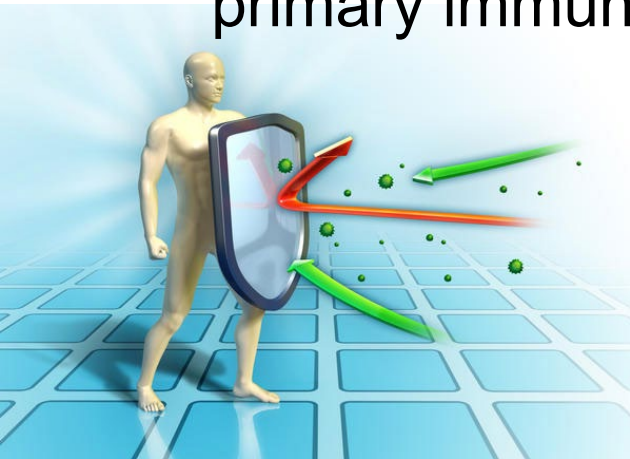
You acquire passive immunity from antibodies produced in another animal and put in your body.



# ACTIVE IMMUNITY

## NATURALLY ACQUIRED

Naturally acquired active immunity occurs when the person is exposed to a live pathogen, develops the disease, and becomes immune as a result of the primary immune response



## ARTIFICIALLY ACQUIRED

Artificially acquired active immunity can be induced by a vaccine, a substance that contains the antigen. A vaccine stimulates a primary response against the antigen without causing symptoms of the disease

# PASSIVE IMMUNITY

## NATURALLY ACQUIRED

Naturally acquired passive immunity occurs during pregnancy, in which certain antibodies are passed from the maternal into the fetal bloodstream.

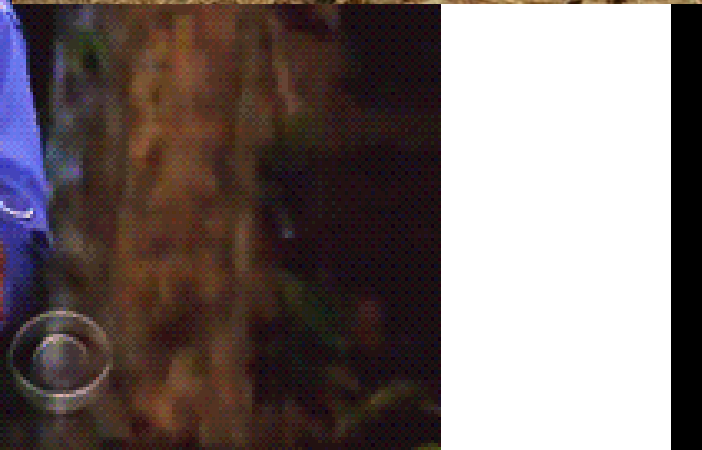
## ARTIFICIALLY ACQUIRED

Artificially acquired passive immunity is a short-term immunization by the injection of antibodies, that are not produced by the recipient's cells.





**TO BE CONTINUED...**



# CH.11 CONTINUED

# IMMUNIZATION

Can be built by getting a injection of a vaccine or antitoxin

A vaccine consists of a dead or weakened pathogen

Once inside your body begins to produce antibodies to fight the pathogen's antigens and will be prepared to fight the real disease if it invades your body

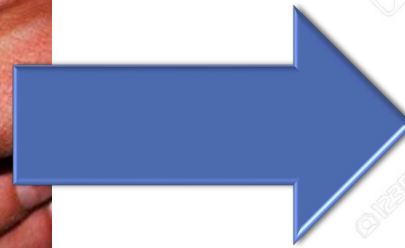


# ANTITOXINS

Injections for tetanus and diphtheria contain antitoxins drawn from animal blood

Antitoxins neutralize the effect of toxins and act faster than blood

Can be used against plants, animals



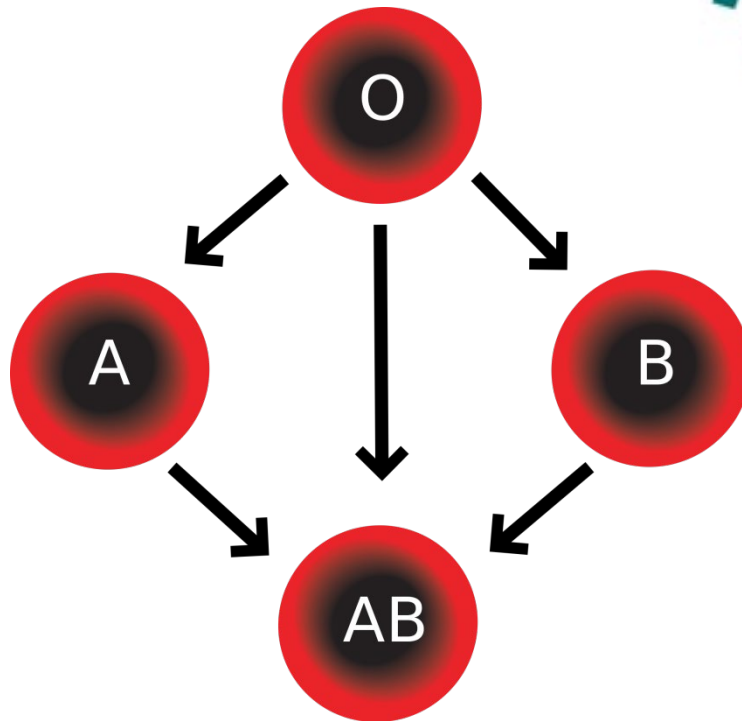
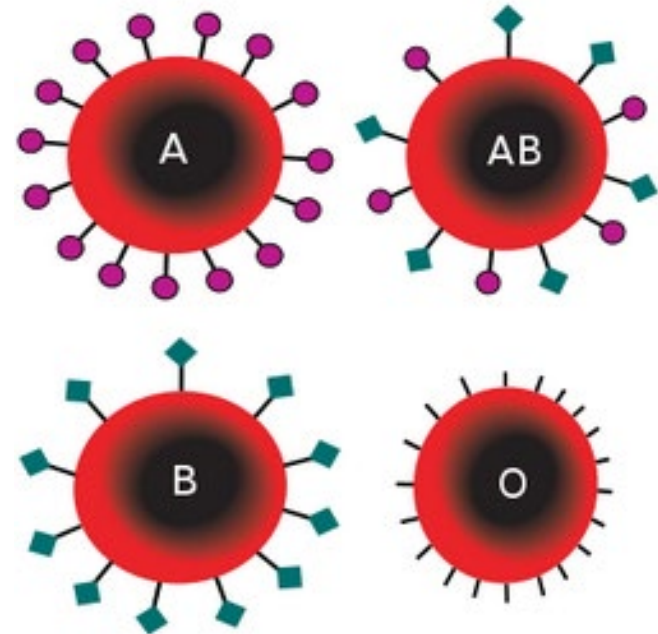
Disease	Effects of Disease
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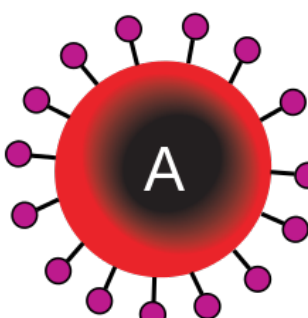
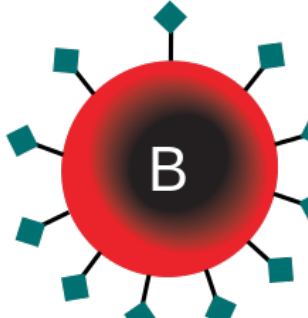
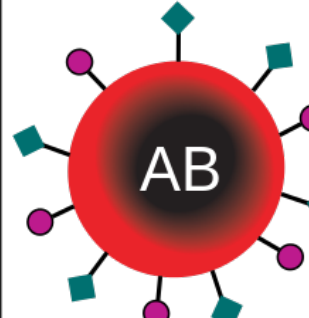
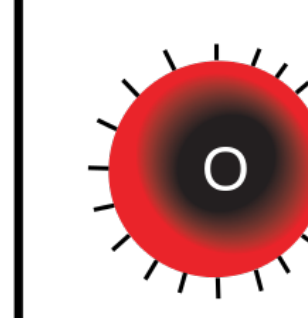
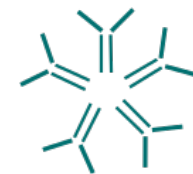

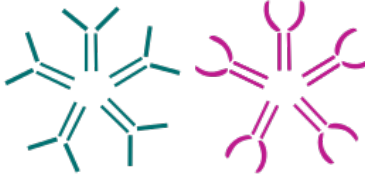




# BLOOD TYPING

Different types: A, B, AB, O

AB universal recipient

O universal donor



	Group A	Group B	Group AB	Group O
Red blood cell type	 <p>A</p>	 <p>B</p>	 <p>AB</p>	 <p>O</p>
Antibodies in Plasma	 <p>Anti-B</p>	 <p>Anti-A</p>	<p>None</p>	 <p>Anti-A and Anti-B</p>
Antigens in Red Blood Cell	 <p>A antigen</p>	 <p>B antigen</p>	 <p>A and B antigens</p>	<p>None</p>

# WHY GET IMMUNIZED?

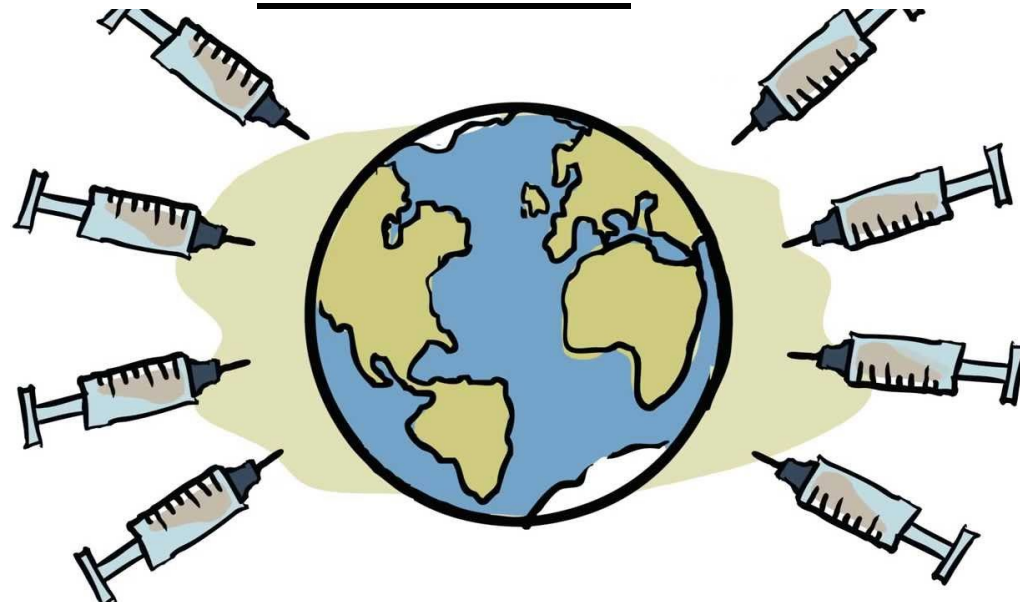


Most people get immunized but some chose not to for personal or medical reasons

Some people may react to immunizations

Basically immunizations prevent more problems than they cause so most people chose to get them

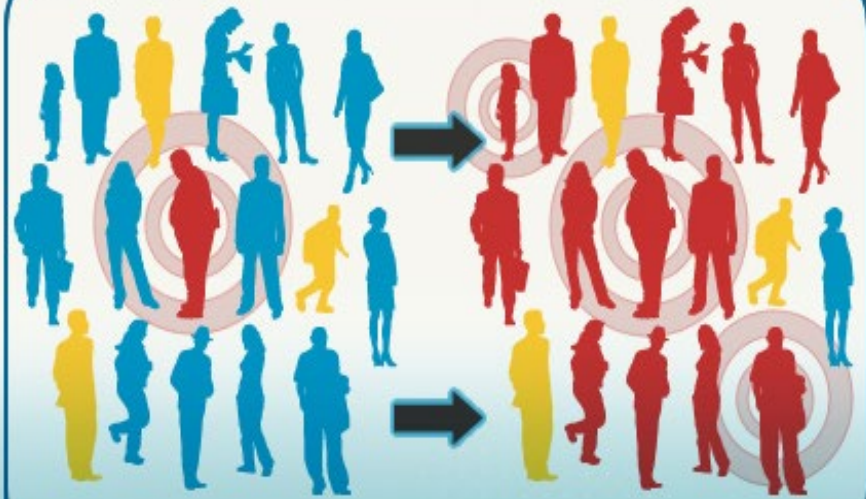
Have reduced the incidents of communicable diseases and related deaths





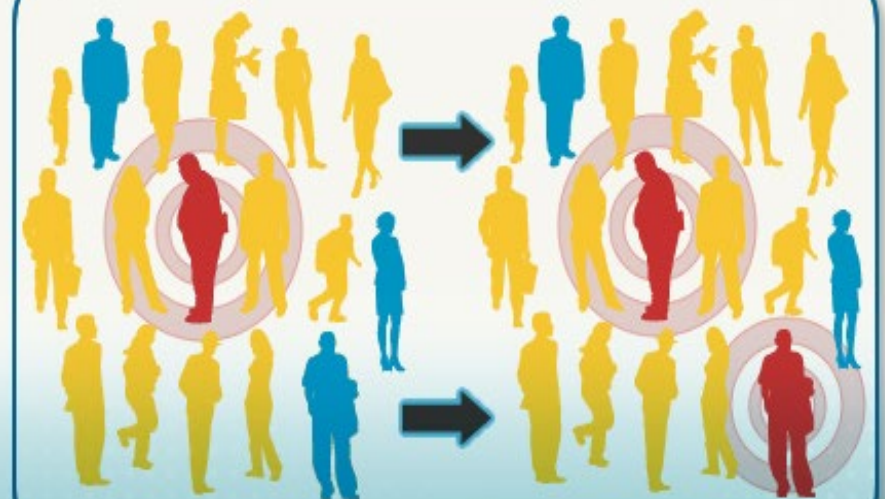
# EFFECTS

If only SOME get vaccinated...





...the virus spreads.


If MOST get vaccinated...



...spreading is contained.

 Healthy, non-vaccinated

 Healthy, vaccinated

 Not-vaccinated, sick, contagious

# ALLERGIES

Allergies develop when the immune system overreacts and becomes sensitive to substances such as pollen, dust, or mold

The immune system then treats these substances as pathogens and builds defenses against them

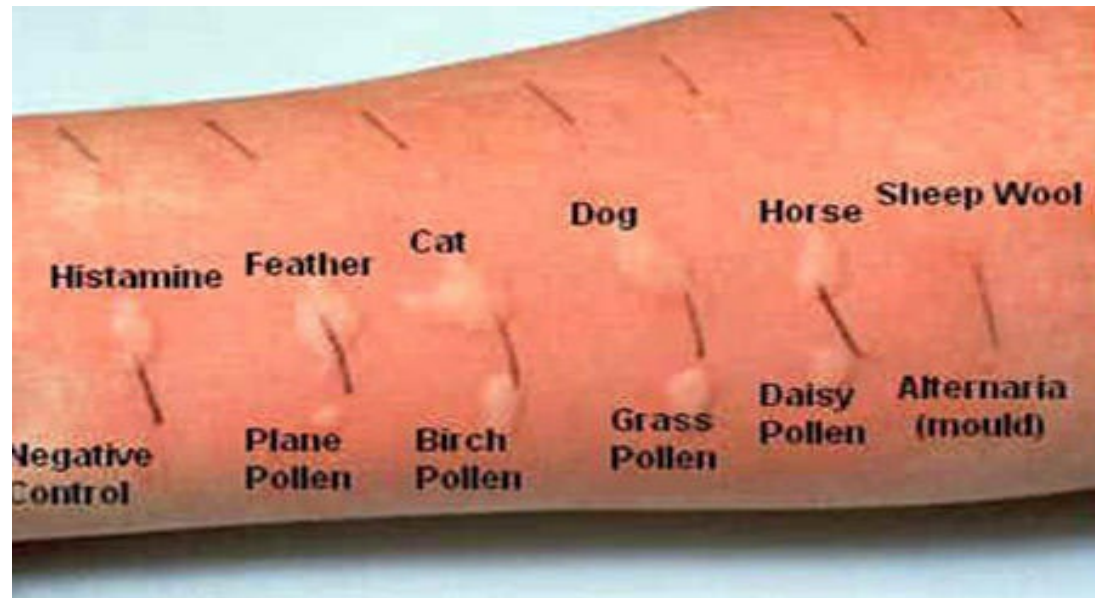
These antibodies result in a variety of symptoms – runny nose, watery eyes, and even breathing difficulties or death



# ALLERGIES

Scratch tests identify allergens. Where drops of antigens are absorbed under scratched skin

Reactions produce redness, swelling, and itching along the scratch



Skin Allergy Test

# TREATING DISEASES

There is still no sure way to prevent colds

This is because the virus continues to mutate, so by the time the new vaccine is made the virus has changed in some form or another

Usually when fighting colds we take over the counter drugs which are sold without a doctor's prescription.

Can relieve the symptoms but not kill the virus

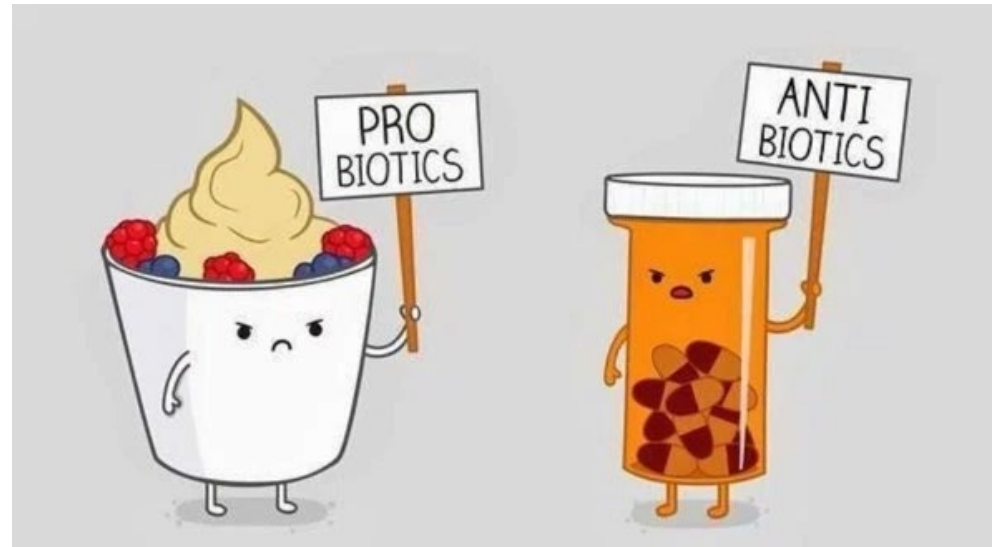


# TREATING DISEASES

If symptoms continue your doctor may prescribe an antibiotic

These either kill bacteria or prevent them from reproducing

Each antibiotic is effective against a specific type of bacteria





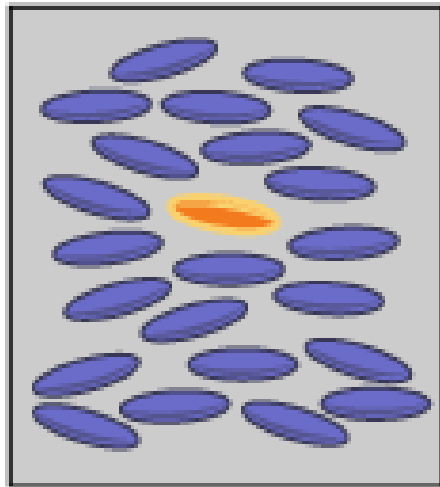
# **PROBLEMS WITH ANTIBIOTICS**

**Some people think they need antibiotics for everyday colds or sore throats but this is not always a good idea because:**

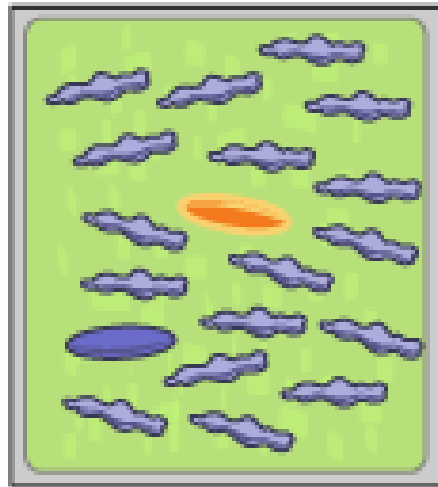
- 1.They kill harmful and helpful cells – your body has many useful bacteria but the antibiotics can't really tell them apart**
- 2.They can cause side effects – some people develop allergies to antibiotics**
- 3.Overuse can help the development of resistant bacteria – bacteria can build resistance to antibiotics after repeated exposure**

# EXAMPLE

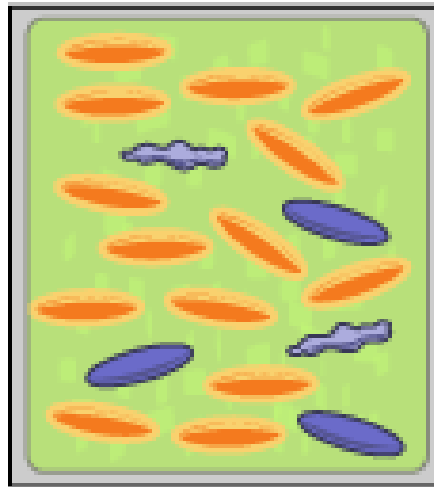
**1**  
A bunch of bacteria,  
including a resistant  
variety...



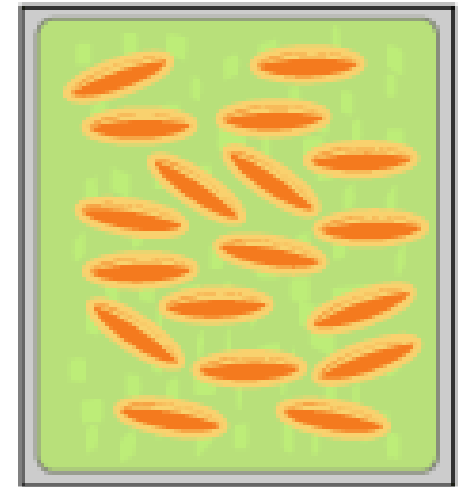
**2**  
...get bathed in  
antibiotics. Most  
of the normal  
bacteria die.



**3**  
The resistant  
bacteria multiply  
and become more  
common.



**4**  
Eventually, the  
entire infection  
evolves into a  
resistant strain.



 normal bacterium

 dead bacterium

 resistant bacterium

# **USE ANTIBIOTICS SAFELY**

**Ask Questions – ask your doctor or pharmacist about side effects and recommended amounts**

**Read Label – provides recommended daily amounts and when you should/shouldn't take them**

**Take Properly – follow the directions on the label or set by your doctor. Not doing so could not provide the intended result**





# **OVER THE COUNTER DRUGS**

**Usually considered safe to use**

**Avoid self diagnosis as many diseases may have similar symptoms and you may be fighting the wrong battle**

**When you have a choice among several medications read the label carefully**

**Find out what the medicine treats – headaches, upset stomach, coughing**

**Read warnings and list of side effects – drowsy**

**Use the recommended amount for each time interval**

# END OF CHAPTER 11

