

Lesson 4 Reading #2: - HOW DO ANTIBIOTICS WORK?

SECTION 1: HOW DO VARIOUS MEDICINES MAKE US FEEL BETTER?

NSAIDS:

Nonsteroidal anti-inflammatory drugs (NSAIDs) effectively reduce inflammation (swelling) and relieve pain. NSAIDs work by blocking the production of certain body chemicals that cause inflammation. NSAIDs are effective in treating general or localized pain, such as back pain, menstrual cramps, and headaches.

CORTICOSTEROID INHALERS:

Inhaled corticosteroids are often the first type of medication prescribed to control asthma. By inhaling the medication, these drugs act locally to decrease inflammation within the breathing passages, thereby avoiding the side effects associated with long-term use of oral corticosteroids.

VACCINES:

Vaccines help you develop immunity without getting sick first. Vaccines are made from the same germs (or parts of them) that cause disease; for example, polio vaccine is made from polio virus. But the germs in vaccines are either killed or weakened so they won't make you sick. Your immune system reacts to the vaccine in a similar way that it would if it were being invaded by the disease — by making antibodies. The antibodies destroy the vaccine germs just as they would the disease germs — like a training exercise. Then they stay in your body, giving you immunity. If you are ever exposed to the real disease, the antibodies are there to protect you.

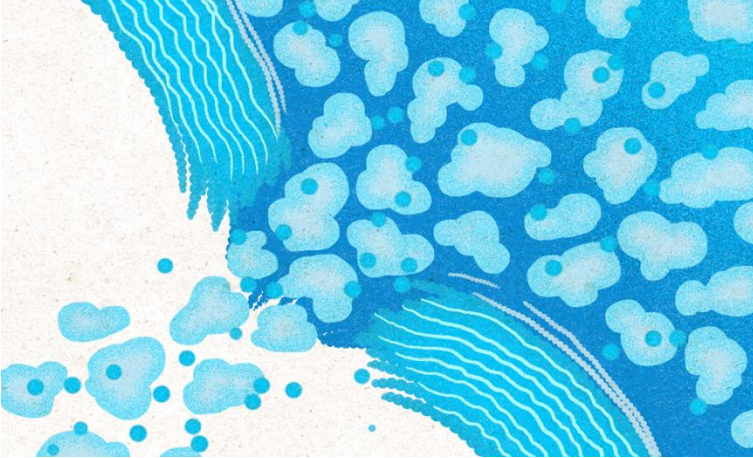
ANTIVIRALS:

Antiviral drugs can lessen symptoms and shorten the time you are sick from influenza by about one day. They may reduce the risk of complications such as ear infections in children, and pneumonia and hospitalizations in adults. For people at high risk of serious flu complications, early treatment with an antiviral drug can mean the difference between having milder illness instead of more severe illness that might require a hospital stay.

ANTIBIOTICS:

Antibiotics are medications used to fight infections caused by bacteria. Disease occurs when the cells in your body are damaged as a result of infection, and signs and symptoms of an illness appear. Many of the symptoms that make a person suffer during an infection result from the activities of the immune system trying to eliminate the infection from the body. Antibiotics treat infections by killing or decreasing the growth of harmful bacteria. Antibiotics work by affecting things that bacterial cells have but human cells don't. Different families of antibiotics have different ways of killing bacteria. Below are descriptions of a few types of antibiotics and their mechanisms of action.

SECTION 2: HOW DO VARIOUS ANTIBIOTICS WORK?

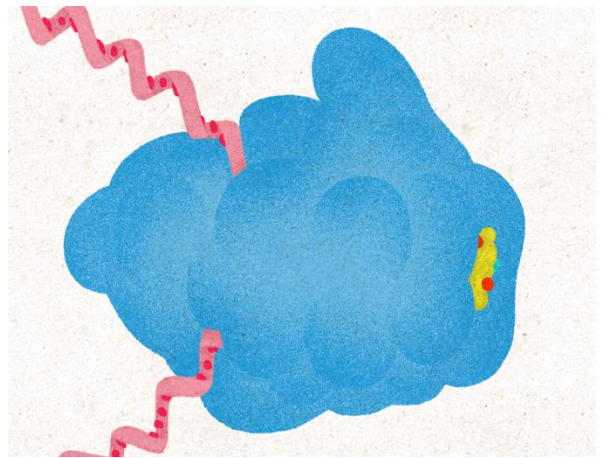


BETA-LACTAM:

Beta-lactam antibiotics kill bacteria that are surrounded by a cell wall. Bacteria build cell walls by linking molecules together—beta-lactams block this process. Without support from a cell wall, pressure inside the cell becomes too much and the membrane bursts. Examples of beta-lactams include penicillin and cephalosporin, which are used to treat many types of bacterial infections.

MACROLIDES:

Antibiotics in the macrolide group affect ribosomes, the cell's protein-building machines. Ribosomes build proteins in both bacteria and human cells, but there are differences between bacterial and human ribosomes. Macrolides block only bacterial ribosomes and prevent them from building proteins. Since proteins do all the cell's work, a bacterium that cannot build proteins cannot survive. Erythromycin, which is commonly used to treat respiratory tract and skin infections, is a macrolide.



QUINOLONES:



Quinolones include antibiotics like ciprofloxacin and levofloxacin, which are used to treat infections like bronchitis and pneumonia. When bacteria begin to copy their DNA, quinolones cause the strands to break and then prevent the breaks from being repaired. Without intact DNA, bacteria cannot live or reproduce.

Adapted from: <http://learn.genetics.utah.edu/content/microbiome/antibiotics>

<https://my.clevelandclinic.org/health/drugs/11086-non-steroidal-anti-inflammatory-medicines-nsaids>

https://www.emedicinehealth.com/understanding_asthma_medications/article_em.htm#corticosteroid_inhalers_for_asthma_use_side_effects_and_interactions

<http://www.vaccineinformation.org/how-vaccines-work/>

<https://www.cdc.gov/flu/antivirals/whatyoushould.htm>

<https://www.healthline.com/health/how-do-antibiotics-work#effectiveuse>

<https://www.ncbi.nlm.nih.gov/books/NBK209710/>