Chapter 14: Vaccinations

The Basics: What are Vaccinations and How Do They Work?

Vaccinations are a defense mechanism is today’s healthcare system against disease. Vaccines are a way to introduce your body to a disease without putting you at risk. Essentially, you teach your immune system what to look for. Whenever you teach your immune system what to look for, your body is able to fight the pathogen off faster and more efficiently if you were to come in contact with the pathogen again. Since your immune system will recognize the pathogen, you might not ever know you came in contact with the pathogen because your body fought the pathogen off so well that you never even got sick. You might be wondering how all of this works. How can you be introduced to a disease and not be at risk? How does your immune system know to fight these pathogens off? This is because of how smart your body is.

Every person has two types of immunity: innate immunity and adaptive immunity. Innate immunity is something that you are born with. Some examples of innate immunity include tears, your skin, and even the acid that is in your stomach. The other type of immunity however is something that you have to develop. Adaptive immunity is something that you develop by exposure. If you have ever heard the common phrase people use about children being around germs saying, “It is good for their immune system”, this is what they are talking about. Your innate immunity, the immunity that you always have, is less specific and because of this attacks most anything it does not know. Your innate immunity however, attacks very quickly. Your adaptive immunity is more specific. Since your adaptive immunity is more specific, it has to see a pathogen that is unknown to it to be able to remember it and kill the pathogen. Therefore, the first time you come in contact with a pathogen will be the most likely you are to contract that illness, and the longest amount of time that it will take you to recover from the illness as well. This is because your adaptive immunity takes it longer than innate immunity to start attacking. The good thing is though that your adaptive immunity has great memory! So, once you have been exposed to a pathogen even just one time before your adaptive immunity will recognize the pathogen and fight it off much more quickly. An advantage to adaptive immunity over innate immunity is that it only kills the cells of the pathogens; it does not kill potentially good cells as well.

 So now that you have a basic understanding of how your immune system works, vaccinations will be fairly easy for you to understand. Vaccinations use your adaptive immunity. Vaccinations are given in the form of injections, often in your arm. It is very likely that many of you have received vaccinations in your life. They do research on many diseases, however vaccinations are not available for all diseases. This is not due to a lack of research. For the ones that they have been able to develop an effective vaccine for, they have. They do this because they realize that the innate immune systems of the general public are ineffective at fighting this disease off and as a result many people are dying because of it. After they decide and research what disease to vaccinate against, they weaken or kill a sample of the pathogens of this disease. They then inject those pathogens into your body. They are weakened or sometimes even killed so that they cannot harm you. There is no way that you can contract a disease because of a vaccination. This is called a primary response; the primary is the first time that you come in counter with a pathogen. However, this gives your body a chance to remember this pathogen. Your adaptive immunity then stores it in its memory. Then, if you ever come in contact with the pathogen again your adaptive immunity already knows that it should fight it off. The second time that you come in contact with a pathogen is known as the secondary response. The secondary response is quicker and more effective. This is how vaccinations work. For example, Sally gets a vaccine for the measles. Her adaptive immune system has the chance to remember those pathogens. A few years later, Sally comes in contact with the measles pathogens at school. However, her body already knows what to do. Her adaptive immunity remembers them and fights them off quickly. Sally has less of a chance of ever getting the measles because her adaptive immunity quickly and efficiently works to kill those pathogens before they could even make her show any symptoms. Sally will likely not even be aware that she came in contact with the measles pathogen at school.

Common Misconceptions:

 There are a lot of frequent misconceptions whenever it comes to vaccinations. Things that people think or maybe heard that are actually scientifically false. Here we will address some of the most common of those misconceptions and why they are untrue.

1. If I get a vaccine I cannot get that disease.

This is false. As explained above, vaccinations just help your body fight off illness. There is not guarantee that it will always be enough that you do not contract the illness. However, if you have gotten a vaccine for an illness and you do contract it, you likely will have it for a shorter amount of time and have less severe symptoms than if you had not gotten the vaccination.

1. Vaccines cause autism.

This is completely false. A fraudulent study was done in the early 2000’s claiming links between a specific vaccination and autism. However, in recent years this study was found to be completely falsified. This study was retracted whenever its false information was discovered and the doctor that authored it lost his medical license.

1. Vaccinations are unsafe.

This is not true. There have been a great number of studies done on vaccinations as a whole as well as on each vaccine before they are put on the market and recommended by health care providers. The United States Center for Disease Control and Prevention, also known as the CDC, not only oversees vaccinations but also recommends them.

1. Someone I know had an adverse reaction to a vaccination because there is poison in them.

This is not a valid argument. Just like anything else such as food, clothing, soap, etc. you can be allergic to or have adverse reactions to vaccinations. There is very little way of knowing that you might be allergic to a vaccination until after you get it. Even so, the cases of adverse reactions are few and far between.

Wrapping it up: Vaccinations for the Win!

 As you can tell by the information given here, vaccinations are incredibly beneficial to the health of every individual as well as the health of the general public. There are 16 diseases that are vaccinated against before children in the United States turn 18. While these diseases are mostly unheard of in America (thanks to vaccines!) they are still very prevalent around the world and many people die from them each year. It is easy to see that the good outweighs any potential risk that come along with vaccinations. However, there is some false news circulating around the United States currently and there are many people who do not know about just how important vaccinations are for both themselves and their family but also the people around them. This is why it is essential the we share our knowledge about vaccinations. Whenever you do not know about something, it can seem quite frightening at first. However, we know that vaccinations are really just to help keep people from getting sick. They are the good guy in the story! Vaccinations for the win! We can all do our part in helping keep these nasty diseases unheard of in the United States by spreading the good news about vaccinations. Whenever people we know are unsure and afraid, we can reassure them that vaccines are completely safe. This benefit both our friends that we are sharing our knowledge with and also us as individuals. Even if you are vaccinated, a disease outbreak could be potentially deadly for anyone. It is the responsibility of everyone to keep it at bay. We can do this by getting our vaccinations and encouraging those around us to do the same.

References:

“How Vaccines Work.” *History of Vaccines*, The College of Physicians of Philadelphia , 2019, www.historyofvaccines.org/content/how-vaccines-work.

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