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Vaccines that protect us to survive

Transcript:

The availability of effective vaccines has had the most profound positive effect on improving the quality of public health by preventing infectious diseases.

How does vaccines work to prevent specific infections?

Vaccine injections are given into your arm or in oral drops for your immune system to fight germs- the invaders or antigens. Of course, vaccines are not given when you have a specific infection but given when not having that infection.

You are given a weaker or attenuated version of a virus or bacteria in the form of a vaccine.

Vaccines contain weakened or inactive parts of a particular organism (antigen) that triggers an immune response within the body.

Newer vaccines contain the blueprint for producing antigens rather the antigen itself.

Pfizer and Moderna vaccines are made using messenger RNAor mRNA, a technology that delivers a bit of genetic code to human cells to make the surface protein known as the spike on the SARS-2 virus. These proteins in your body activates the immune system, teaching it to see the spike protein as foreign and develop antibodies and other immunity weapons to fight.

AstraZeneca vaccine uses a chimpanzee adenovirus vector. This is a harmless weakened adenovirus that usually cause the common cold in chimpanzee. It is genetically changed so that it is impossible for it to grow in humans.

The adenovirus vaccine vector, known as ChAdOx1, was chosen as a suitable vaccine technology for a SARS-CoV vaccine as it has been shown to generate a strong immune response from one dose in other vaccines.

AstraZeneca has been proven to be safe and effective.

When your immune system first encounters a vaccine, it activates two important types of white blood cells. First the plasma B cells the cell that makes antibodies that are used to attack invading bacteria, viruses, and toxins. They also contribute to any allergic and autoimmune disease.

The first antibody produced by the plasma B cell is IgM which form about 10% of all antibodies.

Then there are the T cells, and they are tailored to identify a particular pathogen and kill it. These are also called memory cells, as they are primed up to face the virus, because they have tasted the vaccine given, and being aware to identify the enemy. These cells have a long-life span, and they keep on lingering in your blood for decades. These cells are increased with the 2nd booster shots.

On the second exposure to the same vaccine or the germ, the B cells that remain from before can rapidly divide and create increasing numbers, leading to a second spike in the number of antibodies circulating.

The second dose also starts the process of "B cell maturation" and binds to a particular pathogen.

Memory T cells, meanwhile, also proliferate rapidly and give long lasting immunity.

It is observed in the case of COVID-vaccines the immunized people against the COVID-19 would lose approximately half of their defensive antibodies every 108 days or so. As a result, vaccines that initially offered, say 90% protection might be 70% effective after 6 or 7 months, according to Miles Davenport of Kirby Institute, UNSW and, his colleagues

Immunological studies have shown that there is a decline of antibody levels among vaccinated individuals who are prone to having the risk of breakthrough infection.

Those individuals who are vaccinated can still catch COVID-19, but you are most likely to experience only mild symptoms.

Moderna joined Pfizer by revealing new data showing the waning impact of its Covid-19 vaccine, requiring the need for a 3rd booster shot.

In the US it has been recorded that 88 breakthrough cases among 11,431 individuals who had been vaccinated between Dec 2020 and March of this year.

Long lasting antibodies

It is now observed that there are positive signs of long last antibodies for COVID-19 infection.

People who recovered from mild COVID-19 have bone-marrow cells that can churn out antibodies for decades, although viral variants could dampen some of the protection they offer.

So, it is found that people who have had the infected SARS-Co-2 will probably make antibodies against the virus for most of their lives, as the researchers have found long-lived antibody-producing cells in the bone marrow of people who have recovered from COVID-19.

According to Menno van Zelm, an immunologist at Monash University, Melbourne, a study provides evidence that immunity triggered by SARS-CoV-2 infection will be long lasting and the vaccines will have the same durable effect.

This effect is observed due to the memory cells patrolling in the blood expecting a reinfection and the bone marrow plasma cells hiding in the bone marrow keep trickling out antibodies for decades.

“A plasma cell is our life history, in terms of the pathogens we’ve been exposed to,” says Ali Ellebedy, a B-cell immunologist at Washington University in St. Louis, Missouri, who led the study, published in Nature on 24 May.

Researchers presume that SARS-CoV-2 infection triggers the development of bone marrow plasma cells in mild infections of COVID, but in severe cases of COVID-19 there is a disruption of the plasma cell formation.

Ellebedy’s team states that the ability of some emerging SARS-CoV-2 variants to blunt the protective effects of antibodies means that additional immunizations may be needed to restore levels.

Hope this video talk was useful.

Stay safe at home and be ready for your 3rd booster jab.

Goodbye for now.

What is the most vaccinated country?

Portugal is leading the world in vaccinations, with about 84% of its population fully vaccinated as of Thursday, according to Our World in Data.

What is herd immunity in terms of COVID-19?

Herd immunity', also known as 'population immunity', is the indirect protection from an infectious disease that happens when a population is immune either through vaccination or immunity developed through previous infection. WHO supports achieving 'herd immunity' through vaccination, not by allowing a disease to spread through any segment of the population, as this would result in unnecessary cases and deaths?