FormaCare

a sector group of cefic

Vaccine development & formaldehyde

While the idea that the body can create immunity to certain diseases dates back to 16th century China, the first successful vaccination is credited to an Englishman, Edward Jenner.

Noticing that milkmaids did not get smallpox, Jenner concluded that cowpox, a related disease affecting cows, must somehow confer immunity. Acting on this insight, he injected eight-year old James Phipps first with cowpox, then with smallpox. Phipps showed no signs of smallpox infection. The year was 1796, and the first vaccine was born.

Of course, much has changed since. Today, vaccines confer protection against about 400 diseases. Formaldehyde, an ingredient found in a number of pharmaceuticals, has become essential in their development and production.

Getting an immune response without falling ill

Vaccines make the immune system think it is under attack. Something is used to prime a full-fledged immune response. The trick is to get this response without actually infecting the patient. As Jenner showed, this can sometimes be achieved by using an innocuous cousin of the pathogen.

But most often, this doesn't work. One must work with the pathogen itself. Making sure it protects, but doesn't infect, is the science of the vaccine-maker.

Inactivated or attenuated ?

Live attenuated vaccines are made by weakening the pathogen, be it a virus or a bacteria. The resulting organism can still replicate and stimulate an immune response, but does not cause the illness. Examples of attenuated vaccines include yellow fever, measles, rubella, and mumps.

Inactivated vaccines are made from organisms that have been inactivated using a solution of formaldehyde and sterile water and then purified. Inactivated vaccines are used against the flu, cholera, plague, hepatitis A, tetanus and diphtheria. These vaccines generally contain less than 200 parts per million of formaldehyde.

From the lab to the clinic

Formaldehyde plays a crucial role in production. It is used in small amounts to produce vaccines such as those against anthrax, diphtheria, hepatitis A, influenza, Japanese encephalitis, and tetanus.

A crucial challenge is to ensure vaccines stay stable and effective once they leave the factory. Weeks of storage, vibrations from transport, changes in heat and humidity could all compromise its quality, especially in less developed parts of the world where storage and transport conditions are less likely to be perfect.

Formaldehyde ensures that many vaccines remain sterile, effective and safe. Its role as a preservative alone prevents bacterial or fungal contamination that could cause serious infections.

About Formaldehyde

Formaldehyde is an essential metabolic intermediate in all living cells. It is produced during the normal metabolism of serine, glycine, methionine, and choline and also by the demethylation of N-, S-, and O-methyl compounds, and is a starting point for the metabolic pathway leading to purines, thymidine, and amino acids.

Formaldehyde is also an important industrial chemical used in a wide range of applications, including building materials, furniture, paints and coatings, textiles and pharmaceuticals.

Formaldehyde is broken down within a few hours by sunlight and by bacteria, and it metabolizes quickly in the body. Formaldehyde, therefore, does not accumulate either in the body or in the environment.

About FormaCare

As a sector group of Cefic (the European Chemical Industry Council), FormaCare represents key European producers of formaldehyde, aminoplast glues and polyols. FormaCare aims to promote the sustainable use of formaldehyde and formaldehyde based products among its members and their customers, with due regard to health and environmental care.

Contact us

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