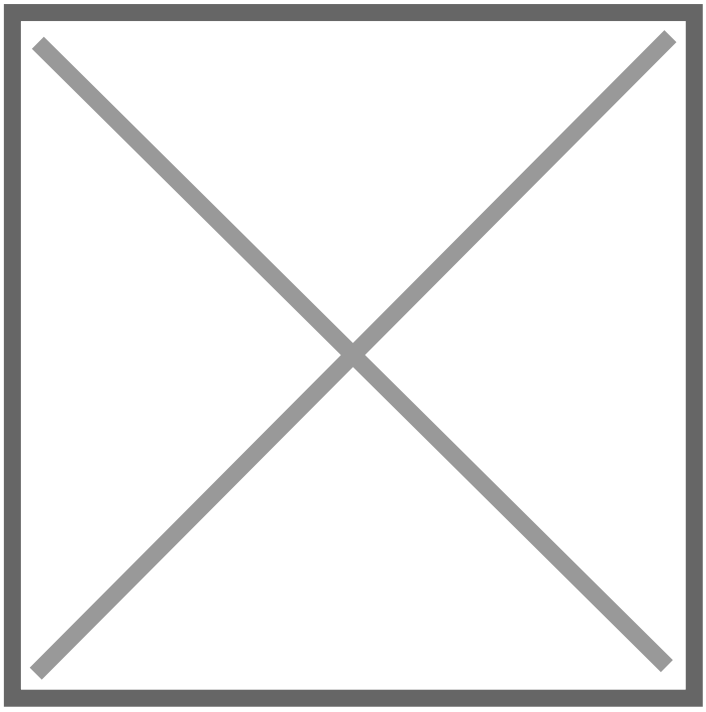
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Cracking the flu vaccine formula

07 March 2012 | News



Influenzavaccine

After the swine flu pandemic, many companies in India took up the challenge of developing a vaccine according to a causative strain and have been successful in saving many lives

Genesis

In 1931, researchers at Vanderbilt University demonstrated viral growth in embryonated hens' eggs. The underlying principle for this technique is still used in the preparation of egg-based vaccines.

The Technology

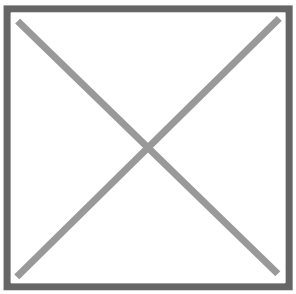
Inactivated vaccines are prepared in a way that the virus is grown in a suitable culture system, either in an egg or in cells, and then killed using heat or other chemicals. The virus coat has glycoproteins on the surface of the virus, namely hemagglutinin and neuraminidase. These have different subtypes by which strains of the virus are known. They are designed in a way that the vaccine elicits immune responses that attack the neuraminidase and haemagglutinin proteins found on the surface.

The Impact

One of the earliest flu pandemics was known to be the Spanish influenza in 1918, which killed 50 million people. More recently, H1N1 influenza or swine flu claimed 18,000 lives worldwide with the Government of India reporting 2,728 fatalities till date. Even though most vaccines for swine flu were introduced after the peak of the pandemic, the development of such vaccines has allowed for the prevention of deaths from swine flu and proved that Indian companies possess the capability to develop influenza vaccines according to the causative strain.

The technology for developing vaccines has evolved tremendously over the years but the underlying principle has remained the same, which is to trigger an immune response in an individual on administration of either the pathogen itself in its inactivated form or a component of it.

Once that happens, our immune system develops a memory against that particular disease pathogen, such that on reinfection by the same pathogen, our immune system has the necessary antibodies to fight that infection.



Today, cell culture-based vaccines that feature molecular technologies are used to produce vaccines according to different genetic varients of the virus.

But if the virus has been built in such a way that the glycoproteins on its surface are constantly evolving, the vaccine does not recognize a new strain. Add to that a process known as antigenic shift, by which two or more different strains of a virus can combine to form a new subtype having a mixture of the surface antigens. This is the challenge in making an influenza vaccine. The influenza virus is of two types: Influenza A and B. Of these, type A leads to most pandemics.

Companies involved

Although seasonal flu vaccines have been adopted enthusiastically in western countries, the concept of a seasonal flu vaccine is yet to take off in India.

After the swine flu pandemic in 2009, Indian vaccine companies have risen to the challenge of developing India's own swine flu vaccine and succeeded. Each of the vaccines launched into the India market have some unique technology that differentiates them for the others.

Zydus Cadila launched Vaxiflu, which was India's first indigenously manufactured egg-based inactivated vaccine, in June

2010. A month later, Serum Institute of India launched Nasovac, also an egg-based vaccine. The differentiating factor was the unique intranasal method of administration.

Also, at the time of its launch, it was the cheapest swine flu vaccine in the market. A few months down the line, Bharat Biotech launched HNVAC, India's first cell culture H1N1 vaccine. The technology involved in a cell culture vaccine allows it to be scaled up in an easier way than egg-based technology.

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