

RESEARCH
A MATTER
OF LIFE
OR DEATH



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CHRISTINE STABELL BENN
RESEARCH CENTER FOR VITAMINS AND VACCINES (CVIVA)



Photo: Bandim Health Project

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Research at the Center for Vitamins and Vaccines (CVIVA) provides fundamental new insights into the immune system and contributes new knowledge that may save lives and improve the health of people all over the world.

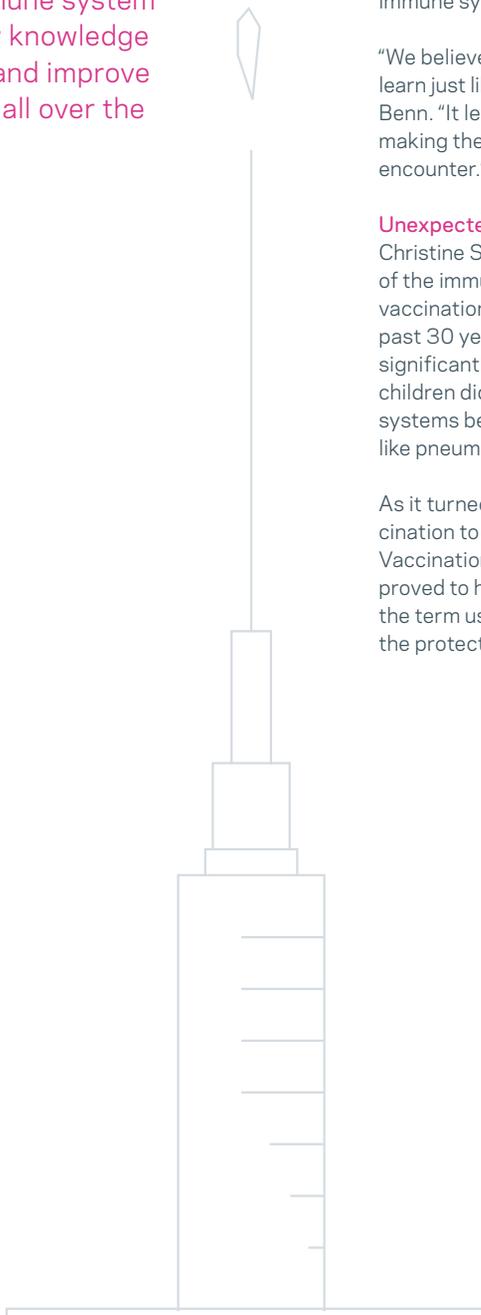
CVIVA supports what can best be described as a paradigm shift. For many years, researchers at the center have argued that not only do vaccines provide protection against specific diseases, but they also have a more general effect on the immune system.

“We believe that the immune system is a smart system that can learn just like the brain,” explains center leader Christine Stabell Benn. “It learns from its experience with specific diseases, thus making the body more capable of fighting diseases it has yet to encounter.”

Unexpected spin-off

Christine Stabell Benn and her colleagues base their conception of the immune system as a learning system on studies of vaccination programs carried out in Guinea-Bissau over the past 30 years. They saw how measles vaccines helped significantly reduce child mortality – not only because the children did not get measles but also because their immune systems became stronger and better able to fight diseases like pneumonia and malaria.

As it turned out, the measles vaccine was not the only vaccination to have a positive impact against unrelated diseases. Vaccinations against smallpox, tuberculosis and polio also proved to have positive side benefits – or non-specific effects, the term used to describe the added effect of a vaccine beyond the protection it provides against a specific disease.



CVIVA researchers have discovered fundamental differences between the immune systems of boys and girls.

Age and gender matter

CVIVA researchers have also discovered that the overall effect of vaccines depends on how early in life one receives the vaccines and the order in which they are received. Furthermore, the researchers have discovered fundamental differences between the immune systems of boys and girls. This suggests that the effects of some vaccines are highly gender determined.

The vast majority of vaccines have positive, non-specific effects. This is especially true of "live" vaccines, in which people are inoculated with a weak form of the disease the immune system is intended to fight, such as vaccines against measles and tuberculosis. However, some vaccines may have negative effects, especially for girls. This occurs, for example, in connection with inactivated vaccines or "dead" vaccines, such as those used against tetanus, diphtheria and pertussis. In girls, the vaccine seems to make them more susceptible to other infections.

Benn stresses that this obviously does not mean that anyone should forgo vaccination in specific situations when it is required. At the same time, however, vaccination programs can clearly be designed much more intelligently if we know more about both the non-specific effects and the basic processes of the immune system.

Saves lives and improves health

CVIVA's research clearly has an enormous social relevance. Low-income countries with high child-mortality rates, in particular, have much to gain from introducing vaccination programs based on CVIVA's recommendations.

"The lives of 6500 children could be saved every day if our results and recommendations were used globally," says Benn, referring to an assessment made by other researchers. "However, countries other than those with low incomes could similarly see health improve. Denmark and other high-income countries could also benefit."

Studies indicate that the vaccine against tuberculosis (known as the Calmette vaccine), part of the Danish vaccination program until about 30 years ago, has also had a more general and positive effect on health, perhaps helping to reduce the number of allergy sufferers. CVIVA researchers are in charge of a new, major Danish experiment aiming to show how the Calmette vaccine affects general health.

"I am very excited to see the outcome of this experiment, and I expect that it will provide fundamentally new insight into the immune system," says Benn.



FACTS:

Research Center for Vitamins and Vaccines (CVIVA)
Center leader / Christine Stabell Benn
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 www.cviva.dk