

# Cystic Fibrosis Research News

## **Title:**

Anti-Pseudomonas aeruginosa IgY antibodies augment bacterial clearance in a murine pneumonia model

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## **What was your research question?**

Gargling with a solution containing antibodies (IgY) purified from chicken egg yolks may serve as an approach to eliminate lung infections caused by the bacteria *Pseudomonas aeruginosa* in cystic fibrosis (CF) patients. We examined the value of preventative treatment with IgY antibodies to reduce lung infections in a laboratory mouse.

## **Why is this important?**

Recurrent *Pseudomonas aeruginosa* infections cause ongoing destruction of the airways in people with CF. These infections are difficult to treat because the bacteria eventually establish a slimy environment known as a biofilm, which reduces the effects of antibiotics.

Previous laboratory experiments show that IgY antibodies prevent bacteria from sticking to the walls of the airways and that IgY improves the ability of the immune system to kill the bacteria. Thus, if a treatment using IgY, is directed against *Pseudomonas aeruginosa* bacteria at an early stage of infection, the development of chronic lung infections in people with CF may be reduced.

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## **What did you do?**

We set up a lung infection model in mice in order to mimic the clinical condition in people with CF. We infected the mice with *Pseudomonas aeruginosa* by injecting the bacteria into their noses (like a vaccination). We then treated them by injecting the IgY antibodies, which act specifically against the bacteria, or the control treatment, salt water or fake IgY antibodies which we know don't work, into the mice's noses in the same way. IgY originates from egg yolks of chickens that are vaccinated with *Pseudomonas aeruginosa*. The extent of infection and subsequent inflammation in the lungs of the mice were measured at specific time points during the first day of infection.

## **What did you find?**

IgY treatment greatly reduced the extent of *Pseudomonas aeruginosa* lung infection in the mice. Airway inflammation was similarly decreased and as a result animal welfare improved in the mice treated with the IgY antibodies. No adverse reactions were seen in these mice.

## **What does this mean and reasons for caution?**

Our results suggest that local treatment, such as gargling with a solution containing IgY antibodies against *Pseudomonas aeruginosa* may reduce the extent of lung infection in people with CF and prevent the development of chronic infection. However our animal model may not precisely represent the clinical situation in humans and we only concentrated on the early phase of infection.

## **What's next?**

Human clinical trials are important to evaluate how well the treatment with IgY antibodies works and if it is safe. The current IMPACTT study (<http://www.impactt.eu/>) will hopefully show treatment with IgY antibodies can prevent and treat serious chronic infection of *Pseudomonas aeruginosa* in people with CF.



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