Q&A: Testing the efficacy of new vaccines against enteroviruses

November 6 2023, by Karin Vikström

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Marta Butrym from the Center for Infectious Medicine (CIM), at the department of Medicine, Huddinge (MedH), is defending her thesis, "Novel vaccines and antiviral treatments for enterovirus induced

infections and disease," on November 10, 2023. Her main supervisor is Malin Flodström Tullberg (MedH).

What is the main focus of your thesis?

The main focus of my thesis was to test the efficacy and safety of new vaccines against a group of enteroviruses (coxsackie B virus) that have been linked to the disease type 1 diabetes and also impaired lung function in cystic fibrosis (CF). I also studied how prevalent coxsackie B virus infections are among Swedish individuals with cystic fibrosis. Another important goal was to test a cancer drug for its newly discovered antiviral properties against such and related viruses.

Which are the most important results?

The most important results were that coxsackie B virus infections are common in cystic fibrosis and that our new vaccine protected a model of cystic fibrosis from coxsackie B virus infection and organ damage. We also found that the coxsackie B virus vaccine is safe and does not accelerate diabetes development in a model of autoimmune type 1 diabetes. On the other hand, the new vaccine protected from infection-induced acceleration of diabetes. We also showed that the cancer drug had antiviral effects and prevented coxsackie B virus infection of intestinal epithelial cells and insulin producing cells.

How can this new knowledge contribute to the improvement of people's health?

The studies showed that the newly developed coxsackie B virus vaccines are safe and efficacious. Our findings contributed to the recent development of a similar vaccine known as PRV-101, which has been tested with excellent results in a phase I trial. If receiving regulatory

approval for general use, this vaccine will protect from coxsackie B virus infections, known to cause for example respiratory infections and myocarditis.

It will also protect from disease-worsening infections in susceptible groups like those with cystic fibrosis, and, most importantly, can be used to address the role of coxsackie B virus in type 1 diabetes. The intestinal barrier is where the initial infection takes place and thereby our findings suggest that a cancer drug may be efficient in preventing local infection and the spread of virus to other organs. The drug repurposing approach could be beneficial for the general population by speeding up the introduction of the drug as an antiviral treatment as well as lowering the costs of production.

Most importantly, our findings may contribute to an antiviral therapy against enteroviruses.

Provided by Karolinska Institutet

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