

Oral Vaccination against Porcine Circovirus?

GLOBAL - Wang and colleagues have published a paper in *Journal of Virological Methods*, which suggests that lactic acid bacteria could be the key to a new generation of vaccines.

Efficacious vaccines that protect animals against PCVAD and that are delivered through feed or water would have a dramatic impact on the swine industry. If the use of these vaccines also allows differentiation between infected and vaccinated animals (DIVA), producers will have a cost-effective method to deliver vaccines and monitor their usefulness. This month's article from the *American Association of Swine Veterinarians* focuses on recent efforts to develop an oral vaccine delivery system that is effective when used against PCVAD.

Porcine circovirus type 2 (PCV2) is found in swine populations throughout the world, is associated with several swine disease syndromes and has had a severe negative economic impact on the industry. Although effective commercial vaccines have recently become available, the quest to make even more protective vaccines while also minimizing any risks associated with vaccination continues.

In order to make a more effective vaccine, Wang and colleagues explored the idea of using a vaccine delivery method that would induce immunity at the level of mucous membranes (such as the respiratory or intestinal tract), called mucosal immunity, and whole body immunity, called systemic immunity. An attractive candidate for such vaccine delivery is lactic acid bacteria.

Lactic acid bacteria are considered safe as they are neither pathogenic nor do they tend to spread. They can be given orally and will pass through the lining of the intestinal tract without causing any known adverse effects.

Experimental vaccines delivered using lactic acid bacteria are expected to be able to induce both mucosal and systemic immunity in the animal. Depending on the site of delivery of the vaccine, induction of immunity may be altered and directed to the gastrointestinal, reproductive and respiratory tracts.

To develop the new vaccine, Wang's group inserted PCV2 DNA molecules into the non-invasive, non-pathogenic lactic acid bacteria. Subsequently, the manipulated bacteria were used as an oral delivery system for the PCV2 'vaccine'.

The success of this technique was evaluated using a model that included administering the new vaccine to mice orally and later testing the animals for an immune response.

The researchers found that mice that had been given the bacteria with the PCV2 capsid protein had an immune response that was eight times greater than that of the controls. They concluded that transformed lactic acid bacteria show promise as a novel vehicle for oral vaccination and for inducing immunity to PCV2 proteins in animals. This technique may represent a new

generation of vaccines where needles are never used.

Reference:

Wang et al., 2008. Expression of the capsid protein of porcine circovirus type 2 in *Lactococcus lactis* for oral vaccination. *Journal of Virological Methods*, 2008. 150:1-6.

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