

EFFECT OF HOG CHOLERA VIRUS ON THE PORCINE MUCOCILIARY ACTIVITY

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Hog cholera vaccination using live attenuated strains is capable of permitting the colonization of the lung by *Pasteurella multocida* (Pijoan and Ochoa, 1978a). As *P. multocida* is part of the normal upper respiratory tract flora of healthy pigs, the virus must cause some immunosuppression, thus enabling the bacteria to colonize the lung.

The non-immune lung is defended mainly by two different mechanisms: mucociliary clearance and alveolar macrophage phagocytosis. In *P. multocida* infections, alveolar macrophage activity is low, probably due to the capsular material, or to the secretion of toxic factors by the bacteria. Because of this, even though this phagocytic system is affected by the Hog Cholera virus, this is probably not the main mechanism by which the virus exerts its activity (Pijoan, et al. 1980).

On the other hand, tracheal explants of pig embryos will produce a powerful bacteriostatic substance against *P. multocida* which suggests that this is a main mechanism of protection against this agent (Pijoan and Ochoa, 1978b). The secretion of this substance is affected by the viral infection (Pijoan and Ochoa, 1980). In this paper, the effect of vaccinal Hog Cholera on tracheal explants is further described.

Materials and Methods

Pig embryo tracheal explants were obtained and cultured as described before (Pijoan and Ochoa 1978b). The explants were infected for 1 hour with 0.5 ml of a commercial vaccine of the "Chinese Strain" of Hog Cholera virus or a virulent strain (strain "Ames"). Ciliary movement was assessed with a dissecting microscope at 12 and 24 hours postinfection, and samples were obtained for histopathology and immunofluorescence. The tracheal rings were cut and stained with PAS and PAS-Ab (Alcian Blue) at different pH values (2.6 and 1.0). Some infected rings were cut with a cryostat and used for direct and indirect immunofluorescence.

Results

Ciliary activity was severely affected by the field strain of Hog Cholera virus and less so by the lapinized strain. Seventy-five percent of tracheas infected with the field strain, and 27% of tracheas infected with the vaccinal strain ceased to show ciliary activity at 24 hours postinoculation. Histopathology of vaccinal-strain infected explants showed some loss of epithelium and cariorexis of some glandular cells. The PAS-Ab (pH 1.0) stain showed coloration of many goblet cells. The explants with the field strain showed total loss of epithelium, desquamation of mucosa, pyknosis of glandular cells, and very poor staining with PAS and PAS-Ab. Immunofluorescence showed that most of the affected cells were in the mucosa.

Discussion

Previous papers have shown (Pijoan and Ochoa, 1980) that Hog Cholera vaccinal virus interferes with the secretion of bacteriostatic substances by the mucociliary apparatus. This study demonstrates viral activity to be directed against both the epithelium, with cessation of ciliary activity and desquamation, and at the mucosal glands, which lose their staining avidity (and therefore show lack of mucosubstances). These findings confirm the view that immunosuppression

by vaccinal Hog Cholera virus in the respiratory tract, is mainly directed against the mucociliary apparatus. They also support the view that defense against *P. multocida* infection of the pig's lung is mainly found on this system.

References:

- Pijoan, C. and Ochoa, G. (1978)a: J. Comp. Path. 88 (2):167-170.
 Pijoan, C. and Ochoa, G. (1978b): Rev. Lat. Microbiol. 20(1):1-3.
 Pijoan, C. and Ochoa, G. (1980): Proc. IPVS (Copenhagen) p.195.

Resumen

Efecto del virus vacunal del Colera Porcino Sobre la actividad del aparato mucociliar

La vacunación contra el Colera Porcino con cepas vivas atenuadas predispone a los cerdos a la infección pulmonar con *Pasteurella multocida*. Se sabe que un importante mecanismo de defensa contra esta bacteria depende de la secreción de sustancias bacteriostáticas por el epitelio ciliado traqueo-bronquial. En este trabajo se reportan los efectos del virus sobre este sistema.

Se cultivaron explantés traqueales de embriones de cerdo y se infectaron con el virus vacunal.

Esto resultó en una disminución marcada del movimiento ciliar, mayor en traqueas infectadas con el virus de campo que con la cepa vacunal. Además hubo destrucción del epitelio, así como disminución de mucosubstancias en las glándulas. Esto demuestra que el virus afecta a este sistema y de esta manera permite la colonización del pulmón por la bacteria.