International Pig Topics

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Swine influenza V

Humoral immunity

Infection of pigs with influenza A virus stimulates an immune response characterised by the production of antibodies and the proliferation of immune cells. The antibody based or humoral response is essential for reducing or preventing infection, while the cellular response (see on) plays a key role in viral clearance late on in the infection.

Pigs generally develop a rapid immune response and they can overcome infection within a week. They usually remain protected against reinfection with the same or similar viruses.

Mechanism of humoral immunity

After infection, antibodies are mainly produced against haemagglutinin (HA), neuraminidase (N), matrix (M) and nucleoprotein (NP) but only antibodies against the globular part of the HA protein can block influenza A virus into target cells and neutralise virus infectivity.

Antibodies against NA act after infection by limiting the release of virions from infected cells.

Antibodies from other proteins, especially NP and M, mediate the destruction of infected cells by antibody dependent mechanisms.

It should also be noted that mucosal antibodies in the respiratory tract are the most important for protecting pigs from swine flu.

IgM antibodies are produced first and can be detected 3-5 days post infection. IgG antibodies arise 7-10 days post infection and peak at 15-21 days. The IgG antibodies can be found primarily in the serum and also in nasal secretions. IgG antibodies protect the lung tissue and there is some evidence that suggests they can be produced locally. IgA antibodies play a key role in mucosal immunity and they can be detected 4-7 days post infection in nasal secretions. They reach their maximum in serum and mucosal secretions 15 days post infection and remain elevated for a couple of months.

There are differences in the ability of strains to produce cross-reactive antibodies that are able to block viral entry against genetically distinct strains.