**What is this research about?**

*Actinobacillus suis,* or *A. suis* for short, is a species of bacteria that commonly infects pigs. Although most infected pigs do not have signs of disease, *A. suis* can cause fatal septicemia (bacterial infection in the blood) as well as pneumonia, arthritis, and spontaneous abortion of fetal pigs. Over the past few decades, *A. suis* has become an important disease-causing bacteria, especially in otherwise healthy swine herds. While *A. suis* is most commonly associated with pigs, this bacteria has also been identified in other species, including cats, young cows, and horses. Scientists are currently trying to learn more about different strains of *A. suis* and what makes some more harmful and deadly than others. It is difficult to study *A. suis* infections in pigs, however, so researchers are considering using other animal species as “models” for this infection. Since mouse models have been successfully developed for closely related bacterial species, scientists are hoping that *A. suis* will also be able to infect mice and that the resulting infection will be similar to what is seen in pigs.

**What did the researchers do?**

Three strains of *A. suis* were studied: strain SO4 and strain H91-0380 were isolated from pigs, while strain 96-2447 was isolated from a cat. Healthy female mice were infected with one of these three strains, either through drops in the nose or injection into the body. Some of the mice also received injections of pig hemoglobin (a source of iron for the bacteria) or dexamethasone (an immune system suppressant) prior to infection with *A. suis*. The mice were monitored for outward signs of disease for three to seven days, and then killed. Tissue samples from various organs were also analyzed for signs of disease and presence of bacteria.

**What you need to know:**

Mice infected with *Actinobacillus suis* strains, either through nasal drops or injection, rapidly developed clinical signs of disease and bacterial lesions similar to those seen in infected pigs. The mouse model of *A. suis* infection may be a good alternative to directly studying this infection in pigs.
What did the researchers find?
Mice infected with either the feline 96-2447 or swine H91-0380 strain showed clinical signs of acute bacterial infection and a form of pneumonia similar to what is seen in infected pigs. Regardless of the infection route (through the nose or injected), the bacteria spread throughout the body to other organs. The feline strain was associated with more severe signs of disease and higher bacterial levels than either of the pig strains. Pre-treating mice with pig hemoglobin or dexamethasone resulted in an earlier onset of disease symptoms for both pig strains, but did not affect likelihood of death.

How can you use this research?
Microbiologists and veterinarians can use the mouse model of A. suis infection to better understand the effects of A. suis infections in pigs and study why some strains are more virulent than others. They can also use this research to develop strategies to prevent the spread of A. suis from swine herds to other animal species. Vaccine researchers can use the mouse model of A. suis infection to begin to develop an effective vaccine against this bacteria for use in pigs.

Keywords:
Pigs, swine, mice, bacterial infection, Actinobacillus suis, animal model, septicemia

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