

NATIONAL PORK BOARD
Request for Proposals
Information for Summer 2007 Funding

DEADLINE: Tuesday, July 10th, 2007 – 5:00 p.m. CST

The National Pork Board is soliciting research proposals dealing with:

B – Swine Health- PCVAD
D – Pork Safety – Pre-Harvest

Please read carefully the individual solicitation descriptions for project proposals. If you have questions related directly to the description of a specific solicitation, contact the staff member listed in charge of the program area. For questions on the general submission process, contact Bev Everitt at 515/223-2750.

To be considered for committee review, **all proposals must be submitted via the website by 5:00 p.m. CST on Tuesday, July 10, 2007** (see www.pork.org for links). Proposals will be reviewed by both technical advisors and pork producers prior to the committee selection meetings.

STAFF MEMBERS:

Pork Safety

Steve Larsen	slarsen@pork.org	515/223-2754
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Swine Health

Pamela Zaabel	pzaabel@pork.org	515/223-2791
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NOTES:

Proposal selection will occur in late August 2007.

Notification of grant awards will be done in late September 2007.

Project funding will begin November 1, 2007.

Requests for second-year funding must be resubmitted.

B. - Porcine Circovirus Associated Disease (PCVAD)

Introduction

It has not been unusual for clinical PMWS to be diagnosed on farms in the U.S. based on the case definition published by Sorden. (Sorden, S.D., 2000. Update on porcine circovirus and post-weaning multisystemic wasting syndrome (PMWS). Swine Health Prod. 8, 133-136.) These affected farms have historically been positive for Porcine Circovirus type 2 (PCV2).

However, an increase in the incidence of the severe form has been reported in the U.S. since the fall of 2005. Clinical signs of the more severe form of PMWS include anorexia, rapid weight loss, enlarged lymph nodes, and respiratory signs. PMWS, now referred to Porcine Circovirus Associated Disease (PCVAD), is still spreading in the United States swine population.

On August 17 and 18, 2006, scientific researchers, veterinarians, allied industry representatives, and producers met to discuss and vote on PCVAD research priorities. A summary of the meeting and ranked research priorities were published in the Journal of Swine Health and Production 15.1, 47-51. The information gathered during this meeting was used to develop the 2007 PCVAD Call for proposals.

Research Priority

The National Pork Board is calling for research proposals addressing five priority areas including Immunology, Epidemiology, Pathogenesis, Diagnostics, and Prevention and Treatment. The research priorities to be addressed in this call for proposals are outlined below.

- 1) Immunology
 - a. Determine the role of cell mediated immunity and humoral immunity in the immune response to PCV2a and PCV2b infection.
 - i. Defective immune response
 - ii. Effective immune response
 - b. Investigate the effect of strain variation on cross-protection and on cell mediated immunity and humoral immunity.
 - c. Determine cross protection and whether immunogenic epitopes need to be conserved among different strains.

- 2) Epidemiology
 - a. Determine the predominant mode of transmission
 - b. Investigate and identify factors influencing transmission: virus type, pig genetics, herd size, and production system (number of sites).
 - c. Molecular epidemiology—establish a PCV2 sequence database that links strain sequence with clinical disease, infectious co-factors, management practices, chronology and geographic locale.
 - i. Investigate how much genetic variation there is within a genotype
 - ii. Determine if that genetic variation is also reflected as antigenic variation
 - d. Develop checklists of risk factors, management approaches, and roles of other agents, cofactors, and serum therapy.
 - e. Evaluate current practices
 - i. Evaluate what biosecurity practices may prevent infecting a herd.

- ii. Evaluate if injections with antibiotics, vaccines, and serum therapy transmit disease.
- f. Estimate whether susceptibility, transmissibility and persistence change with age, PCV2 strain, various co-factors and management factors.
- g. Define the role of the sow herd in an outbreak
 - i. In a cleanup program
 - ii. Identify the criteria for determining when an unaffected farm should begin vaccination (geospatial factors, when undertaking “risky” practices, cost-benefit in an unaffected farm)
- h. Define the duration of PCV2A and PCV2B infection and the ability to be transmitted when:
 - i. Young pigs are infected.
 - ii. When older pigs are infected.

3) Pathogenesis

- a. Develop tools for pathogenesis research, including source of PCV1-and PCV2-negative pigs (all ages), reproducible disease model, and technology to look for other agents.
- b. Conduct classical pathogenesis studies in conventional pigs to investigate :
 - i. Role of PCV2A and PCV2B in PCVAD—Determine which genotype is more strongly associated with PCVAD
 - ii. Investigate the role of concurrent PCV2A&B infections—Determine if dual genotype infection with PCV2 results in more severe disease than infection with a single genotype
- c. Determine variability in disease expression due to host variation, ie, genotype-phenotype, age-parity, management, and gender.
- d. Determine the role of PCV2 in vertical transmission:
 - i. The frequency of vertical transmission
 - ii. If it is constant or changing as a function of the PCV2 genotype and antibody status of the breeding herd
 - iii. Semen transmission in PCVAD—viral loads and frequency and identification of contaminated semen.
 - iv. Effect of sow/gilt exposure to PCV2
- e. Characterize diseases caused by PCV2 and selected co-factors:
 - i. Does co-infection with specific co-factors result in a specific disease syndrome—PCVAD model systems to investigate include: PDNS, Shaker Pigs, PRDC, PMWS—agents to investigate include: PCV2A & 2B, PRRS, Teschovirus, Parvovirus, others.

4) Diagnostics

- a. Develop standardized diagnostic tools for use the diagnostic laboratories in North America. Tools and Tests include:
 - i. Tissue Culture adapted PCV2a, and PCV2b,
 - ii. Monospecific polyclonal and monoclonal antibody,
 - iii. Standardized differential and real time PCR,
 - iv. Standardized IFA and serum neutralization serology,
 - v. Quantitative DIVIA Antibody ELISA

- b. Determine when pigs stop shedding, especially focusing on detecting the carrier state in gilts and boars.
- c. Develop protocols for monitoring boar studs and breeding herd, especially for the purpose of producer surveillance and import criteria.
- d. Define and quantify serological profiles to address clinical expectation by investigating timing of infections and vaccinations.

5) Prevention and Treatment

- a. Investigate the relationship of maternal/passive antibody and:
 - i. Vaccination interference—Determine if high levels of maternal antibody interfere with vaccination
 - ii. Investigate how much antibody variation exists in the breeding herd and how this might impact maternal antibody transfer
 - 1. Determine if that variation is a function of parity
 - 2. Determine if it would be beneficial to have the same level of antibody in the breeding herd
 - iii. Cross serotype/genotype infection—Investigate if maternal antibody have the same “protective” effect on PCV2A and PCV2B (i. e. does one virus get in and infect baby pigs sooner than the other one in pigs that have the same levels of passive antibody)
 - iv. Determine if passive antibody against one genotype promotes infection at a younger age with the other genotype
 - b. Vaccine composition—Determine if PCV2B based vaccine better than a PCV2A based vaccine in the face of PCV2B infection.
 - c. Determine vaccine efficacy in the face of PCV2 and cofactors.
 - d. Determine the most effective truck and facility decontamination procedures to reduce or eliminate PCV2 from the environment.
 - e. Investigate ability to produce PCV2 negative pigs from positive herds. If possible, determine ramification of repopulating with PCV2 negative pigs.
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D. PORK SAFETY

1. Pre-harvest reduction of pathogens with potential public health significance.

Pre-harvest food safety research for the following agents or pathogens should include the areas of epidemiology, pathogenesis, prevalence, on-farm risk factor management, monitoring and measurement, and/or intervention or control strategies. Funding limit is \$40,000 per project. A larger funding request may be considered if appropriate justification is given, especially for farm level trials with numerous replicates. Researchers are encouraged to find matching funds or work on collaborative projects. Novel approaches and concepts are encouraged even if they do not fit into a specific priority area. Salmonella research is the top priority for the industry. Specific topics of interest with regard to Salmonella and other pathogens are described below (please note that these are **not** in priority order):

- Development and evaluation of enumerating Salmonella before and after interventions to find out their effectiveness.
- Risk assessment model development to quantify the relationship between on-farm prevalence of Salmonella and other zoonotic pathogens to the risk of human illness.
- Development and evaluation of evolving molecular, and other, diagnostic tools and monitoring techniques that can be used in epidemiological investigations.
- Develop strategies for data collection and data management to predict the need for application of interventions to reduce Salmonella prevalence to an acceptable level.
- Test the impact of Salmonella lairage reduction programs on the amount of Salmonella found on the carcass or in the final product.
- Evaluation of dietary characteristics (feed form, dietary ingredients, antibiotic use, feed contamination levels, etc.) as a potential intervention strategy to reduce Salmonella prevalence.
- Study transmission rate of Salmonella within production systems, or barns, and by serotype or genotype.
- Toxoplasma, Campylobacter and Yersinia – specific topics of interest with regard to these pathogens are described below (please note that these are **not** in priority order):
 - Development of management and/or facility strategies for outdoor or bedded pigs to reduce the risk of these pathogens.
 - Identification of previously unrecognized risk factors for infection with these pathogens, and interventions to address those risks.
 - Controlled studies to determine the relative contribution of water sources on these pathogen infections in swine and effective interventions at the producer level.

2. Post-harvest reduction of pathogens with potential public health significance.

Post-harvest food safety research for the following agents or pathogens should include the areas of epidemiology, pathogenesis, prevalence, on-farm risk factor management, monitoring and measurement, and/or intervention or control strategies. Funding limit is \$40,000 per project. A larger funding request may be considered if appropriate justification is given, especially for farm level trials with numerous replicates. Researchers are encouraged to find matching funds or work on collaborative projects. Novel approaches and

concepts are encouraged even if they do not fit into a specific priority area. Salmonella research is the top priority for the industry. Specific topics of interest with regard to Salmonella are described below (please note that these are **not** in priority order):

- Development and evaluation of enumerating Salmonella before and after interventions to find out their effectiveness.
- Studies to increase the knowledge base of multi drug resistant (MDR) bacteria in pork and to determine their susceptibility to microbiological interventions.
- Expand knowledge of stress adaptation and cross protection of pathogens.
- Identification of sanitation procedures capable of preventing cross contamination with allergens.

3. Impact of production practices on carcass defects and physical hazards.

Research should include the areas of epidemiology, pathogenesis, prevalence, risk factor management, monitoring and measurement, and/or intervention or control strategies. Funding limit is \$40,000 per project. A larger funding request may be considered if appropriate justification is given, especially for farm level trials with numerous replicates. Researchers are encouraged to find matching funds or work on collaborative projects.

- Studies to determine the impact of alternate injection methods and/or techniques (such as hip injection or needle free injection systems) on carcass defects and/or physical hazards. Long term studies in sows and market hogs are desirable.
- Studies to determine the causes of, and farm-level interventions for, carcass defects such as abscesses and/or physical hazards