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E. FUNDING SOURCES FOR RESEARCH:

Boehringer Ingelheim Vetmedica (USDA NADC, Faaberg and Kehrli)- Characterization and Modification of PRRSV and PRRS Disease

Boehringer Ingelheim Vetmedica, (UMN)

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F. WORK PLANNED FOR NEXT YEAR

Objective 1. Elucidate the mechanisms of host-pathogen(s) interactions.

Immunity and pathogenesis (PRRSV):

1) To continue investigations of PRRSV evolution, structure and immunity(UMN)

2) To continue investigations on anti-IFN effect of PRRSV UMD, UNL, SDSU, UIUC)

3) PRRSV non-structural proteins and their interactions with host-cell proteins(UCONN)

4) Type I IFN response in swine (UCONN)

5) Nsp2 mutants carrying immune-stimulators to enhance PRRSV-specific immune response, implications for vaccine (SDSU).

6) Pursuit of broadly neutralizing antibodies X PRRSV (UNL)

7) Pursuit of conserved T cell epitopes and their application to multi-epitope vaccines (UNL, UIUC)

8) In vivo analysis of engineered PRRSV(NADC)

9) Assessment of host response to different strains of PRRSV(NADC)

10) Continue to make progress on the characteristics of PRRSV immunity, including the role of genetics.(KSU)

11) Continue to study the role of macrophages and dendritic cells in PRRSV immunity.(KSU)

12) Develop a SCID model for investigating PRRSV immunity and pathogenesis.(KSU)

13) As part of to the Veterinary Immune Reagents Network (US VIRN) BARC will continue to develop immune reagents for the research community(USDA BARC)
14) Conferring homologous and heterologous protection X PRRSV by rTGEVs vectors (CNB-CSIC)

**Virus structure (PRRSV):**

1. Structural studies of PRRSV nonstructural protein 2 (NADC)

**Other emerging viral diseases:**

1. To continue investigations of mechanisms of PCV2 pathogenesis (UMN)
2. To collaborate with USDA APHIS on the NAHMS swine health survey to assess PCV2 status (UMN)
3. To continue with Influenza studies (UGA) some of them in co-infection with PRRSV (UGA)

**Objective 2. Understand the ecology and epidemiology of PRRSV and emerging viral diseases of swine.**

**PRRSV**

1) To assess the sustainability and cost-benefit of filtration as a means to reduce the risk of airborne viral spread between farms. (UMN)

2) To further investigate the role of PRRSV-contaminated slurry as a means of viral spread between farms. (UMN)

**Other emerging viral diseases:**

1. To continue investigations of influenza transmission dynamics. (UMN)
2. Surveillance in selected farms in South Dakota will be conducted comparing SIV sequences between people, swine and turkeys (SDSU)

**Objective 3. Develop effective and efficient approaches for detection, prevention and control of PRRSV and emerging viral diseases of swine.**

**Detection:**
1. Continued evaluation of on-site field testing for PRRSV will be conducted (SDSU)

2. Develop and test new PRRSV diagnostic microarray (USDA NADC)

3. New assays (cytokine FMIA, microarray and RNAseq analyses) will be used to produce more data on PHGC pig samples (USDA BARC)

**Prevention (PRRSV):**

1. We will continue to work on PRRSV host interaction and PRRSV vaccine development (SDSU)

2. Pursuit of an optimal DIVA Marker system for PRRSV MLVs (UNL, SDSU)

3. PRRSV diversity applied to characterization of heterologous protection (UWM, UIUC, UNL, SDSU)

4. Optimization of immunization X PRRSV infection by exploring nanoparticle-based platforms and potent mucosal adjuvants (Ohio)

**Control (PRRSV):**

UMN, and ISU

**Other emerging viral diseases:**

1. Continued development of FMIA for SIV vaccine evaluations (SDSU)