

PROTECTING THE NATION'S AGRICULTURE

The Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) Plum Island Animal Disease Center (PIADC) has been protecting the nation's agriculture against the accidental, natural, or intentional introduction of transboundary animal diseases (TADs)—including foot-and-mouth disease (FMD) and African swine fever (ASF)—for nearly 70 years. PIADC is the only federal laboratory in the nation that can conduct diagnostics and research using live FMD virus (FMDV) and live ASF virus (ASFV).

To execute its agricultural defense mission, PIADC operates as a partnership between DHS S&T, the U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS), and the USDA Plant and Animal Health Inspection Services (APHIS).

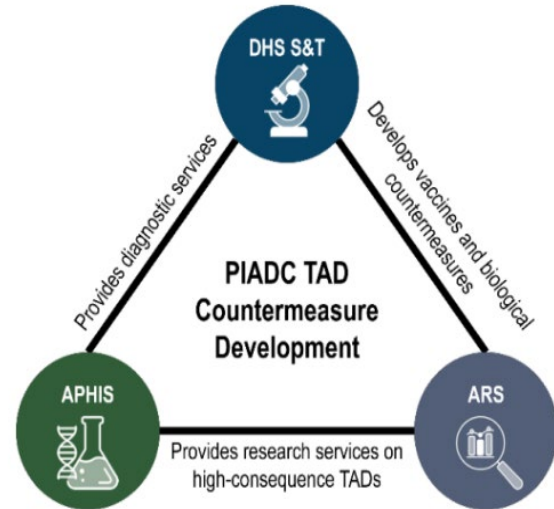


PIADC's mission is to protect U.S. agriculture by conducting countermeasure research on high-consequence livestock pathogens and foundational research for the veterinary community, and by providing essential diagnostics to the global community.

EXPERTISE IN AGRICULTURE DEFENSE

PIADC requires dedicated expertise and lab infrastructure to maintain modern capabilities for countermeasure development to support the DHS agriculture defense mission. PIADC's scientific subject matter experts (SMEs) serve the broader homeland security enterprise by:

- Performing advanced development of vaccines and other biological countermeasures to TADs



DHS S&T, ARS, and APHIS contributions to TAD countermeasure development

- Establishing cooperative research and development agreements (CRADAs) with global animal health biopharmaceutical companies, veterinary biotech, and animal agriculture industry stakeholders
- Filing and receiving U.S. Patent and Trademark Office (USPTO) patents related to TAD novel vaccine compositions, methods of production, and use

IMPACT – DEFENDING AGAINST TADS

Since 1956, PIADC has defended the nation against TADs—such as FMD and ASF—that cause food insecurity and impact export trade markets for animal products. While the U.S. has been FMD-free for almost 100 years, the cost of an outbreak could cost \$2 billion to \$200 billion.¹

ASF is a highly transmissible disease with mortality rate up to a 100 % in swine, and no licensed vaccines or effective disease treatments are currently available. Following a 2018 outbreak, China—a global leader in pork production—lost approximately 225 million pigs to the disease or to culling as a means to control the outbreak.² ASF outbreaks have now been reported in over 50 countries, including most of Asia and, most recently, Haiti and the Dominican Republic. The U.S. pork industry is one of the largest pork exporters globally, exporting around a fourth of its pork products annually.³ While the United States has never had a case of ASF, a domestic outbreak

would significantly impact its ability to export pork, and efforts to control a disease outbreak could cost billions.

PATENTS RELATED TO TAD VACCINES

PIADC research and development (USDA and DHS) has resulted in numerous patents granted by the USPTO. In 2018 alone, PIADC scientists received six USPTO-granted patents, and there are currently several patents pending.



PIADC scientists conduct research to protect the nation's agriculture against the threat of TADs

PIADC inventions support more efficient production of next generation, molecular-based FMD vaccines, including more rapid manufacturing for novel, emerging FMD strains. By following this blueprint, other scientists may be able to create animal or human vaccines against diseases caused by picornaviruses in a fraction of the time it takes now.

INDUSTRY PARTNERSHIPS AND CRADAS

PIADC has established agreements with industry partners for FMD and ASF vaccine development. In 2019, PIADC fulfilled an agreement with the National Pork Board to evaluate commercial disinfectants to decontaminate surfaces contaminated with ASFV and entered into an agreement with MatMaCorp for evaluation of a field-deployable ASFV test.

In 2020, PIADC and MatMaCorp successfully conducted a laboratory evaluation of a field-deployable genetic test to detect ASFV in infected pigs and pork products.

MatMaCorp's device detected ASFV in clinical tissue samples obtained from ASFV-infected laboratory pigs. As ASF continues to rapidly spread in many parts of the world, this

field-deployable technology can help respond to the threat posed by accidental, natural, or intentional introduction of ASF in the U.S.

ESTABLISHED ASF TASK FORCE

In response to ASF's increasing global threat, PIADC established an interagency ASF Task Force. To date, it has met its primary objectives, including:

- Performing advanced development of vaccines and other biological countermeasures to TADs
- Improving diagnostic test surge capacity to support national surveillance and outbreak response
- Increasing national preparedness and response
- Evaluating commercially available disinfectants to determine their efficacy to decontaminate ASFV-contaminated surfaces
- Fast-tracking development and scale-up production of an emergency-use ASF vaccine

ASF MASTER QUESTIONS LIST

In 2021, as a result of significant contributions from PIADC SMEs, the S&T Probabilistic Analysis for National Threats Hazards and Risks Program and the S&T Hazard Awareness & Characterization Technology Center published an [ASF Master Questions List \(MQL\)](#), which is intended to:

- Quickly present the current state of available information to government and industry stakeholder decision-makers during a possible operational response to an ASF outbreak
- Allow structured and scientifically guided discussions across the federal government and industry stakeholder decision-makers without burdening them with the need to review scientific reports
- Prevent duplication of efforts by highlighting and coordinating ASF research

The MQL will undergo periodic updates to ensure it remains current.