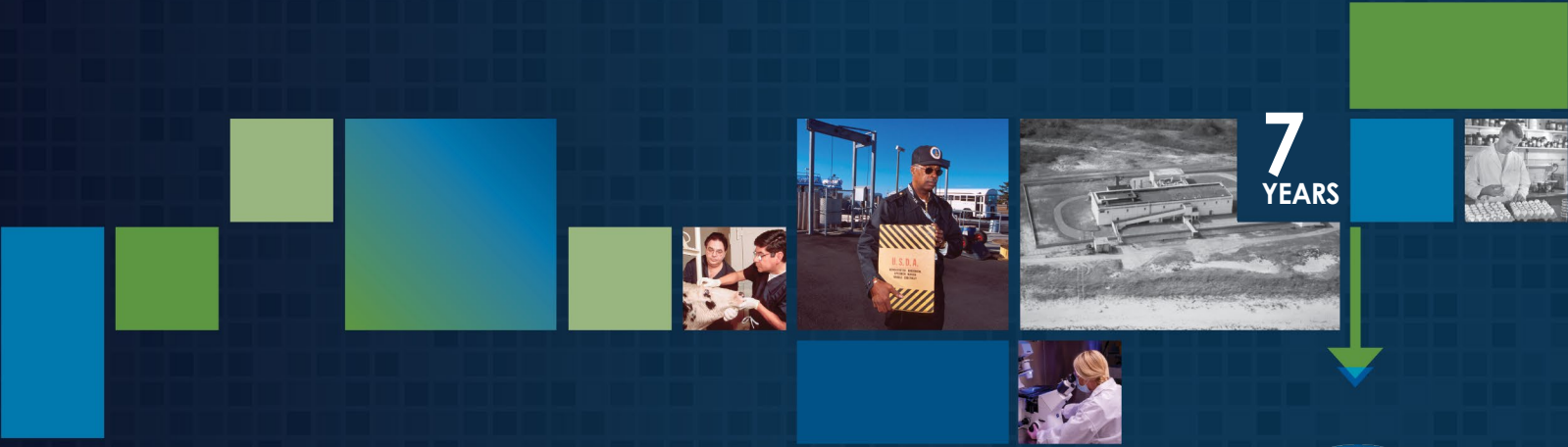




# Science and Technology



## Major Contributions from the Plum Island Animal Disease Center (1954–2024)




- 2023** The U.S. Department of Homeland Security (DHS) Science and Technology Directorate's (S&T's) Plum Island Animal Disease Center (PIADC) Science group publishes a peer-reviewed journal article on the evaluation of whole-carcass composting as a mortality disposal option for African swine fever virus (ASFV)-infected swine. Composting is an important consideration in developing localized outbreak response and recovery plans.
- 2023** U.S. Department of Agriculture (USDA) Agricultural Research Service (ARS) scientists collaborate with colleagues from Vietnam to develop the first two commercially available vaccines to protect against African swine fever (ASF). The vaccines, NAVET-ASFVAC and AVAC ASF LIVE, are based on the live attenuated strain of the ASFV that was originally developed at PIADC by USDA ARS in 2015.
- 2023** DHS S&T's PIADC Science group publishes a peer-reviewed journal article on the evaluation of DNA vaccine candidates against foot-and-mouth disease (FMD) virus in cattle. Although the experimental DNA vaccine candidates alone were unsuccessful in conferring protection against FMD, results suggest that DNA plasmid vaccines may enhance the immune response to other types of FMD vaccines.
- 2022** USDA ARS announces that a vaccine candidate for ASF passed an important safety test required for regulatory approval, moving the vaccine one step closer to commercial availability.
- 2022** The DHS S&T PIADC Science group awarded more than \$700K for two Cooperative Research and Development Agreements with the National Pork Board and Swine Health Information Center to conduct research on the environmental stability of ASFV in soybean-based feed ingredients and manure slurries.
- 2021** In response to an outbreak in the Dominican Republic, the DHS S&T PIADC Science group contributes to the development of the ASF Master Question List, an up-to-date information clearinghouse that promotes coordinated research and better response planning, while reflecting the current state of ASFV research.



- 2021** USDA ARS announces that one of its ASFV vaccine candidates has been shown to prevent and effectively protect both European and Asian bred swine against the current circulating Asian strain of the virus.
- 2021** The DHS S&T PIADC Science group publishes its laboratory evaluation of MatMaCorp's portable ASFV detection system in the peer-reviewed journal *Transboundary and Emerging Diseases*.
- 2021** PIADC publishes research report "Inactivation of African Swine Fever Virus on Stainless Steel and Concrete with Commercial Disinfectants and Organic Acids," and as a result, two new disinfectant products receive U.S. Environmental Protection Agency (EPA) Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) registrations (Virocid ® FIFRA Section 3; Acetic Acid FIFRA Section 18) for use against ASFV during outbreaks.
- 2020** The USDA Animal and Plant Health Inspection Service (APHIS) Veterinary Services receives EPA Section 18 Quarantine Exemption for use of AeroDis 7127 by the airline industry.
- 2018** DHS S&T PIADC funds an interagency project with the National Institutes of Health/National Institute of Allergy and Infectious Diseases to evaluate a viral-vectored Henipavirus vaccine candidate in a successful proof-of-concept swine study using a Nipah virus challenge conducted at the Canadian Food Inspection Agency biosafety level 4 facility in Winnipeg.
- 2018** USDA ARS FMD-LL3B3D A24 Cruzeiro vaccine is removed from the United States' Select Agent Program regulations, representing a major step forward for the generation of safer FMD vaccines.
- 2018** DHS S&T PIADC leadership establishes the ASF Interagency Task Force—with representatives from DHS S&T and USDA—to increase interagency collaboration, coordination, and information exchange, and to pool interagency resources at PIADC to address the threat of ASF.
- 2017** A laboratory-based diagnostic test that differentiates infected from vaccinated animals (DIVA) receives a USDA product license for the FMD virus DIVA serology test manufactured in the United States. The test was co-developed by DHS S&T PIADC and Texas A&M scientists in collaboration with ARS and APHIS, and industry partner Veterinary Medical Research and Development.
- 2016** DHS S&T PIADC provides funding to the not-for-profit Transboundary Animal Biologics Inc. (TABI), resulting in TABI receiving the first ever USDA APHIS permittee license for the importation, distribution, and sale of Pestiporc Oral, an orally delivered vaccine for classical swine fever.
- 2016** DHS S&T PIADC scientists co-author their first peer-reviewed scientific publication on ASF, "Induction of Robust Immune Responses in Swine by Using a Cocktail of Adenovirus-Vectored African Swine Fever Virus Antigens."
- 2014** An interagency team of PIADC scientists from DHS S&T and USDA receive the Secretary's Exceptional Service Gold Medal—the highest service award granted by the Secretary of Homeland Security—for their seminal work contributing to the USDA licensure of the first molecular FMD vaccine for cattle.
- 2013** DHS S&T PIADC Science group completes the first successful studies in cattle and swine using an RNA-based FMD vaccine candidate.



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- 2013** DHS S&T PIADC funds an interagency agreement with ARS, resulting in Zoetis (formerly Pfizer Animal Health) receiving the first ever USDA APHIS conditional license for a Rift Valley fever cattle vaccine.
  - 2012** The world's first molecular vaccine for FMD, discovered by ARS scientists and developed by the DHS S&T PIADC Science group, receives a conditional license. This is the first regulatory-approved FMD vaccine that can be produced on the U.S. mainland.
  - 2011** DHS S&T PIADC provides funding to the not-for-profit TABI, resulting in TABI receiving the first ever USDA APHIS permittee license for importation, distribution, and sale of Bioaftogen, an FMD inactivated vaccine manufactured in Argentina.
  - 2011** DHS S&T PIADC provides interagency funding to USDA ARS for the development of proof-of-concept, rationally designed, live attenuated ASF vaccines.
  - 2010** DHS S&T PIADC Science group and USDA ARS publish their first jointly authored, peer-reviewed scientific publication, "Adenovirus serotype-5 vectored foot-and-mouth disease subunit vaccines: the first decade."
  - 2009** DHS S&T PIADC Science group and the Animal Resource Branch collaborate to complete the largest ever single PIADC cattle study, which evaluated an FMD vaccine candidate in 50 cattle.
  - 2008** DHS S&T PIADC provides funding to the first ever FMD vaccine licensing study in livestock conducted on the U.S. mainland.
  - 2008** DHS S&T PIADC provides interagency funding to USDA ARS for ASFV laboratory technique training, allowing ARS to restart an ASF research program at PIADC four years after ARS terminated its ASF research program in 2004.
  - 2007** DHS S&T PIADC Science group conducts the first successful study showing that a viral-vectored FMD vaccine candidate protects against FMD using a contact challenge model.
  - 2007** USDA ARS scientist Dr. Marvin Grubman receives the USDA Secretary's Honor Award for contributions toward the development and licensure of the world's first molecular FMD vaccine for cattle.
  - 2006** DHS S&T PIADC Science group conducts the first successful set of cattle viral-vectored FMD vaccine candidate studies with an industry partner.
  - 2006** DHS S&T PIADC executes the first contract with an industry partner GenVec, resulting in the publication of subsequent journal articles in 2010 and 2015.
  - 2005** DHS S&T PIADC launches the U.S. Department of Energy's Oak Ridge Institute for Science and Education (ORISE) program and appoints the first ORISE scientist to train at PIADC.
  - 2005** USDA ARS scientists are recognized by the Federal Laboratory Consortium for Technology Transfer for the invention of a special lancet for drawing blood from laboratory mice. The lancet allows investigators to draw blood with very little pain to the animal.
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- 2005** DHS S&T PIADC Science group completes their first seven FMD vaccine candidate cattle studies.
  - 2004** DHS S&T stands up the PIADC Science group comprised of federal staff and science contractor support.
  - 2003** Rapid real-time polymerase chain reaction assays are developed and evaluated for their ability to detect minute quantities of virus in animals prior to the onset of clinical symptoms.
  - 2002** USDA ARS creates a non-replicating adenovirus engineered to produce empty capsids of FMD virus. This new vaccine is non-infectious to livestock, and one dose protects swine within days.
  - 2002** The Homeland Security Act of 2002 transfers ownership of PIADC from USDA to the newly formed DHS.
  - 1995** After five years of research, genetic engineering developments allow for cDNA clones of FMD virus to produce non-infectious empty capsids, identify virus binding sites on cells, identify antiviral compounds for FMD, and develop new vaccine technology based on non-infectious but native virus materials.
  - 1992** After nearly 30 years of research, researchers from USDA develop a thermostable rinderpest vaccine that was vital to the worldwide eradication of the disease. Unlike its predecessor, PIADC's vaccine was inexpensive, required no refrigeration, and appeared to confer immunity to calves as well as adult cattle.
  - 1984** The USDA APHIS team assumes control of diagnostic work at PIADC.
  - 1983** The USDA ARS team definitively identifies FMD virus proteins through genome sequencing.
  - 1981** USDA ARS leads the first demonstration of an effective vaccine for a viral disease in man or animals based on a vaccine protein produced in *E. coli* by genetic engineering methods.
  - 1979** USDA ARS develops technology to store FMD vaccine antigen as a frozen concentrate, providing the ability to stockpile antigen in a vaccine bank. A U.S. Patent was awarded for FMD vaccine based on the use of non-infectious virus coat protein VP1.
  - 1971** The USDA Foreign Animal Disease Diagnostician training school is initiated.
  - 1970** USDA ARS develops and tests vaccine adjuvants, providing better vaccine protection of swine against FMD.
  - 1967** USDA ARS scientists recognize the involvement of viral RNA polymerase enzyme in virus replication.
  - 1966** The USDA ARS team discovers the virus infection associated antigen and its use in a diagnostic test to determine if animals have been infected with the FMD virus.
  - 1963** The USDA ARS team purifies FMD virus, and its chemical structure is determined.
  - 1956** The Plum Island Animal Disease Laboratory is inaugurated with new, fully operational laboratories at Building 101.
  - 1955** FMD virus from England is introduced into the Plum Island research program. Diagnostic capability for FMD is established.
  - 1954** The USDA acquires Plum Island from the U.S. Army and establishes PIADC under the administration of ARS.
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