Report on Global African Swine Fever Research Alliance 3rd Research Coordination Meeting

Ploufragan France Sept 2016

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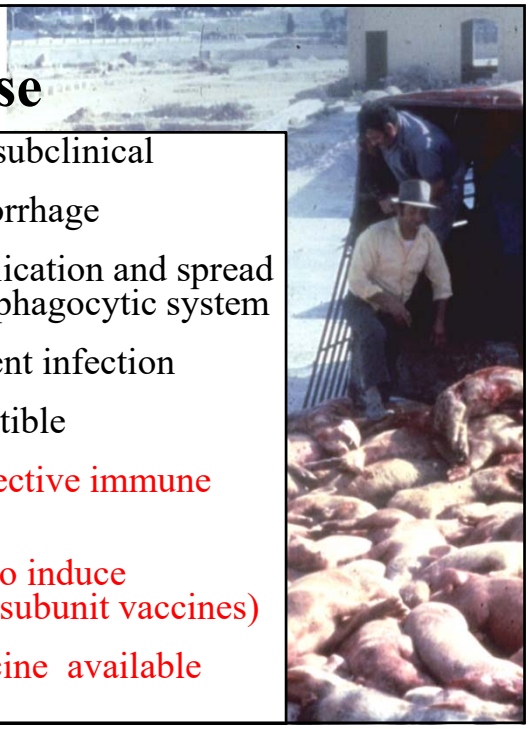
USAHA-2016

African Swine Fever (ASF) Virus

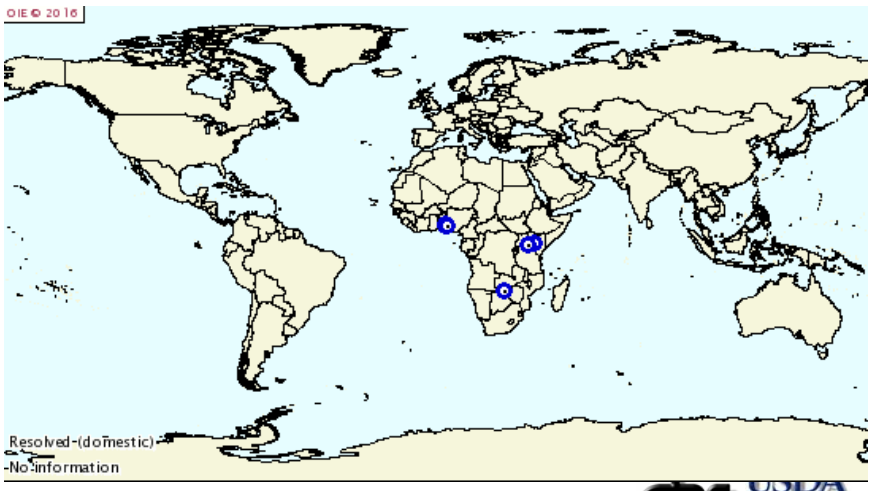
- **Only member of the Asfarviridae family**
- **Causes a lethal hemorrhagic disease in domestic pigs**
- **Large, icosahedral, double-stranded DNA virus**
- **Linear dsDNA genome170-190kb**
- **Contains 150+ genes**
- **Initial cellular target is Macrophages**
- **Currently there is no commerically available vaccine**

ASF: The Disease

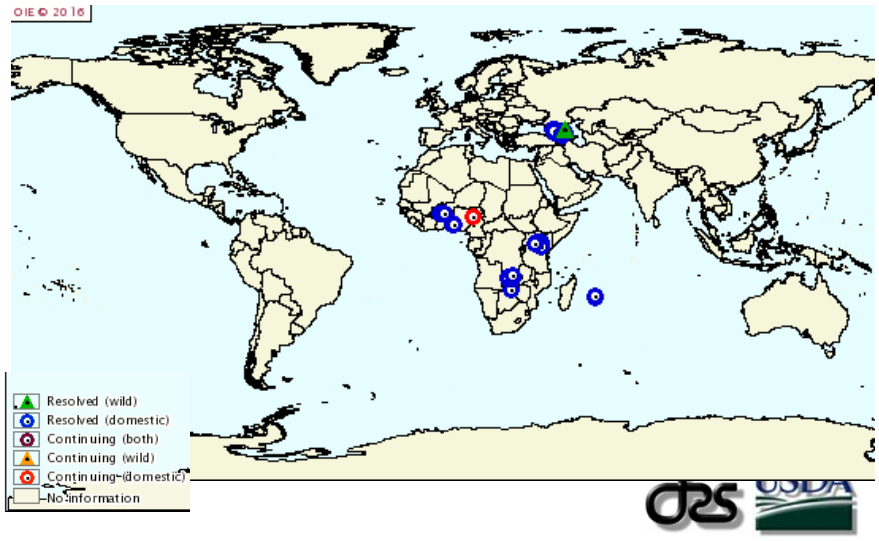


- Highly lethal (100%) to subclinical
- Edema, ascites and hemorrhage
- Virulence associated replication and spread within the mononuclear-phagocytic system
- Long-term persistent/latent infection
- All domestic pigs susceptible
- No identification of protective immune mechanism
- No virus protein shown to induce protective immunity (no subunit vaccines)
- No Live Attenuated Vaccine available

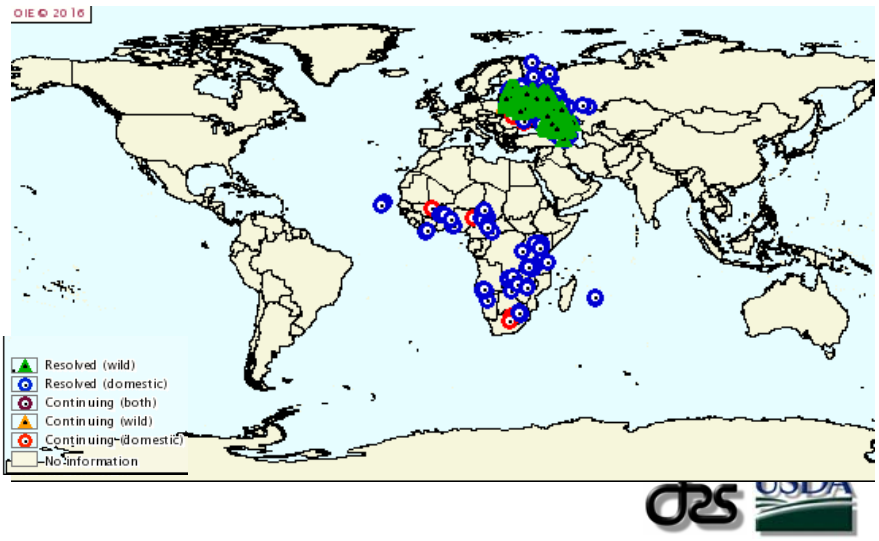
Dec 2006



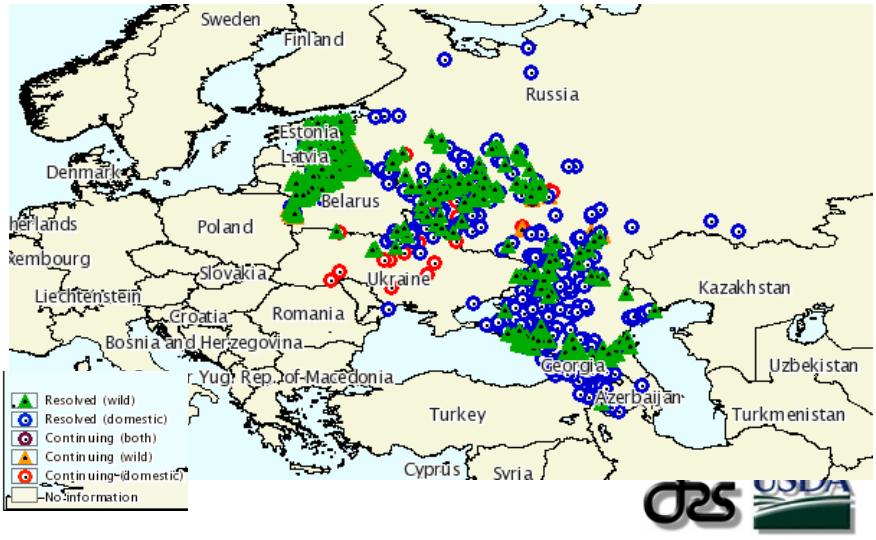
Dec 2007



2005-2016



June 2016



ASFV Research Program at FADRU

Develop intervention strategies to control ASF virus by identifying virus-host determinants of virulence and transmission and applying this knowledge toward the development of candidate ASF vaccines that are efficacious against the most prevalent ASF strains (i.e. Georgia).

- **Development and standardization of a challenge model to assess ASFV virulence and test efficacy of vaccine candidates**
- **Comparative studies of early pathogenesis events in swine during infection with highly virulent and attenuated ASFV strains using a natural route of infection.**
- **Identification of immune mechanisms mediating protection induced by experimental live attenuated vaccine strains.**
- **Functional Genomics and development of ASFV experimental vaccines**

INTERNATIONAL COLLABORATIONS ARE CRITICAL TO UNDERSTAND AND CONTROL ASF!

Vision and Mission of GARA

First GARA Meeting April 2013

Vision:

- A coordinated global research alliance enabling the progressive control and eradication of ASF.

Mission:

- To establish and sustain global research partnerships that will generate scientific knowledge and tools to contribute to the successful prevention, control and where feasible, eradication of African Swine Fever.

Global African Swine Fever
Research Alliance

GARA Strategic Goals

- **Goal 1.** Identify research opportunities and facilitate collaborations within the Alliance
- **Goal 2.** Conduct strategic and multi-disciplinary research to better understand ASF
- **Goal 3.** Determine social and economic drivers and impact of ASF
- **Goal 4**. Develop novel and improved tools to support the prevention and control of ASF
- **Goal 5**. Determine the impact of ASF prevention and control tools
- **Goal 6.** Serve as a communication and technology sharing gateway for the global ASF research community and stakeholders

Membership

- Any organization interested in enabling the GARA vision and mission is encouraged to join the alliance! Contact: Cyril.Gay@ARS.USDA.GOV
- There are three membership options:
  1. GARA Partner. ASF research organization that has signed the GARA Memorandum of Understanding
  2. GARA Collaborator. Organization that collaborates on a research project with a GARA member
  3. GARA Stakeholder. Organization that benefits, shares , or supports the GARA mission

GARA

- **GARA Partners**
  - 35 partners have signed the GARA MoU

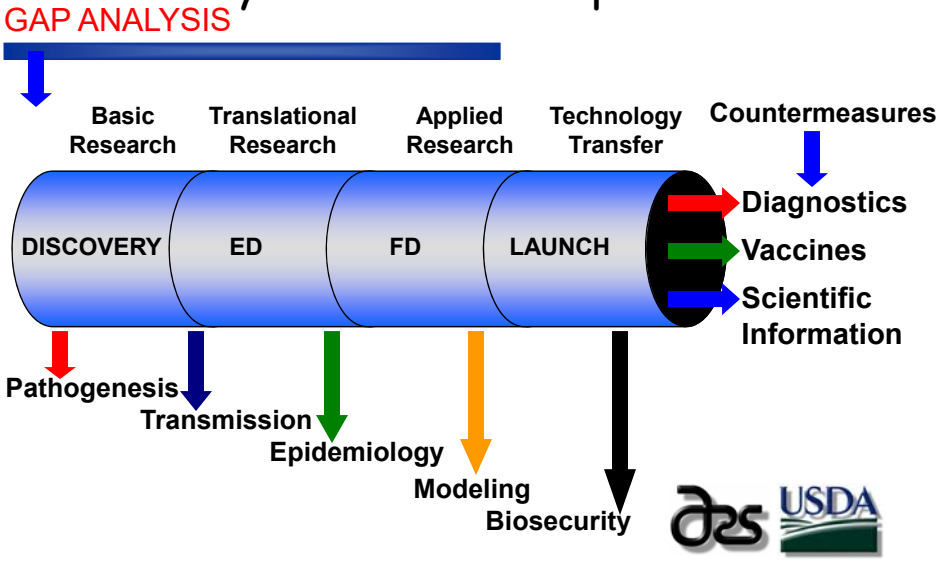
- **Stakeholders**
  - STAR-IDAZ, AU-IBAR, Merial, Harrisvaccines, Aptimmune Biologics, Zoetis Animal Health
- **GARA collaborators**

GARA Executive Committee

- **President (2016-2018)**
  Marie-Frederique LePotier, ANSES, France
  marie-frederique.lepotier@anses.fr
- **Chief Executive**
  Covadonga Alonso, INIA, Spain
  calonso@inia.es
- **Science Director**
  Sandra Blome, FLI, Germany
  sandra.blome@fli.de
- **Finance Director**
  Charles Masembe, Makerere University, Uganda
  cmasembe@cns.mak.ac.ug
- **Executive secretary**
  Cyril Gay, USDA, Agriculture Research Service, United States
  Cyril.Gay@ARS.USDA.GOV

GARA
Global African Swine Fever Research Alliance

The research pipeline: why research is important



GAP ANALYSIS

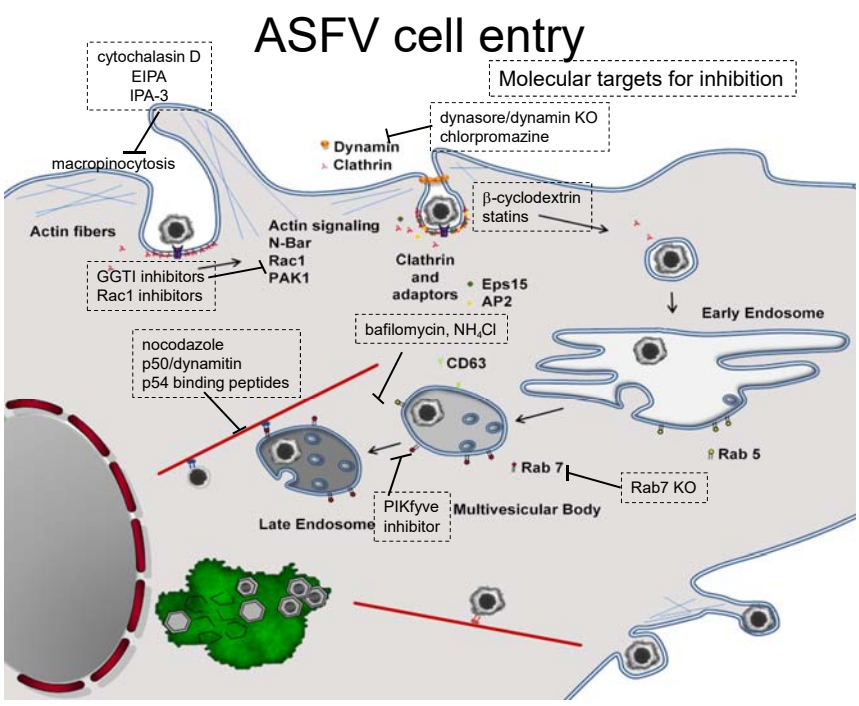
1. Lack of knowledge in the mechanisms of protection involving experimental vaccines
2. Lack of information on neutralizing epiptopes in viral protein
3. Lack of knowledge of cellular immune response
   - Specific cell types involved in inducing an immune response
   - Cell types involved in long term protection
4. Lack of available full length sequence of field isolates
5. Lack of Host Cell Response Transcriptome
6. Lack of understanding virus-host interactions
7. Lack of knowledge natural transmission

Scientific Sessions

- Virology & Pathogenesis
- Vaccines and immune response
- Epidemiology focusing in Europe
- Epidemiology focusing in Africa
- Molecular Epidemiology & Diagnosis
- Poster Session
- Gap Analysis

Examples of research opportunities for countermeasure development

- Understanding virus-host interactions



Determinants of virulence

- Several ASFV genes have been identified both in European and African pathogenic isolates, with functions involving virulence and host range. These genes are important for ASFV virulence, but not sufficient, indicating that other viral determinants or combination must play significant roles in viral evasion.

Gaps

- To identify new virulence determinants.
- Differences in virulent and attenuated virus in specific genes.

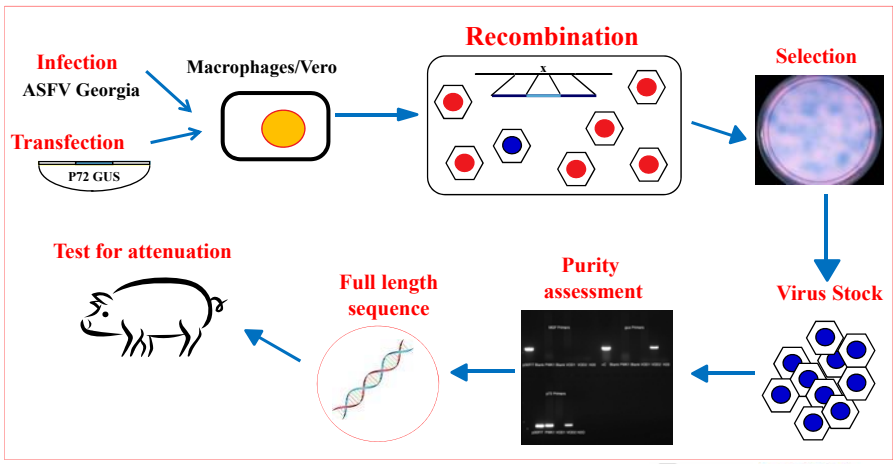
Research Priorities

-Generation of deletion mutants of individual viral genes and deletion mutants of more than one gene.

-Generation of recombinants mutants over expressing genes that modulate immune response.

-In vivo experiences with recombinants virus.

Gene deleted recombinant ASFV strain Georgia vaccine candidates



http://www.ars.usda.gov/GARA/

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Thank you!

GARA Communication: Web Site

- Website
  - Established and maintained by ARS
    http://www.ars.usda.gov/GARA/
  - Links to all member institutes web sites
  - Lists of collaborations and scientists'
  - Meeting reports

Fighting African Swine Fever Together