The paradoxical survival of African Swine Fever by free-living wild boar

A molecular approach to understanding wildlife disease susceptibility

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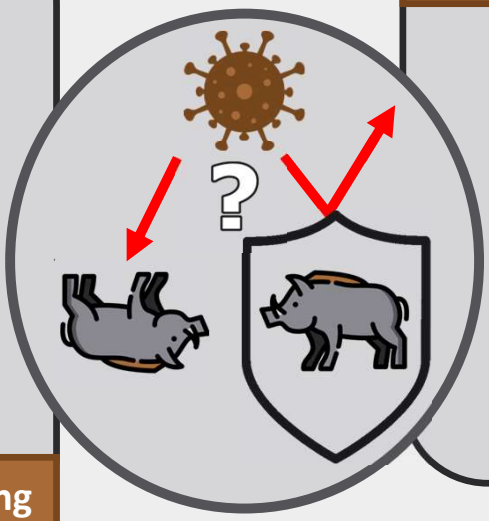
African Swine Fever (ASF)

- Arrived in Georgia in 2007
- ASF 100% lethal to pig and wild boar?
- Reports of **surviving wild boar**

Aim: Identify factors affecting survival of ASF by free-living wild boar



What causes variance in survivability to a disease?

1. Condition animal
   - Genetic load
   - Prior and current pathogens
   - Commensal microbes
2. Evolutionary immune strategy
   - Species and population:
     - Innate vs adaptive responses
       Or short-term vs long-term
       (Changes on genetic and expressional level)
3. Environmental conditions
   - Local climate
   - Food availability

Expectations

- High baseline investment in innate responses;
  - ASF is adept at avoiding the activation of the initial responses
- Observed as: differences in gene expression and genetic variants of innate immune genes

Proposed Experimental Set-up

= ♀, < 2y old, Non-pregnant Non-lactating

Experimental groups

- Belgium: n=35 Pre-ASF Epidemic vs n=35 Post-ASF Epidemic
- Latvia: n=40 Deceased vs n=40 Survivor
- Lithuania: n=10 Pre-ASF Epidemic vs n=10 Post-ASF Epidemic

Belgium:	*Eradicated ASF*
Latvia:	*ASF since 2014*
Lithuania:	*ASF since 2014*

Molecular Analyses

- Population genetics (VS)
- GWAS (A T VS C G)
- Transcriptomics Immune pathways
- Throat Microbiome: Species + Function

Assessed Factors

Belgium
- Genetic load, Bottleneck, drift, inbreeding

Belgium, Latvia, Lithuania
- Genes under selection for ASF survival

Lithuania
- Influence prior microbe interaction
- Regulation immune pathways

Succeeding experiments

Invasive Ranges → Naïve

Compare immune baseline

Afflicted countries (Europe)
VS
Naïve countries (invasive range)

Goal: Ability to predict naïve population susceptibility