



College of
Veterinary Medicine
UNIVERSITY OF GEORGIA

Avian Mycoplasma Control

- past, present and future?

Naola Ferguson-Noel, DVM, MAM, PhD

Eco Asia Poultry Online Conference 2021

Pathogenic Avian Mycoplasmas

- *M. gallisepticum*
- *M. synoviae*
- *M. iowae*
 - primarily turkeys
- *M. meleagridis*
 - turkeys



“We solved Mycoplasma a long time ago; there is no need for anything new”

Why is Control Important?...

- Clinical disease – pathogenic strains



Why is Control Important?...

- Vertical transmission

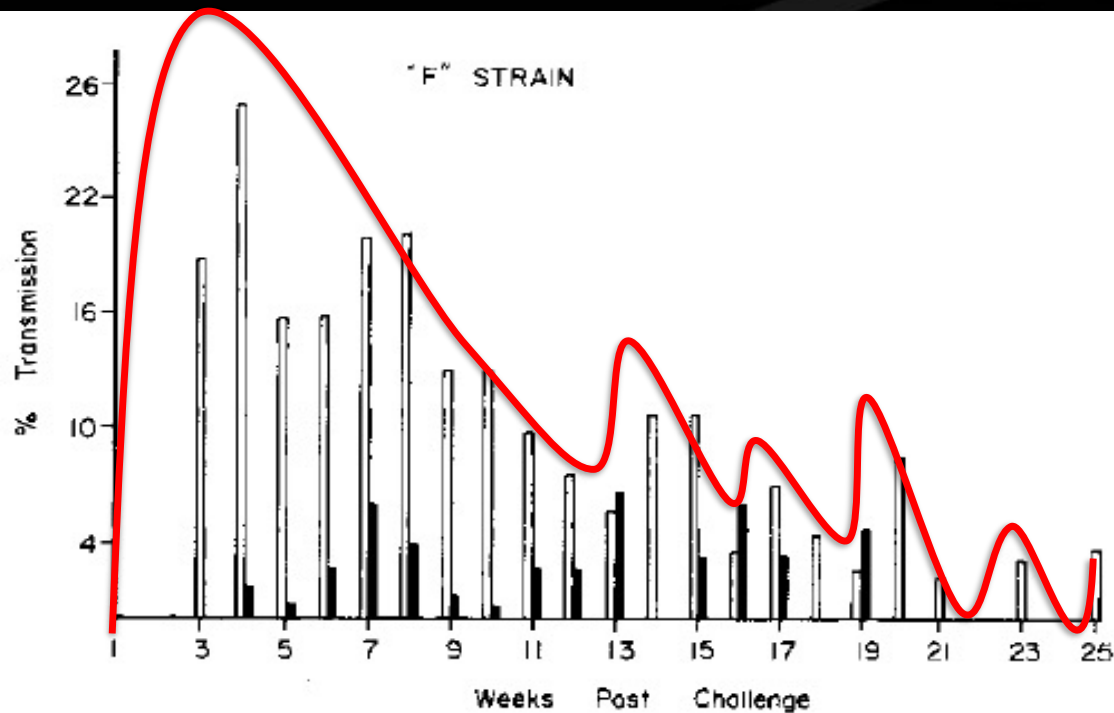
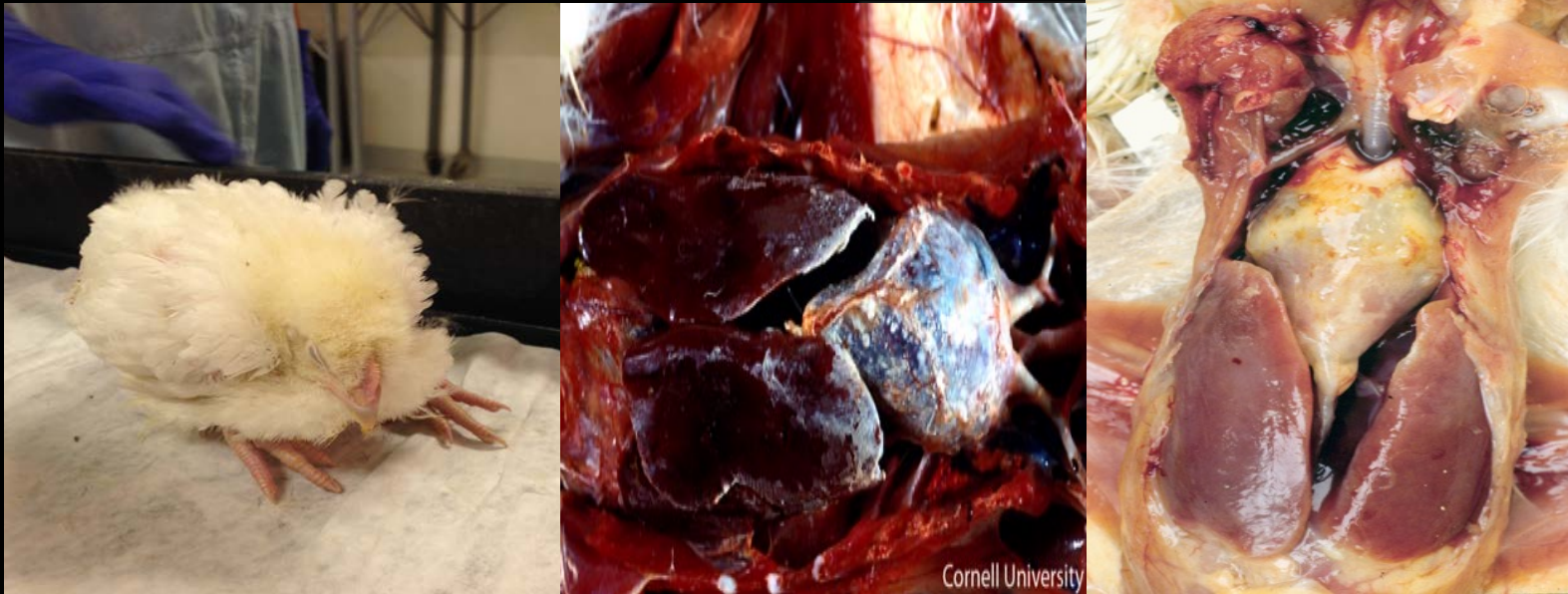


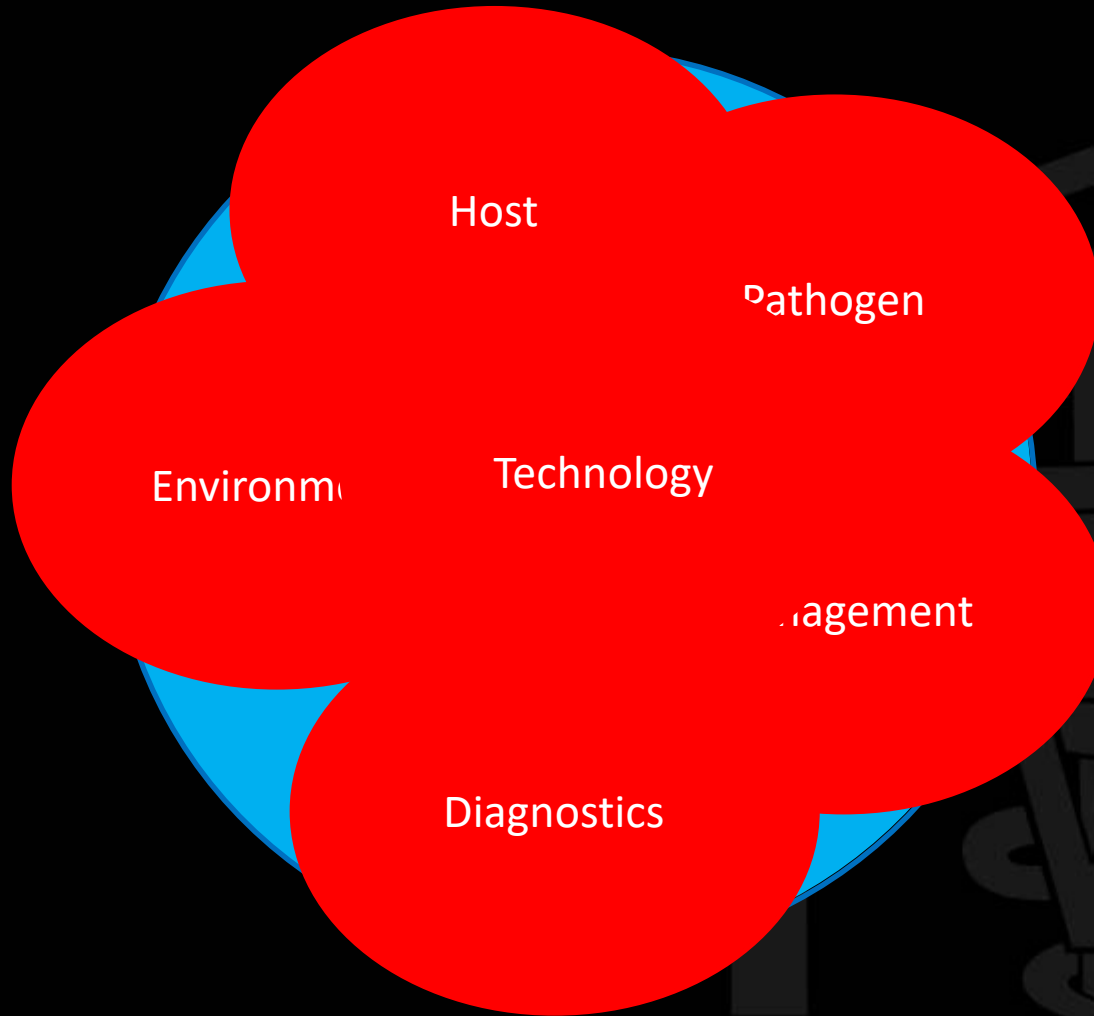
Fig. 1. Egg transmission of F-strain-vaccinated chickens (black bar) and unvaccinated controls (white bar).

Why is Control Important?...

- Disease complexes



Past, Present and Future



Current picture

- Industry struggles with decisions on controlling pathogens and disease
 - Avirulent strains
 - Antibiotics - resistance, “antibiotic-free”
 - Vaccines – safety, DIVA
 - Concurrent disease
 - Management and efficiency

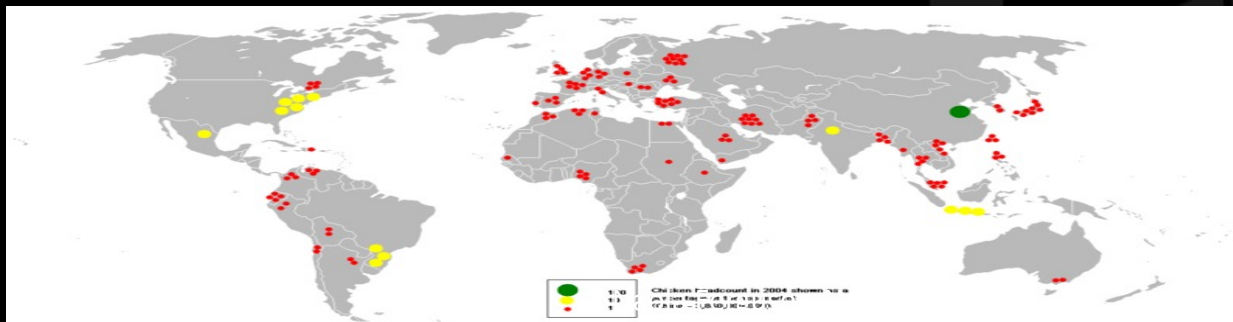
Approaches to Control

- Keep it out
 - Surveillance
 - Quarantine and Slaughter

- Live with it
 - Medication
 - Vaccines

Considerations

- Multiple age complexes
- Dense poultry populations (backyard flocks)
- Economics (export)
- Cooperation of industry
- Severity of disease/challenge



Control Options

- Biosecurity
- Eliminate Flock
- Quarantine/Isolate
- Treatment
- Vaccination



Control Options

Short Term

- Eliminate Flock
- Quarantine/Isolate
- Medication

Long Term

- Biosecurity
- Eliminate Flock
- Medication
- Vaccination

Avian Mycoplasma Diagnosis

- Serology - SPA, HI and ELISA
- PCR – conventional and real-time
- Culture



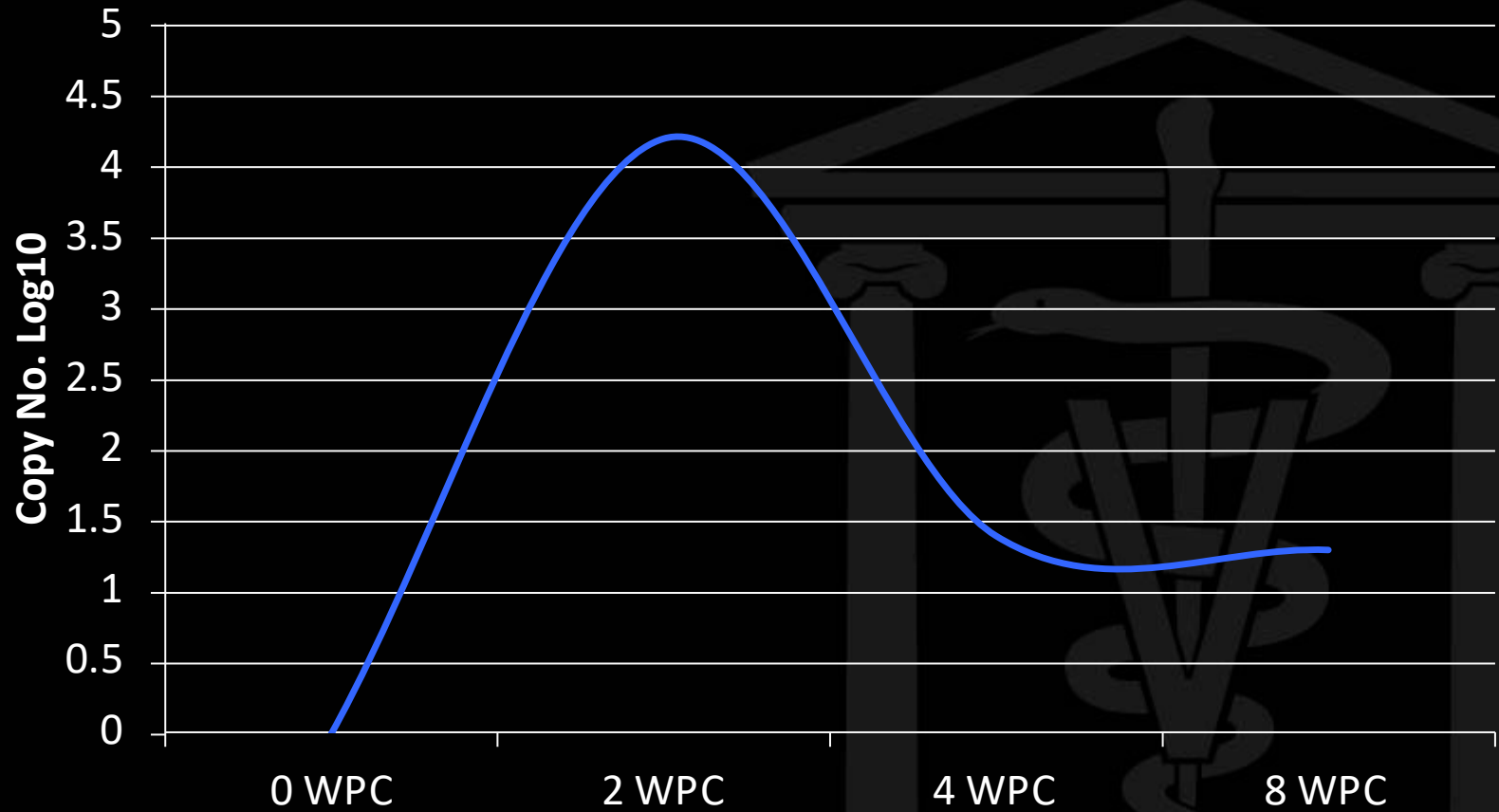
Polymerase Chain Reaction

- Several procedures available
 - Real time and conventional
 - Species specific
 - Strain specific

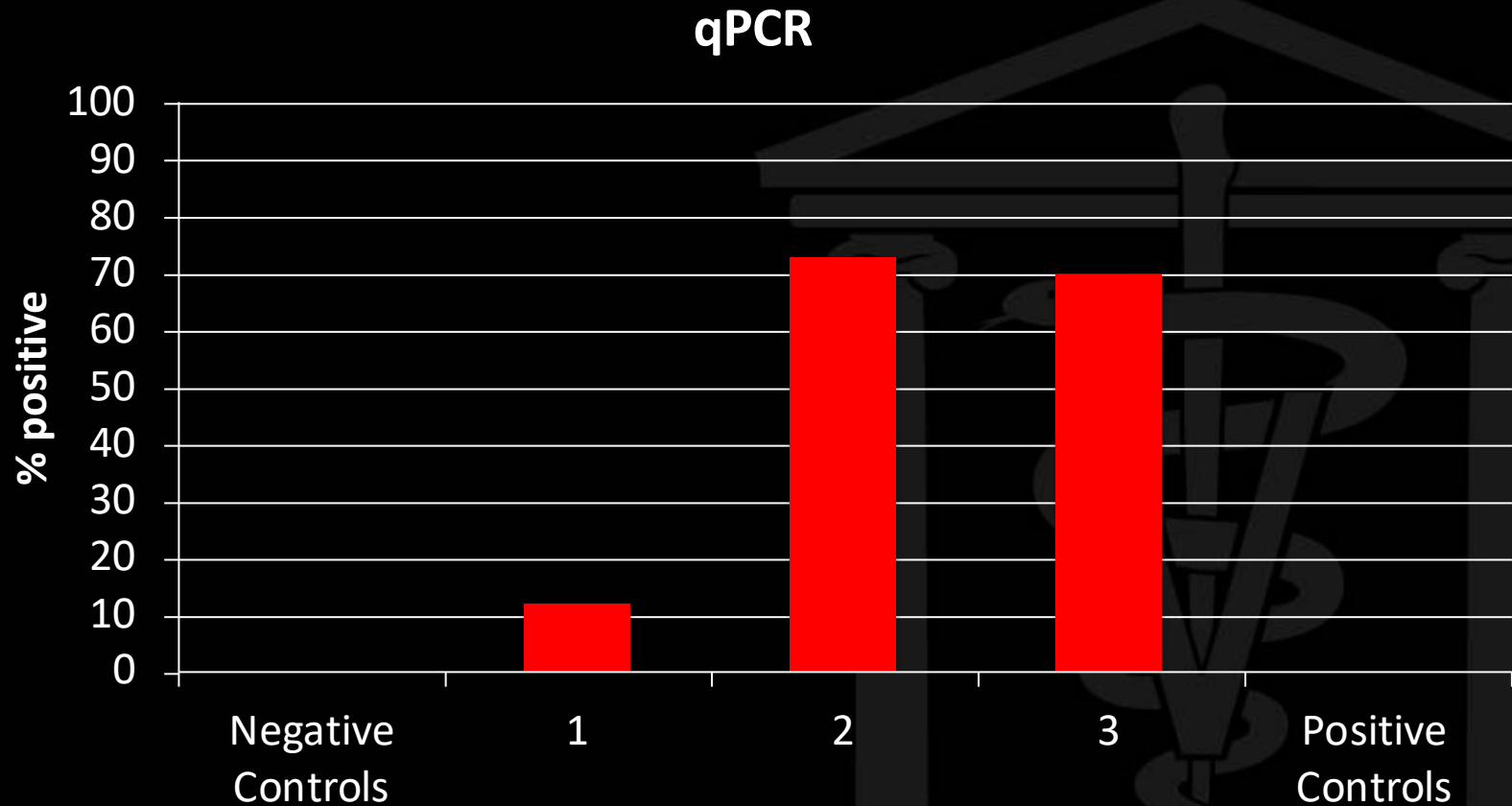
Polymerase Chain Reaction

- Surveillance
- Pre-vaccination screening
- Post-vaccination monitoring
- Effect of interventions (medication)

MG Replication



Variable Doses = Variable Protection

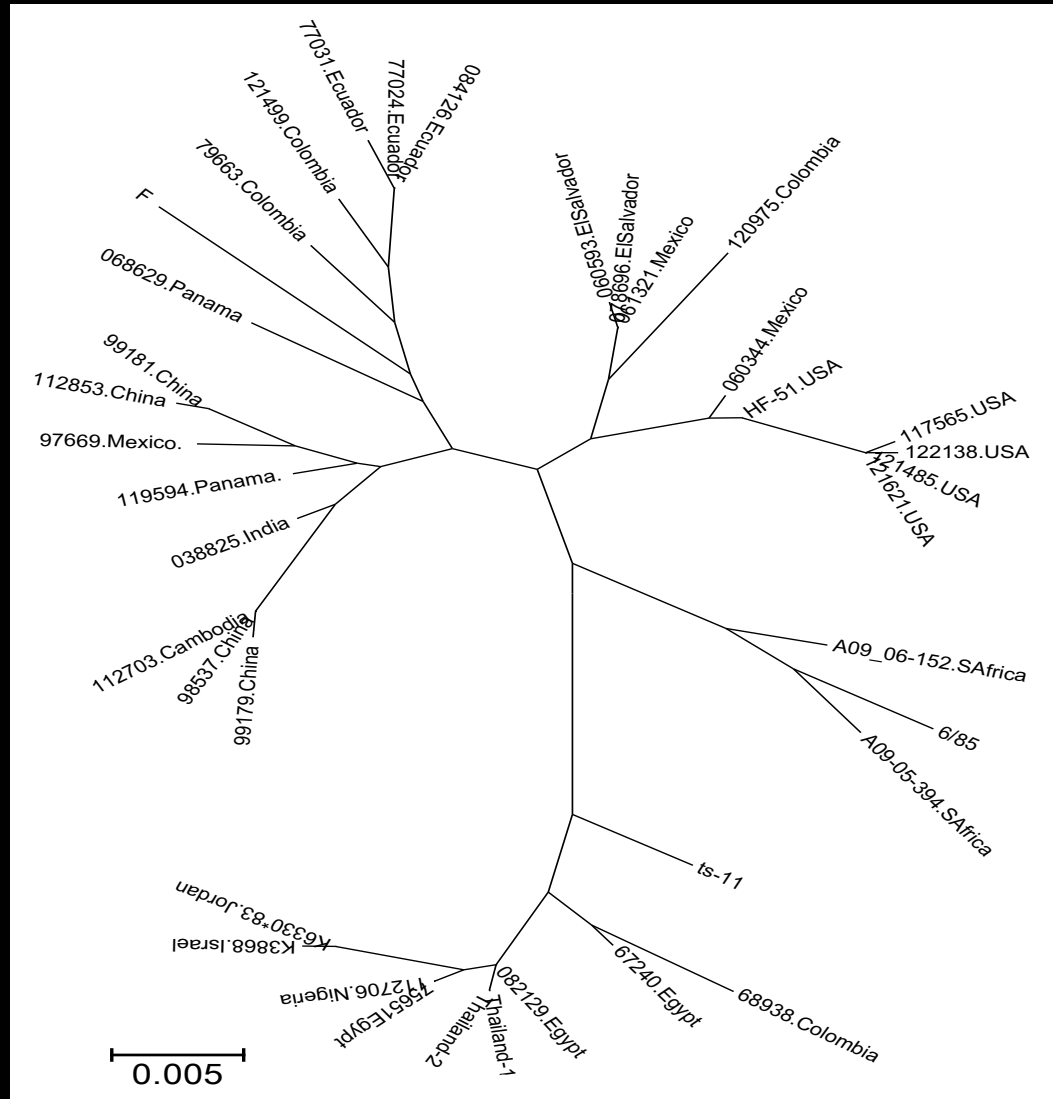


Strain Typing

- Gene Targeted Sequencing (GTS)
 - *mgc2* and IGSR for MG
 - *vlhA* for MS
- Epidemiology
- Vaccine Monitoring

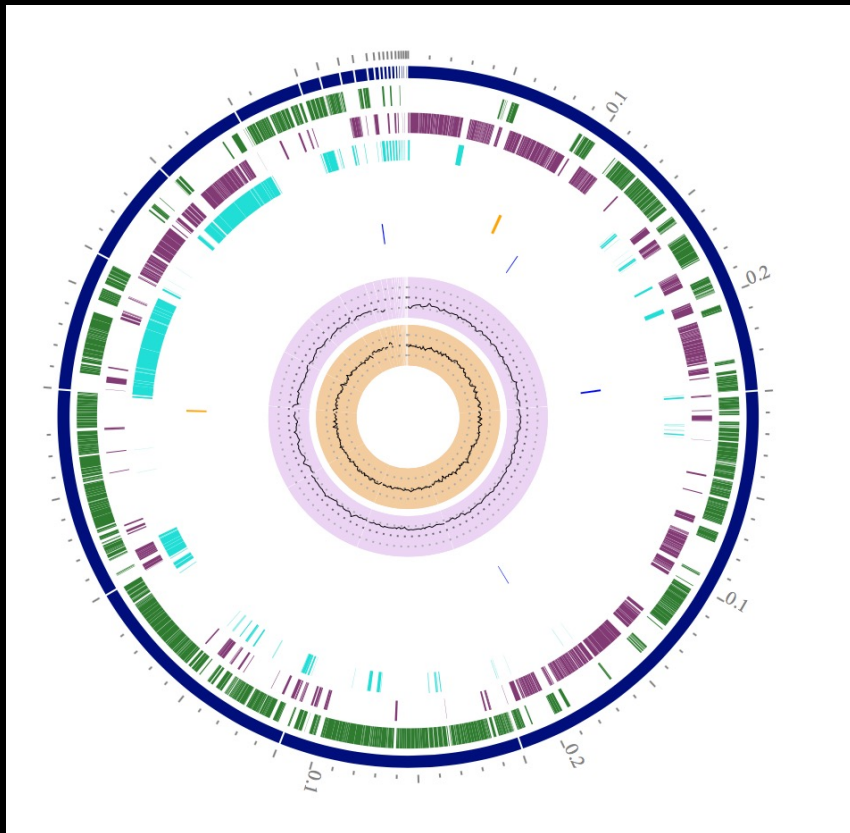


MG Sequencing



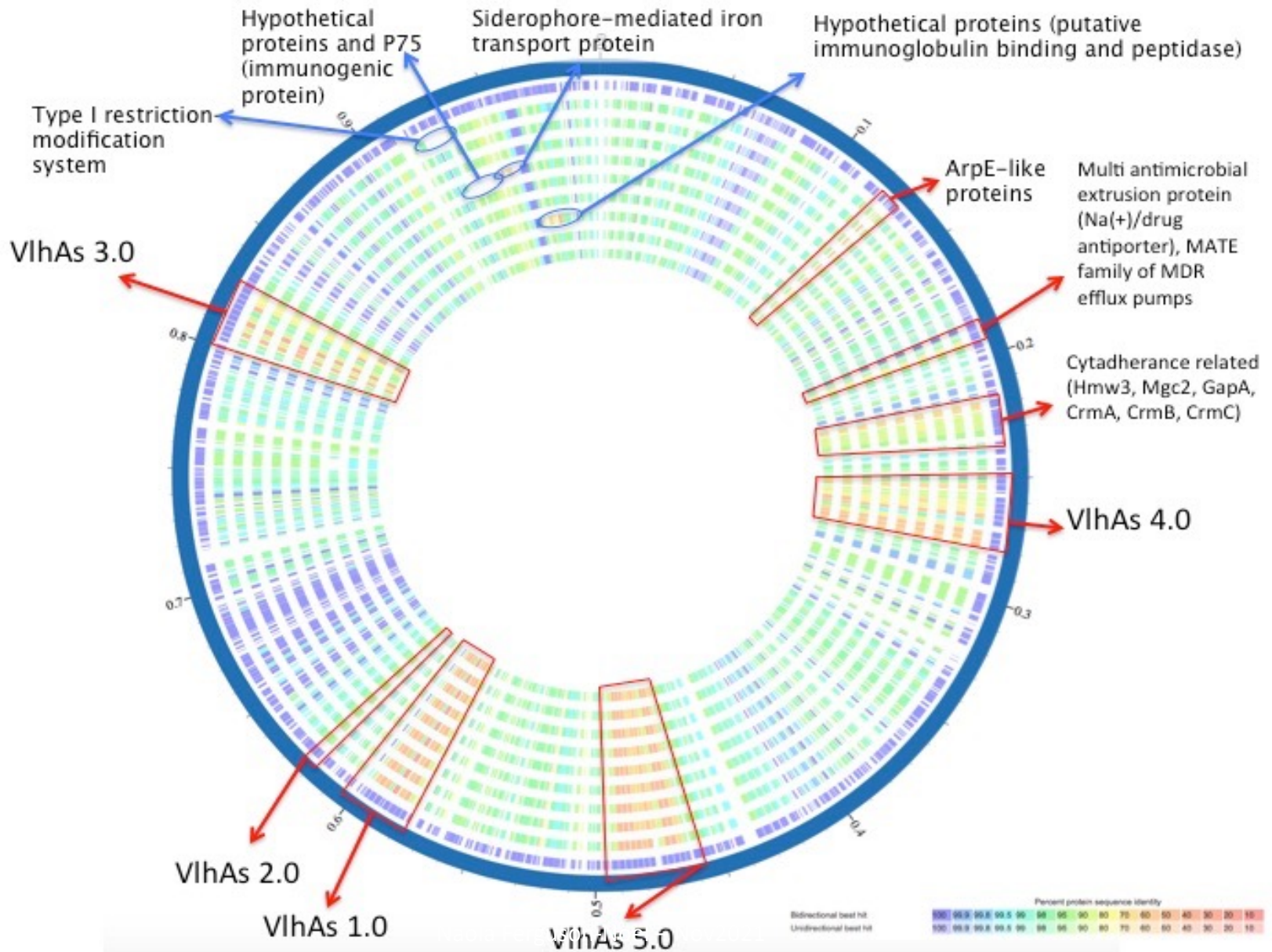
Mycoplasma Genomes

K6632A F-strain isolate

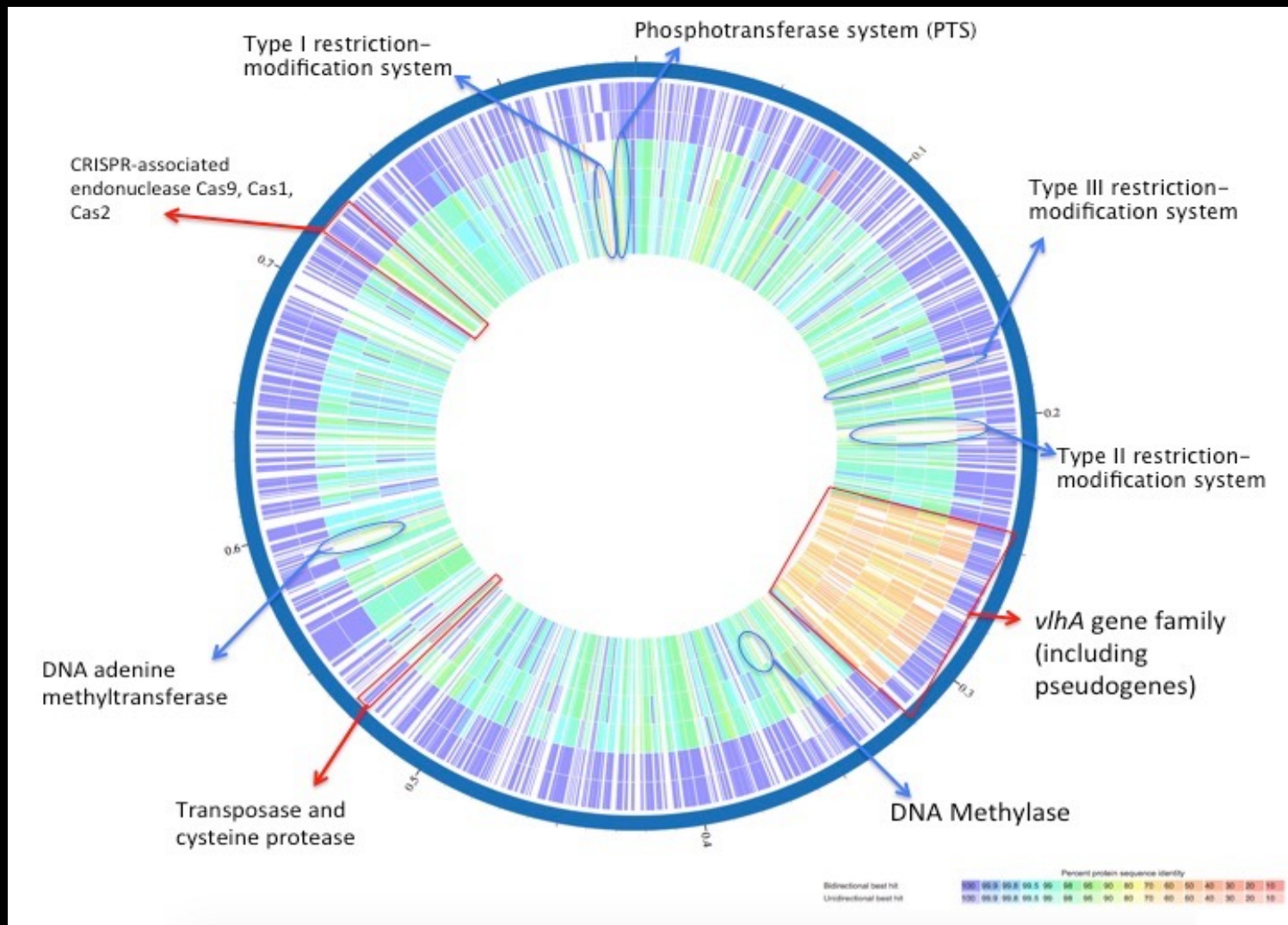


- 942,605 - 1,024,678 bp genome length
- 21- 39 contigs
- 800 - 862 coding sequences

Proteome analysis of *F*-strain isolates



Proteome analysis of MS isolates



Applications of Full Genome Sequencing to Diagnostics

- More targets for epidemiological tracking
- Identify virulence factors
- DIVA strategies
 - F-strain
 - ts-11
 - 6/85
 - MS-H



Wish List for Diagnostics

- More sensitive? More specific?
- Cheaper
- More portable
- Pen side tests
- Higher throughput
- Panel of organisms testing



What do you have?

- Prevalence of infection
 - Survey vs Regular monitoring
- Strain typing



How is it spread?

- Vertical/Horizontal



Vertical transmission

- Small % infected as embryos
- Respiratory viruses trigger transmission and respiratory disease
- Superinfection with *E. coli*
- Chilling, dust, crowding, etc. exacerbate

Horizontal transmission

- Pullets reared free of infection
- Infection occurs near peak production
- Egg production drops and then recovers
- Most often occurs on multi-age farms

How is it spread?

- Vertical/Horizontal
- What level(s) of breeding stock
- Management and biosecurity



Long term Control Plan

- High prevalence or Low prevalence?
- Medication
- Vaccination?
- Strict biosecurity
- Segregation
- Monitor effects on protection from clinical signs and vertical transmission
 - Serology and PCR at regular intervals

What will you do?

- Action plan (short term)
 - Eliminate
 - Treat
 - Vaccinate/ Stop vaccinating



Thank you

Naola Ferguson-Noel, DVM, MAM, PhD

University of Georgia, Poultry Diagnostic & Research
Center

953 College Station Rd., Athens, GA 30602-4875

Phone: (706) 542-3068 Lab: (706) 542-5646

naolaf@uga.edu

<http://vet.uga.edu/avian>



College of
Veterinary Medicine
UNIVERSITY OF GEORGIA