

Emerging Disease of Arthritis due to Novel Reoviruses in Broiler Chickens in California

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Prasad

**Hulimangala hosakote
Lingareddy
Shivaprasad**

CAHFS Works in Partnership With

1. California Department of Food and Agriculture
2. School of Veterinary Medicine
3. Livestock and Poultry Producers
4. Veterinarians
5. United States Department of Agriculture (USDA)



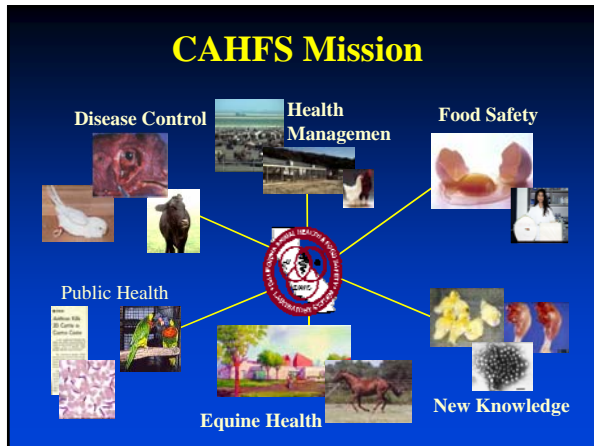
California Animal Health & Food Safety Laboratory System

School of Veterinary Medicine
University of California - Davis

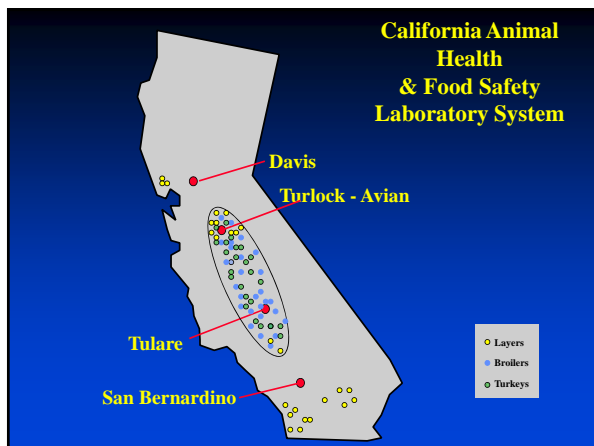


Mission

To provide the peoples of California
and others with the highest quality
diagnostic laboratory support for:



- ## CAHFS' Mission
1. Surveillance and response for Foreign Animal Diseases
 2. Livestock and poultry disease control
 3. Enhancement of livestock and poultry health
 4. Ensuring the safety of foods of animal origin
 5. Protection from animal diseases that can affect people (Zoonosis)
 6. Equine health and performance
 7. Recognition and dissemination of new knowledge
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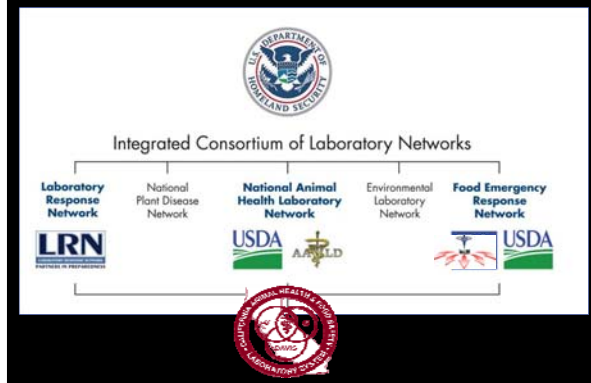
Services offered at each laboratory

Each of four laboratories offer services to match the needs of the animal populations located within the immediate vicinity of that laboratory

	Davis	Turlock	Tulare	San Bernardino
Bacteriology	☐	☐	☐	☐
Immunology	☐	☐		☐
Biotechnology	☐	☐	☐	
Path/Histo	☐	☐	☐	☐
EM	☐			
Toxicology	☐			
Avian Virology	☐			
Mamm. Virology	☐			

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CAHFS' Integration with NAHLN



Tests Essential for Disease Diagnosis

- ✓ History
- ✓ Clinical signs
- ✓ Necropsy (autopsy)
- ✓ Serology (ELISA, HA/HI, AGID, etc.)
- ✓ Immunology (FA, IHC, etc.)
- ✓ Biotechnology
- ✓ Bacteriology/Mycology

Tests (Contd.)

- ✓ Histopathology/Immunohistochemistry (AI, NDV, IBV, ILT, WNV, ABV, IBDV, Chlamydia, Trichomonas, Listeria, etc.)
- ✓ Parasitology
- ✓ Toxicology/Nutritional analysis
- ✓ Electron microscopy (DEM, TEM and SEM)
- ✓ Virology (egg embryos, cell culture)
- ✓ Hematology, serum chemistry, cytology

Biotechnology

- PCR (RT-PCR)
 - AI, NDV, vv/IBDV, IBV, ILT, Reo, Rota, Astro, WNV, Herpes, Adeno, Polyoma, PBFDV
 - Bacteria (MG, MS, *S. Enteritidis*, *Avibacterium*), protozoa, fungi
- MLSA – MG (fingerprinting), RFLP - ILT
- MALDI – TOF (Matrix-associated laser/desorption ionization – Time of Flight)
- 5.8S, 16S and 23S rRNA gene sequ for bacteria
- Sequencing - IBV
- Standardization and validation

Diagnostic Quality

- Quality/final diagnosis depends on the quality and quantity of effort by pathologist/diagnostician
 - Rapid turn around time
 - Thorough diagnostic work up
 - Communication with the clients
 - Use friendly and easily understandable language
- ❖ Client confidentiality maintained



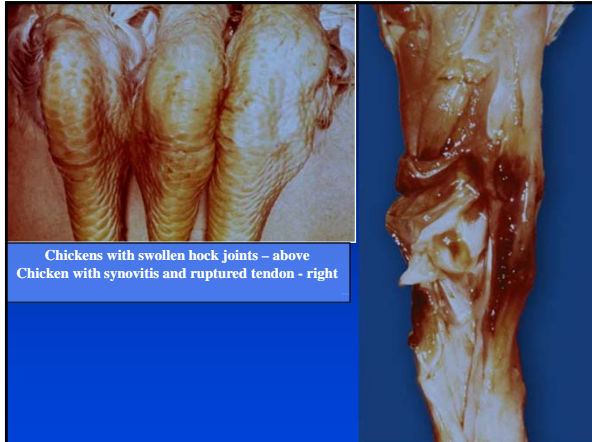
Avian Reoviruses

- Ubiquitous viruses that cause various diseases of economic significance in chickens and other species of birds
- Genus: Orthoreovirus, Family: Reoviridae
- ❑ Arthritis/tenosynovitis and tendon rupture in broiler chickens.
- ✓ Virus is transmitted vertically
- ✓ Was well controlled with vaccination of the breeders

Avian Reoviruses – Other diseases

- Malabsorption and runting stunting syndrome (RSS) – very common
- Also been associated with respiratory and nervous system disease in chickens
- Immunosuppressive disease in chickens
- Myocarditis in chickens and turkeys
- Generalized disease in ducks, geese, pigeons, psittacines, *etc.*





Emerging Reovirus in Broiler Chickens

- USA: 2011-2014 in Pennsylvania. Onset between 2 and 4 weeks of age
- Morbidity: 20 to 40 %, mortality 10 %
- Clinical signs, gross and histopathology
- Virus isolation and sequencing
- Numerous variants: 78 % distinct from vaccine strain, S1133. Novel reovirus
- France, other European count., China, *etc.*
- Numerous cases in SE USA, esp. Georgia

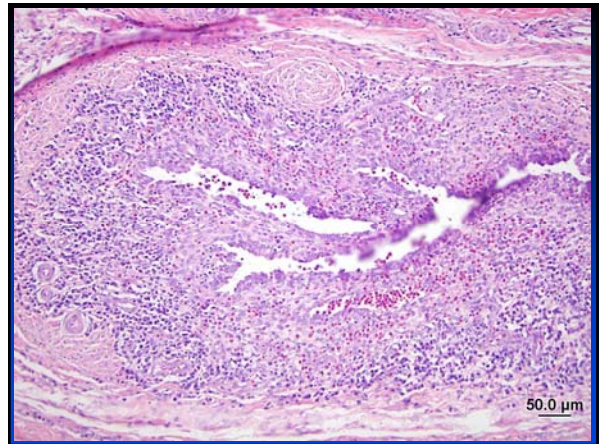
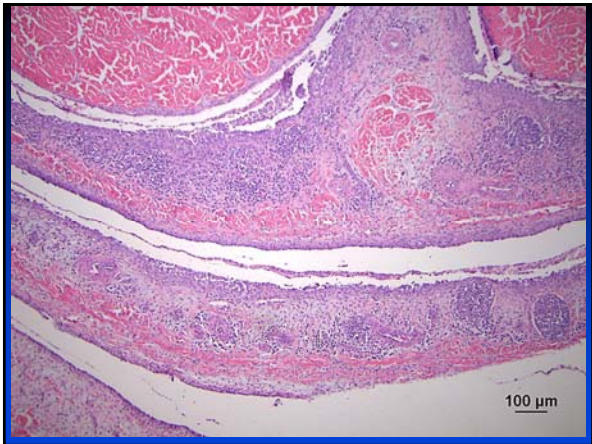
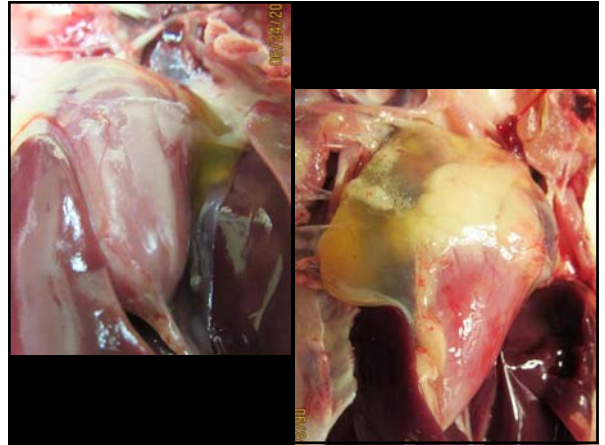
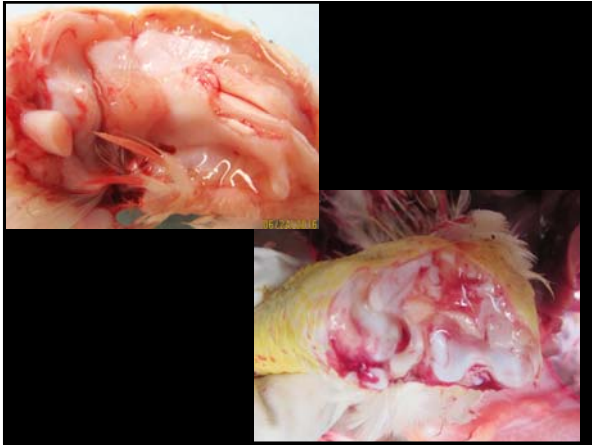
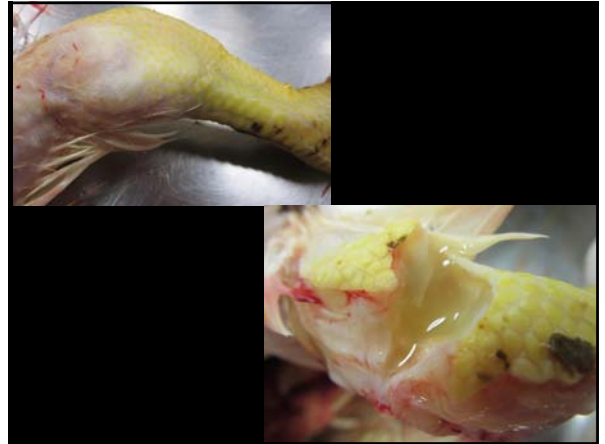
Emerging Disease of Reovirus in Broiler Chickens

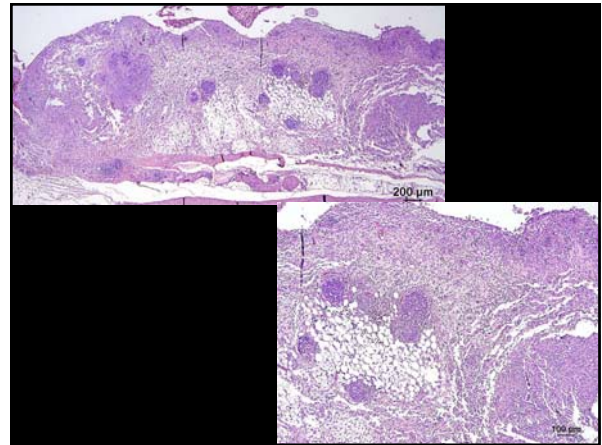
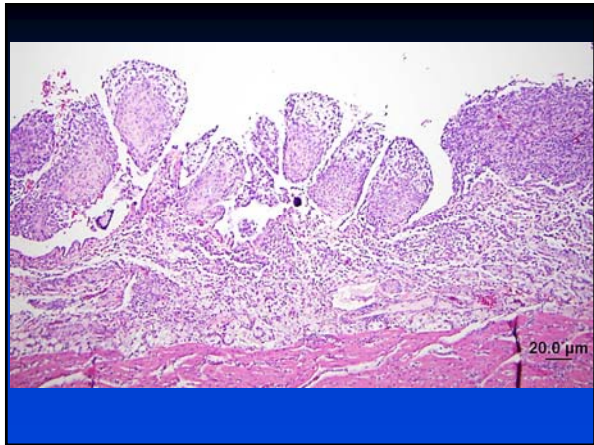
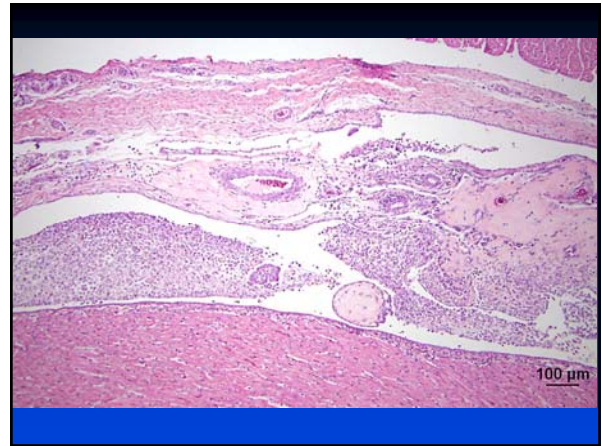
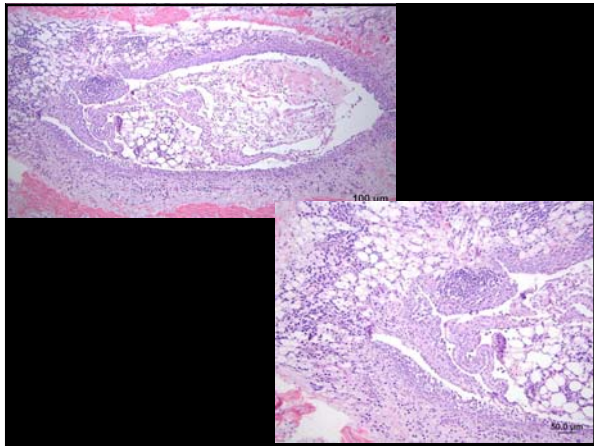
- Disease in California, early 2015
- Numerous cases submitted to Tulare and Turlock laboratories
- Breeders - vaccinated for Reovirus
- Age of onset - about 20 days
- Outbreaks - birds being down on legs, unable to walk, leg/s stretched laterally, posteriorly or anteriorly

Reovirus in Broiler Chickens

- Increased morbidity (mostly culls) and mortality, lack of uniformity
- Bacteriology, gross and histopathology
- Virus isolation (cell culture - ID by EM) – tendons mostly, heart and occasionally liver
- Serology
- Molecular characterization
- PCR and IHC – under investigation

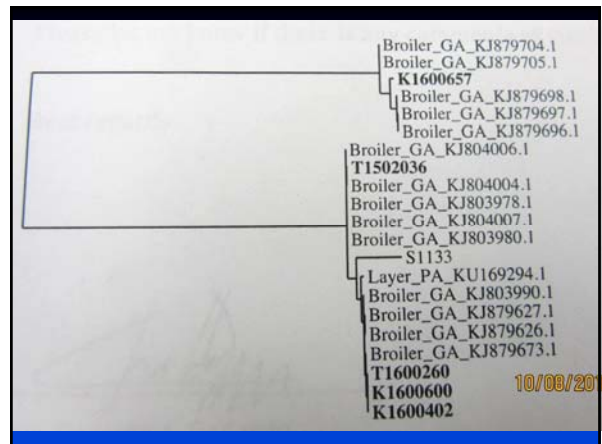






Reovirus in Broiler Chickens

- **Bacteriology.** Occasionally *E. coli* and *Staphylococcus aureus* isolated. Mixed viral and bacterial infections
- **Serology:** mostly negative in acute infections but moderate to high titers in subacute and chronic infections
- **Virus isolation.** Reovirus isolated better in early infections. Adenovirus isolated occasionally, significance unknown
- **Molecular characterization**



Reovirus in Broiler chickens

- Breeders vaccinated for S2133 Reovirus
- Clinical signs: starts @ 10 to 15 days of age
- Vertical transmission
- Tenosynovitis/arthritis
- Hydropericardium –epicarditis and myocarditis. Occasionally hepatitis
- Virus isolated and characterized
- Variants, variants to variants, *etc.*
- Breeders are vaccinated with variants

