



Tracking bacteria from the chick navel to the yolk sac

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Introduction

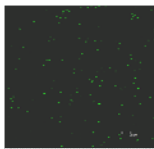
- Chicks with unhealed navels at hatching:
 - Lower final BW and higher mortality [1]
 - Delayed absorption of yolk sac (YS) and less developed intestine [2]
- Infection of the YS (omphalitis) = main cause of first week mortality in broiler chicks [3]
- Avian *E. coli* (APEC) cause omphalitis [4]
- The presence of APEC may increase the ability of some human *E. coli* to cause disease in people [5]
- Are bacteria entering the YS through the chick navel?
- The poultry industry is interested in controlling factors affecting the health of newly hatched chicks

Our Approach

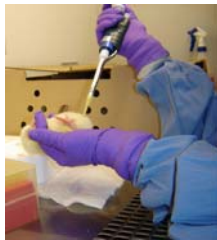
- 3 groups of 72 chicks:
 - 36= healed navels
 - 36= navel buttons



Fluorescent *E. coli* bacteria



Placed on the chick navel



- Chicks kept in bio-containment chambers
- Chicks dissected from day 0 to 5
- Navels and YS processed for fluorescence and light microscopy



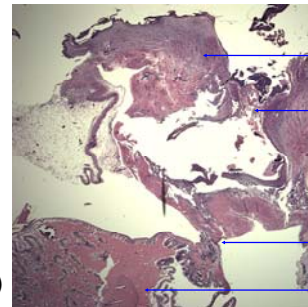
Navel skin

Yolk sac

In most chicks, regardless of navel condition, the navel was attached to the YS

Expected Results

- Only a few samples have been processed to date, thus no concluding results can be presented at this time
- Using a light microscope, we expect to describe the tissue attaching the navel to the YS



Skin

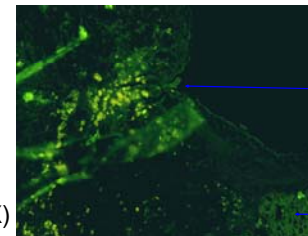
Navel

Attachment tissue

Yolk Sac

(10X)

- Using a fluorescence microscope, we expect to confirm if *E. coli* bacteria are entering the chick through the navel, and the YS through the attachment tissue



Attachment tissue

Yolk Sac

(40X)

What does this mean?

- It is possible that a natural connection exists between the navel and the YS
- Navel health could be a critical factor in the prevention of omphalitis
- Fluorescent bacteria could be used to track other infections of interest for the poultry industry

References

- [1] Fasenko & O'Dea, 2008. *Poult. Sci.* 87:594-597
- [2] Kawalilak, Ulmer Franco, & Fasenko, 2010. *Poult. Sci.* 89:82-87
- [3] Rai et al., 2005. *Avian Poult. Biol. Rev.* 16:87-93
- [4] Amabile de Campos et al., 2005. *Vet. Microbiol.* 106:275-285
- [5] Johnson et al., 2007. *J. Bacteriol.* 189:3228-3236

Acknowledgements

