

## Interpretation of *Escherichia coli* found in Intestinal and Fecal Samples

*E. coli* is **normal flora** in the gastrointestinal tract of mammals and is recovered in almost all fecal or intestinal cultures.

*E. coli* is implicated in diarrhea in three ways:

- Virulence factor-positive strains (**ETEC**) causing increased fluid secretion in the small intestine leading to secretory diarrhea in neonatal animals.
- Virulence factor-positive strains (**EPEC, EHEC/STEC, AEEC**) causing damage to intestinal mucosa resulting in diarrhea in young animals.
- **Small intestinal overgrowth** of normal *E. coli*, generally associated with other co-morbidities like viral or parasitic infections, causing dysbiosis leading to malabsorption and osmotic diarrhea in young animals.

The significance of an *E. coli* isolate is based on identification of virulence factors, histologic examination of intestinal sections when available, and compatible clinical signs. NDSU-VDL routinely performs PCR for common virulence factors on samples from ruminants younger than 14 days and small animals when indicated.

## Antimicrobial Susceptibility Testing

We no longer routinely perform or recommend susceptibility testing for the following reasons:

- Poor correlation between the susceptibility data and treatment response.
- Antimicrobial breakpoints for in vitro susceptibility are known only for serum achievable concentrations, and not the treatment of intra-intestinal *E. coli*.
- If small intestinal overgrowth due to *E. coli* (a significant co-morbidity in diarrhea) or bacteremia is suspected, then fecal culture is a poor representation of both sites and susceptibility data would be erroneous.

### Recommended samples for testing:

- ≥ 5 grams feces
- Fresh and fixed 5-10 cm sections of each segment of small intestine (duodenum, jejunum, ileum) and one 5-10 cm section of colon.
- Swabs are not recommended.

References for more information and for current recommended treatment strategies:

1. Constable PD. Treatment of calf diarrhea: Antimicrobials and ancillary treatments. *Vet Clin Food Anim.* 2009 Mar;25(1):101-120.
2. Radostits OM. *Veterinary Medicine: A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats, and Horses.* Elsevier (2007) pgs. 865-869.
3. Smith BP. *Large Animal Internal Medicine.* Elsevier (2015) pgs. 320, 331-333.