

## **2C-101: Bacteriophages to control enterotoxigenic *E. coli***

**Project Leader - Emeritus Professor Mary Barton**

### **Background**

This study was designed to evaluate the efficacy of a bacteriophage (phage) cocktail for the treatment of diarrhoea caused by antibiotic resistant enterotoxigenic *Escherichia coli* (ETEC). ETEC is an important infective agent of neonatal and weaned piglets causing diarrhoea leading to serious morbidity, mortality and economic loss. Phages are viruses specific for bacteria only and can rapidly kill the host by lysis *i.e.* bursting the bacterial cell. ETEC strains from Corowa were used in enrichments to isolate & purify lytic phages specific for these pathogenic strains only.

### **Methodology**

The trial was carried out at Rivalea in module 3 at Corowa, NSW. Six litters of piglets were selected at onset of scouring and all received the standard electrolyte treatment via waterer. A cocktail of phages specific for a number of enterotoxigenic *E. coli* (ETEC) strains isolated at the Corowa site of Rivalea was administered orally to the three treatment litters on day 0 @ 8am & 3pm. The remaining litters were controls. No antibiotics were given to either group. Scour scores, rectal swabs & weight were collected days 0, 2 & 6. Swabs were analysed for the presence of ETECs and phages. The *E. coli* isolates were checked for susceptibility to the phages in the cocktail. Environmental swabs were taken days 0, 2 & 6 & tested for the presence of phages.

### **Key Findings/Conclusions**

1. The Corowa site has multiple ETEC strains present.
2. More than one ETEC strain was evident in module 3.
3. Only piglets in one litter carried *E. coli* that were lysed by phages in the cocktail.
4. Clinical results (scour score, behaviour & general appearance) indicate that the phages may have been effective in treating the piglets in this litter.
5. No control group had the same pathogen profile to allow comparison.
6. The efficacy of phage treatment could not be definitively demonstrated without comparison to controls.
7. No significant differences between treatment & controls were noted in ADG & scour score - most litters were heavier & healthier than the litter that responded.
8. The data suggests that phages have potential for treatment of ETEC induced diarrhoea.
9. A trial at a facility with infections due to one or few known & characterised ETEC strains should be carried out.
10. Isolation and characterisation of phages specific for ETEC strains should be ongoing to develop a library of therapeutic phage candidates.

### **Potential Users of Information**

Research community only at this stage.