P3.15 - APTAMERS FOR BLOCKING ENTEROTOXIGENIC *ESCHERICHIA COLI*

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ABSTRACT

Enterotoxigenic *Escherichia coli* (ETEC) is the major cause of enteric infections in swine, resulting in significant costs for the swine industry. Among other virulence factors, fimbriae are essential for the initial adhesion of ETEC to the intestinal epithelial cells. In particular, the F4-type (K88) fimbriae are commonly associated with neonatal infections and most post-weaning diarrhoeal infections. These diseases are traditionally prevented or treated with antibiotics, but the use of antibiotics is being highly restricted due to the growing phenomenon of antimicrobial resistance. Therefore, novel strategies such as aptamers, which are small single-stranded oligonucleotides capable of binding to target molecules, seem to be a promising alternative to block the initial adhesion of F4-ETEC. The present study focuses on two parallel studies, the first in which two pre-selected aptamers (31/37) were tested in an *in vivo* model, *Galleria mellonella,* to evaluate their toxicity at three inoculated concentrations (1µM, 10µM, 20µM) and the performance as treatment (C_{apt}=500 nM) with infection (10^8 CFU/mL) of five strains (F4-ETEC, F18-ETEC, *Escherichia coli* K12, *Klebsiella pneumonia* ATCC 43216, *Staphylococcus aureus* ATCC 25929). Secondly, new specific DNA aptamers were selected through an innovative cell-SELEX approach against F4-ETEC bacteria, which involved four main steps: library incubation, partitioning, elution, and amplification. Both pre-selected aptamers showed no toxicity in *Galleria mellonella* after 96 h, regardless of the inoculated concentration. Furthermore, inoculation of 'aptamer 31 + F4-ETEC' in *Galleria mellonella* increased the larval survival rate and health index when compared to inoculation with F4-ETEC alone. Regarding the new selection of DNA aptamers, 12 rounds of SELEX were successfully carried out and a final pool of potential aptamers against F4-ETEC was obtained, which will now be evaluated for their specificity and affinity. This work demonstrates the potential of aptamers in the treatment of ETEC infections as an alternative to antibiotics.

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