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Evaluation of *Caenorhabditis elegans* as the Host in an Infection Model for Food-borne Pathogens

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Abstract

The bacteriophagous nematode *Caenorhabditis elegans* has been recognized as a surrogate host for human pathogens. The aim of this study was to examine whether food-borne pathogens are pathogenic in nematodes. Young adult worms were allocated onto peptone-free medium covered with a bacterial suspension of each pathogen. The plates were incubated and as the number of live and dead worms scored at least every 24 h. Twelve of the 14 pathogenic strains, namely *Aeromonas sobria*, the diarrheagenic *Escherichia coli* strains (enteroaggregative *E. coli*, enterohemorrhagic *E. coli*, enteropathogenic *E. coli*, enterotoxigenic *E. coli*, enteroaggregative *E. coli* heat-stable enterotoxin 1 gene-possessing *E. coli*, and diffusely adherent *E. coli*), *Listeria monocytogenes*, *Salmonella Enteritidis*, *Staphylococcus aureus*, *Vibrio parahaemolyticus*, and *Yersinia enterocolitica* reduced the survival rate of worms to varying degrees. The remaining 2 strains, *Bacillus cereus* and enteroinvasive *E. coli*, did not. Thus, food-borne pathogens can infect and proliferate within bacteriophagous nematodes on peptone-free medium to the same extent as reported with conventional peptone-containing medium. However, the non-enteropathogenic *E. coli* strain HS and deletion mutants of *L. monocytogenes*, which have lost their virulence in the murine model, were also still nematocidal. Although this nematode could be an alternative host for these pathogens, the nematocidal activity of these pathogens may not necessarily reflect enteropathogenicity in humans. Pathogens and the virulence genes to be analyzed must be carefully selected before using this alternative host.

Key words:
C. elegans, Enteric pathogen, Virulence, Screening, Infection model

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