Campylobacter-host interaction at the intestinal mucosal surface
Important facts about *Cambylobacter*

*Cambylobacter*, particularly *Cambylobacter jejuni*, is one of the most common bacterial causes of diarrheal illness in the United States.

0.5% of the general population are infected each year in the United States.

*Campylobacteriosis* can trigger Guillain-Barr syndrome, an autoimmune disease affecting the nerve system.

Fewer than 500 of *Cambylobacter* organisms can cause illness in humans.

(from CDC web site)
Poultry Productions is the major source of *Cambylobacter*

- Diarrhea, cramping, abdominal pain, and fever
- Adhere to epithelial cells in the middle portion of small intestine
- Bacterial migrate across epithelial cells to lamina propria
- Hyperplasia and hypertrophy
- Polymorphonuclear leukocytes mount and confine infection to gastrointestinal tract
- Inflammatory response also mediates release of prostaglandins
Transmigration of *Campylobacter* across the intestinal epithelial layer
Inflammatory responses against *Cambylobacter*
Objectives of the project

Select invasive and non-invasive strains from food isolates
To compare the abilities of different isolates of *C. jejuni* to adhere, invade, and migrate across the polarized epithelial layer.

Exam the invasion mechanism
To determine the effect of *C. jejuni* invasion on the organization of the tight junction and actin cytoskeleton of polarized epithelial cells.

Exam the initial immune responses
To determine the effect of *C. jejuni* invasion on the surface expression of the chemokine and homing receptors for leukocytes.
The adherent and invasive abilities of *Campylobacter* strains isolated from retail meat

<table>
<thead>
<tr>
<th>Strain</th>
<th>adherence</th>
<th>invasion</th>
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<tbody>
<tr>
<td>E. Coli</td>
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Correlation between the adherent and invasive abilities of *Campylobacter* strains isolated from retail meat

\[
[-\log(\text{adhesion})] = 0.06 + 0.45[-\log(\text{invasion})]
\]
Campylobacter invasion into human intestinal epithelial cells

Nuclei/Campylobacter/actin filaments
Polarized Epithelial Cell Culture System
Transcytosis of *Campylobacter* across polarized intestinal epithelial cells
Gonococci-induced Interleukin-8 secretion by polarized human intestinal epithelial cells
IL-8 secretion induced by *Campylobacter* retail meat isolates

![Graph showing IL-8 secretion induced by Campylobacter retail meat isolates. The x-axis represents different strains, and the y-axis represents IL-8 secretion (pg/ml). The graph compares apical and basolateral secretion.](image-url)
TNF-α secretion induced by *Campylobacter* retail meat isolates

![Graph showing TNF-α secretion (pg/ml) for various strains](image-url)
Summary

The retail meat isolates of *Campylobacter* have a wide range of adherence, invasion, and transcytosis abilities.

The abilities of *Campylobacter* retail meat isolates to invade human intestinal epithelial cells are positively associated with their adhere abilities.

*Campylobacter* induces polarized secretion of inflammatory cytokines IL-8 and TNF-α in human intestinal cells.
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