



## The F336 bacteriophage recognizes the capsular phosphoramidate modification of *Campylobacter jejuni* NCTC11168

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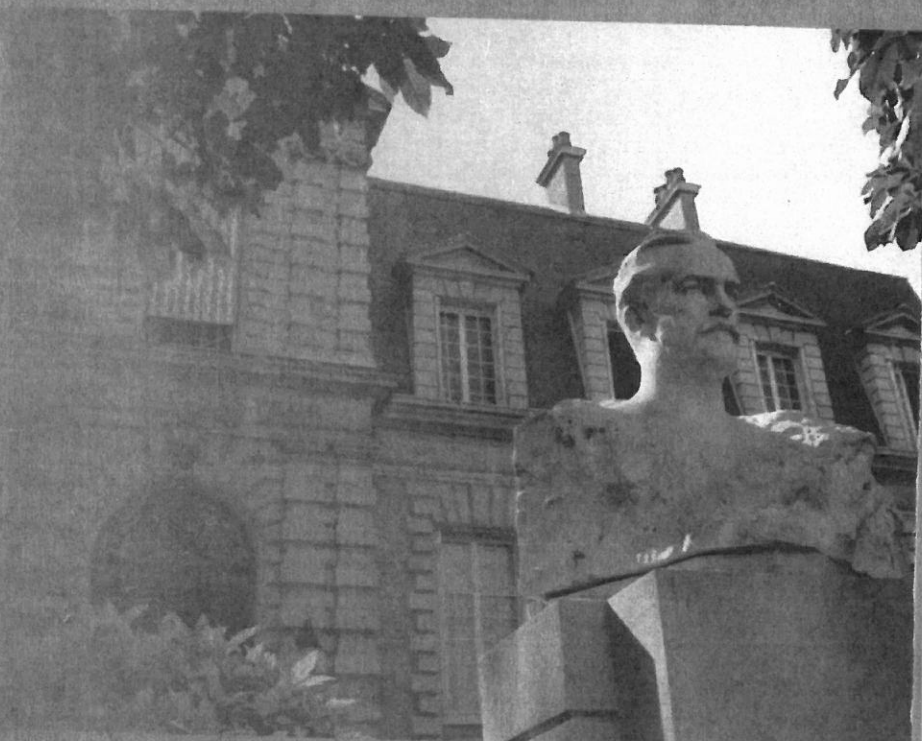
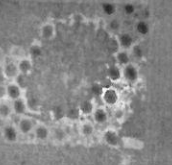
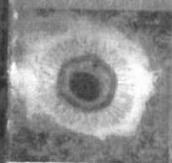
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# VIRUSES OF MICROBES

## VIRUS DE MICROBES

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ABSTRACT BOOK  
LIVRE DES RÉSUMÉS

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## VIRUSMICROBES2010/135

### The F336 bacteriophage recognizes the capsular phosphoramidate modification of *Campylobacter jejuni* NCTC11168

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*Campylobacter jejuni* is the most common cause of bacterial gastroenteritis in the developed world. Symptoms range from mild to severe diarrhea and may, in rare cases, lead to life-threatening disorders of the autoimmune system. Poultry meat is regarded as the major source of infection since *C. jejuni* commonly colonises the poultry intestine and contaminated faecal matter is readily transferred to the meat during slaughter. Previously, we isolated a number of bacteriophages infecting *C. jejuni* that could potentially be exploited to reduce the number of *C. jejuni* in poultry prior to slaughter. To investigate the mechanisms behind phage resistance against *C. jejuni*, we used phage F336 belonging to the Myoviridae family to select a *C. jejuni* NCTC11168 phage resistant strain. We found that phage F336 has reduced adsorption to the phage resistant strain, thus indicating that the receptor is altered. While proteinase K treated *C. jejuni* cells did not affect adsorption, periodate treatment resulted in reduced adsorption, suggesting that the phage binds to a carbohydrate moiety. While the lipooligosaccharides of the wild type and phage resistant strains were similar, we found a significant difference in the capsular polysaccharides using high resolution magic angle spinning NMR spectroscopy. Interestingly, the phage resistant strain lacks an O-methyl phosphoramidate (MeOPN) moiety attached to the GalfNAc on the capsular polysaccharide (CPS), which was further confirmed by mass spectroscopy. Sequence analysis of the phage resistant strain showed that the phase variable gene *cj1421*, which encodes the GalfNAc MeOPN transferase contains a tract of 10 G's resulting in a non-functional gene product. However, when the phage resistant strain reverted back to phage sensitive, *cj1421* contained 9 G's and the GalfNAc MeOPN was regained in this strain. Of particular note is that we observed reduced plaquing efficiency by six of our phages on the resistant NCTC11168 strain, suggesting that the MeOPN moiety of the CPS is the receptor for several phages infecting *C. jejuni*. In summary, we have identified a novel receptor of phages infecting *C. jejuni* and propose that phage predation is the driving force behind the large diversity of capsular polysaccharides and their modifications in *C. jejuni*.

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