



 *Campylobacter*
Laboratorio Nazionale di Riferimento

Batteriofagi:
un approccio innovativo nella lotta contro *Campylobacter* 

CIFIV, 15/12/2015

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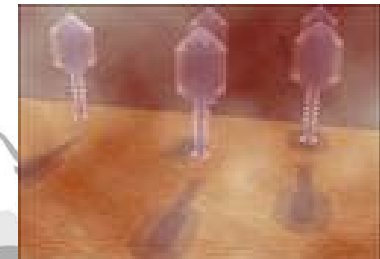
FINANZIAMENTO: MSRC07/12

- Protocollo isolamento fagi contro *Campylobacter jejuni* e valutazione spettro d'ospite
- Isolamento di 36 fagi da confermare

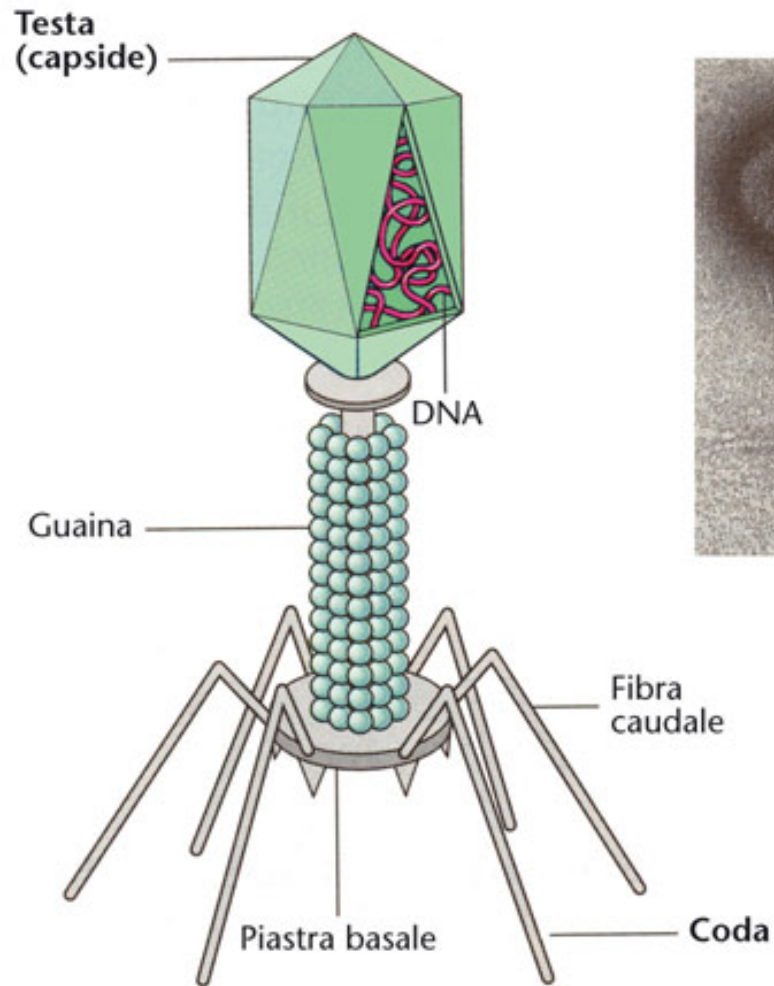


CARATTERISTICHE GENERALI

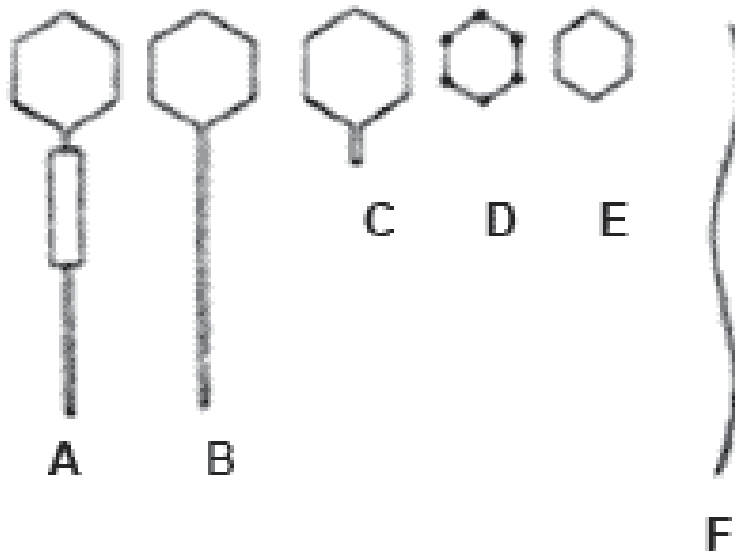
1. ORGANIZZAZIONE NON CELLULARE
2. MOLTIPLICAZIONE INTRACELLULARE
3. PRESENZA DI UN UNICO TIPO DI ACIDO NUCLEICO (DNA o RNA)
4. ASSENZA DI METABOLISMO PROPRIO



Morfologia



CLASSIFICAZIONE



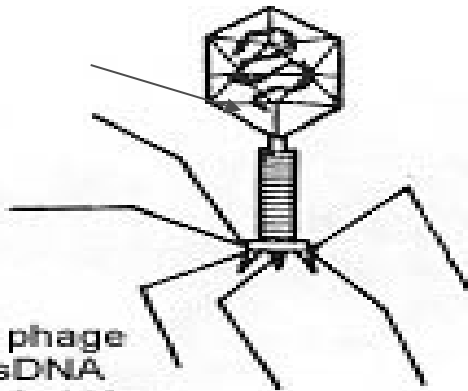
BRADLEY

Figure 1. Basic morphological types of bacteriophages Bradley (1967)



DIMENSIONE

| | |
|-----------|----|
| 1 | mm |
| 1.000 | um |
| 1.000.000 | nm |



T4 phage
 dsDNA
 head 80x110nm,
 tail 110nm long



T3 phage
 dsDNA
 head 60x60nm,
 tail 20nm long



T1 phage
 dsDNA
 head 54x54nm,
 tail 140nm long



M13 phage
 ssDNA
 helical,
 800x10nm



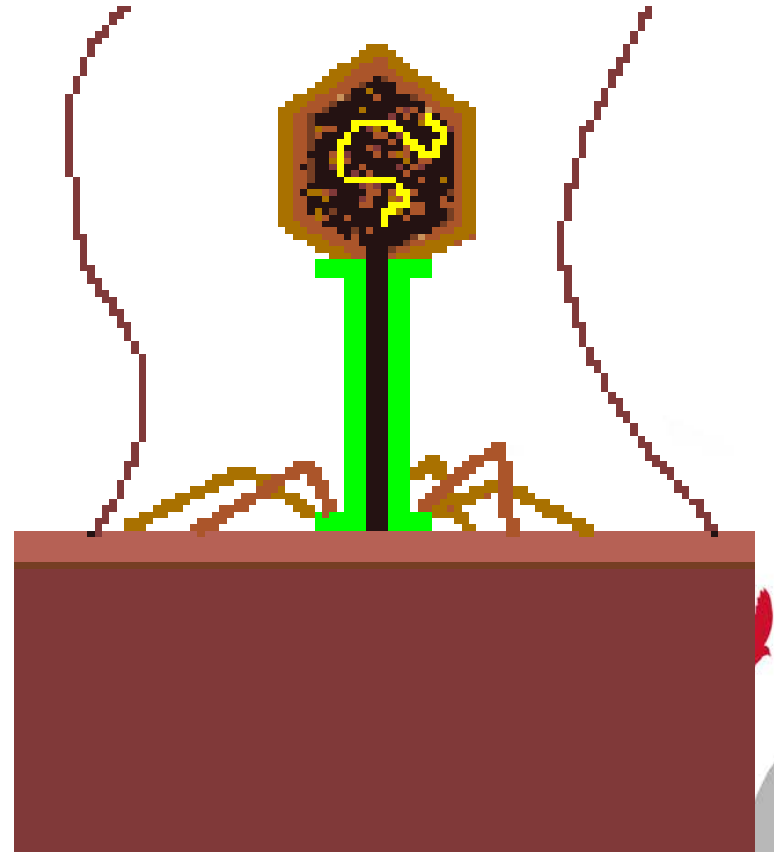
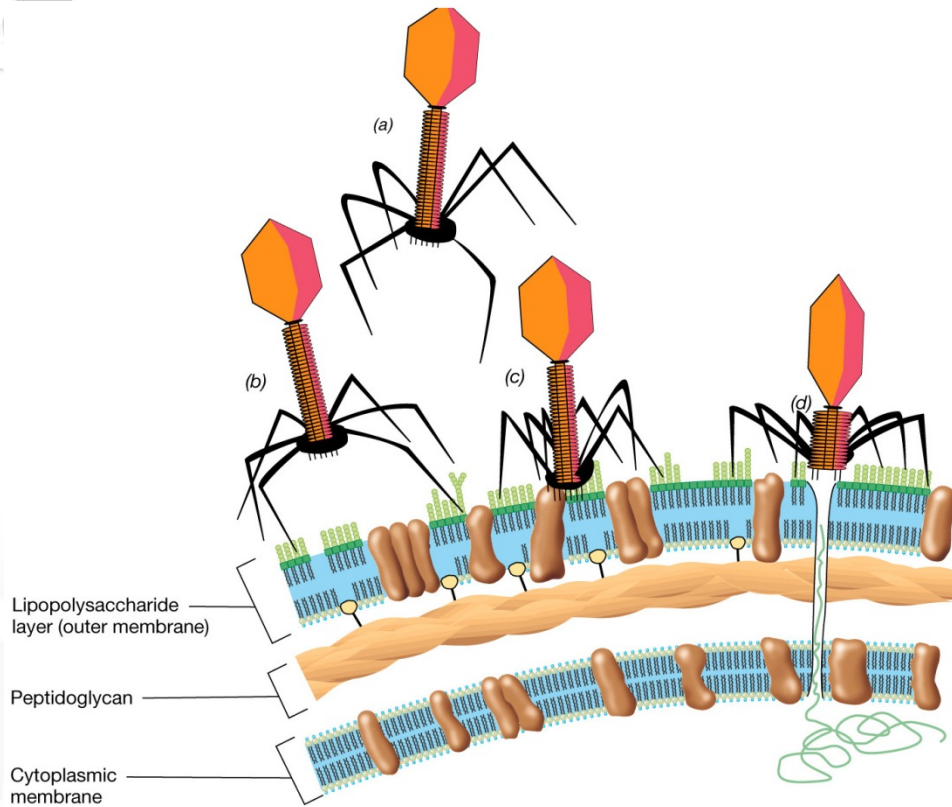
Caratteristiche specifiche dei batteriofagi

- a) pH:** generalmente stabili tra 5 e 8. A basse T° tra 4 e 10
- b) T°:** Termoresistenza in relazione ad ambiente/ospite (> per fagi in yogurt/formaggi, < per fagi di germi psicotropi)
- c) U.V.** sensibili
- d) Shock Osmotico, H.P.:** Ghost particles
- e) Disinfettanti:** acido periacetico, etanolo, sodio ipoclorito
- f) Resistenti a fermentazioni**



CICLO REPLICATIVO FASE DI ATTACCO e SPECIFICITA' D'OSPITE

Interazione con recettori :



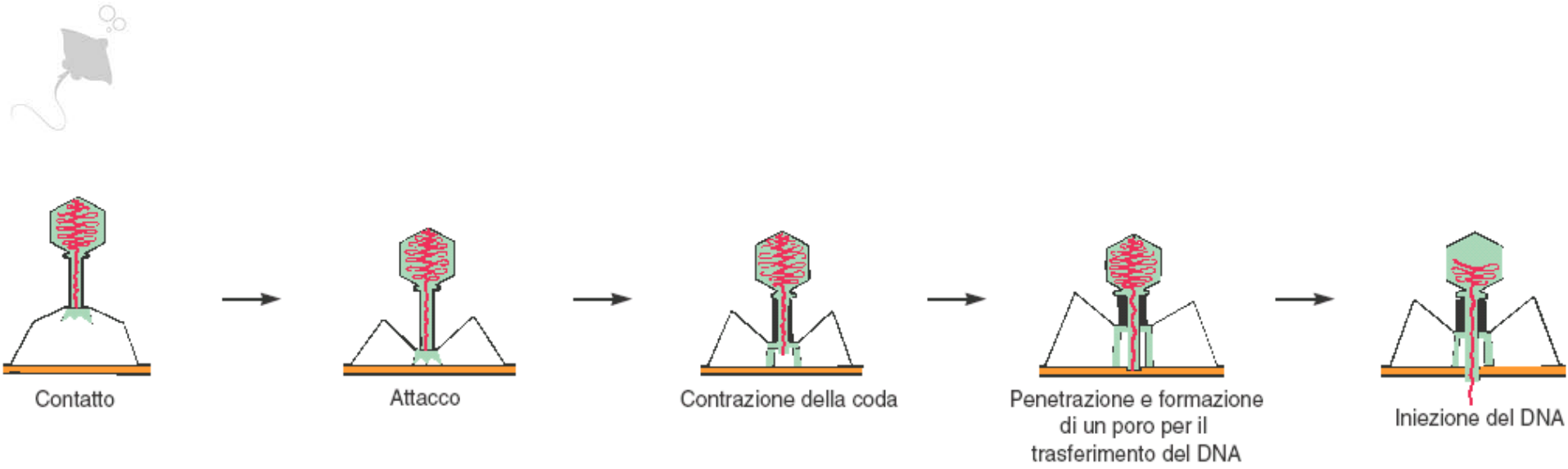


Figura 13.3 Adsorbimento e introduzione del DNA del fago T4.

MOVIE

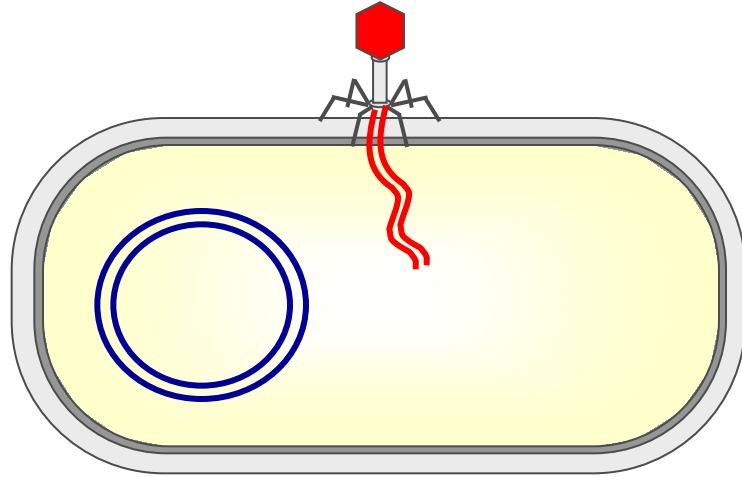


Batteriofagi temperati e lisogenia



IZSAM G. CAPORALE
TERAMO

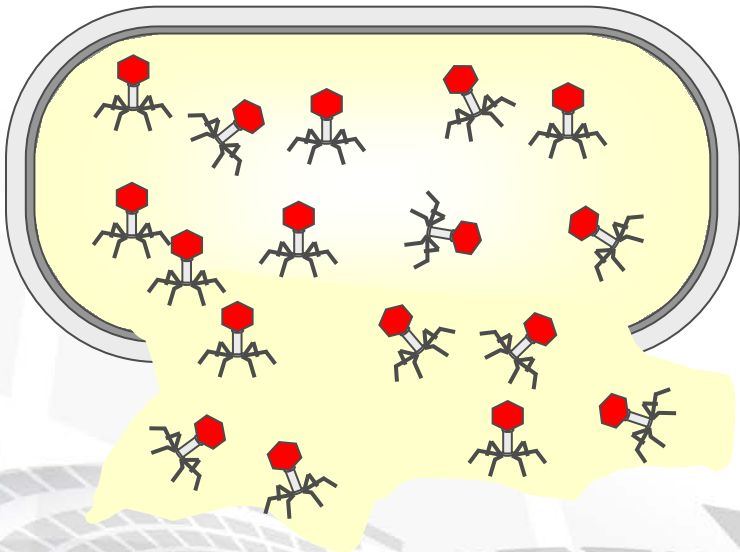
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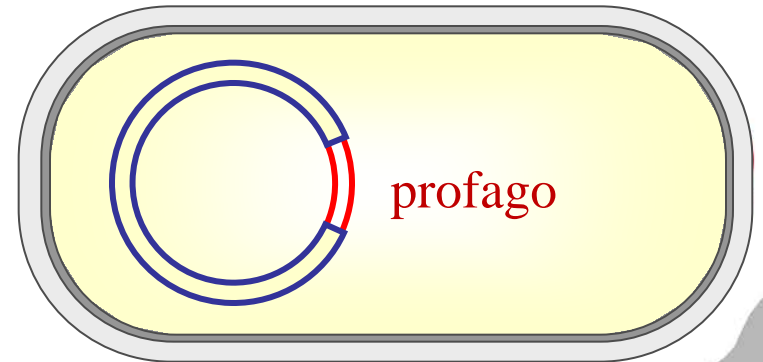
ciclo litico



ciclo lisogenico



← induzione

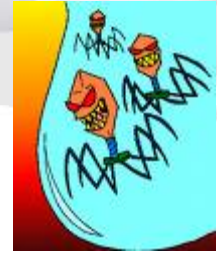


batterifago lisogeno





GOOD versus BAD

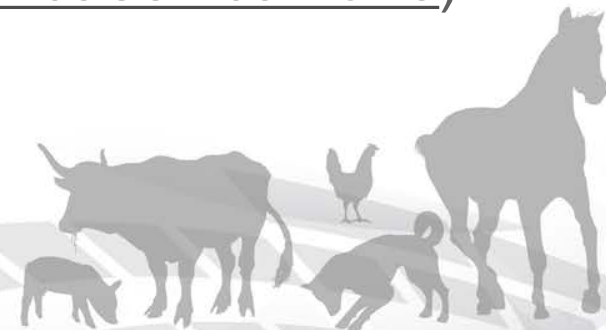


a) Utili:

- 1) Fagoterapia
- 2) Decontaminazione degli alimenti

b) Dannosi:

- attribuzione di nuove caratteristiche di patogenicità
- alterazioni nelle fermentazioni dell'industria alimentare (problemi di caseificazione)





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Available online at www.sciencedirect.com



Veterinary Microbiology 109 (2005) 275–283

Fagoterapia

**veterinary
microbiology**

www.elsevier.com/locate/vetmic

Phage therapy reduces *Campylobacter jejuni* colonization in broilers

Jaap A. Wagenaar^{a,*}, Marcel A.P. Van Bergen^a, Mark A. Mueller^b,
Trudy M. Wassenaar^c, Richard M. Carlton^b

Carvalho et al. *BMC Microbiology* 2010, **10**:232
<http://www.biomedcentral.com/1471-2180/10/232>

RESEARCH ARTICLE

Open Access

The *in vivo* efficacy of two administration routes of a phage cocktail to reduce numbers of *Campylobacter coli* and *Campylobacter jejuni* in chickens

Carla M Carvalho^{1†}, Ben W Gannon^{2†}, Deborah E Halfhide², Silvio B Santos¹, Christine M Hayes², John M Roe², Joana Azeredo^{1*}

APPLIED AND ENVIRONMENTAL MICROBIOLOGY, Nov. 2005, p. 6554–6563
0099-2240/05/\$08.00+0 doi:10.1128/AEM.71.11.6554-6563.2005
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Vol. 71, No. 11

Bacteriophage Therapy To Reduce *Campylobacter jejuni* Colonization of Broiler Chickens†

C. Loc Carrillo, R. J. Atterbury, A. El-Shibiny, P. L. Connerton, E. Dillon, A. Scott, and I. F. Connerton*

Division of Food Sciences, School of Biosciences, Sutton Bonington Campus, University of Nottingham, Loughborough LE12 5RD, United Kingdom

Received 2 February 2005/Accepted 16 June 2005

Journal of
Applied Microbiology



Journal of Applied Microbiology ISSN 1364-5072

REVIEW ARTICLE

Campylobacter bacteriophages and bacteriophage therapy

P.L. Connerton, A.R. Timms and I.F. Connerton



School of Biosciences, Division of Food Sciences, University of Nottingham, Loughborough Leics, UK



Stato dell'arte

Table 3
Campylobacter phage sequences published to-date.

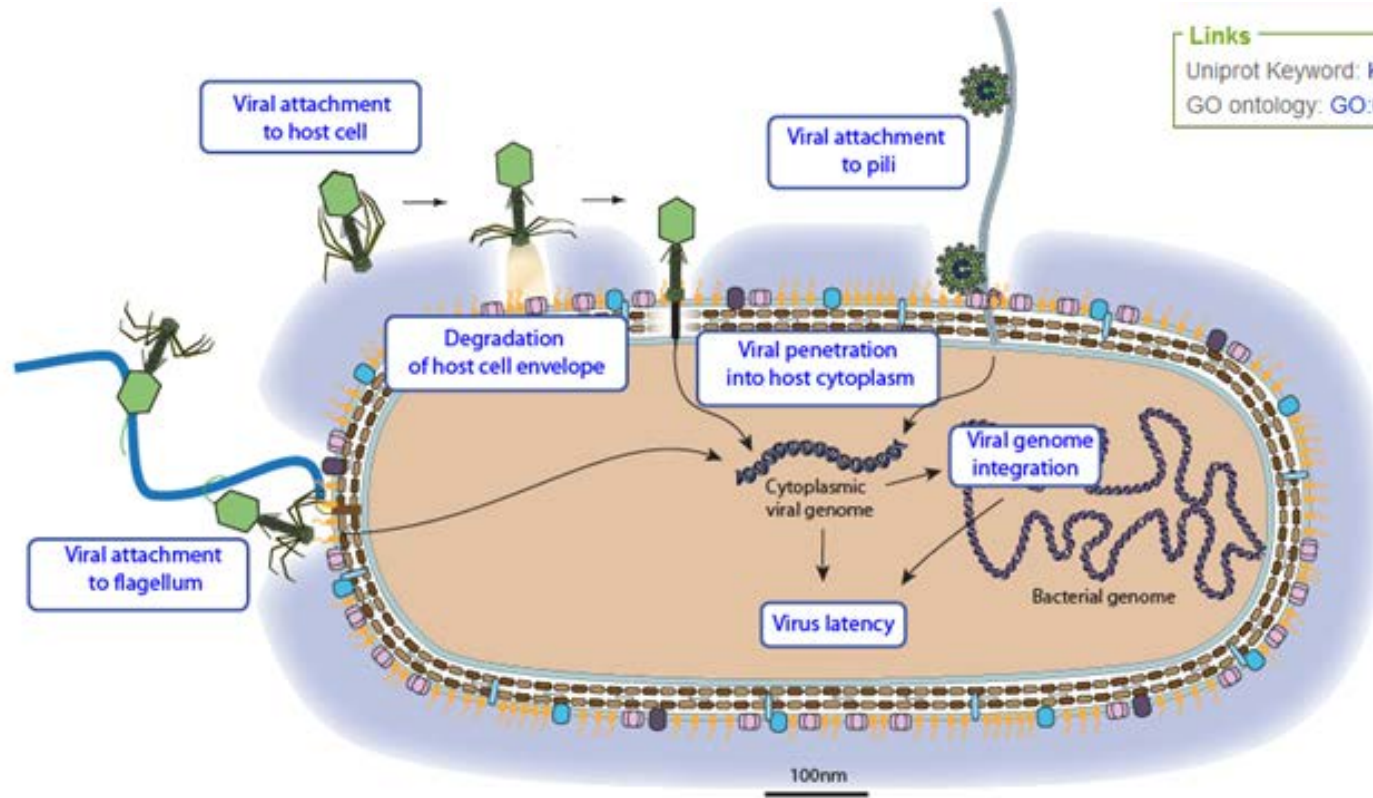
| Phage | Accession number | Reference |
|----------------|----------------------|--------------------------|
| CP220 | EMBL: FN667788 | (Timms et al., 2010) |
| CPT10 | EMBL: FN667789 | (Timms et al., 2010) |
| NCTC12673 | GenBank: NC_015464.1 | (Kropinski et al., 2011) |
| vB_CcoM-IBB_35 | Unknown | (Carvalho et al., 2012a) |
| CP81 | GenBank: NC_019507.1 | (Hammerl et al., 2012) |
| CP21 | GenBank: NC_019507.1 | (Hammerl et al., 2012) |
| CP30A | GenBank: NC_018861.1 | — |
| CPX | GenBank: NC_016562.1 | — |

Janež, N., & Loc-Carrillo, C. (2013). Use of phages to control *Campylobacter* spp. *Journal of microbiological methods*, 95(1), 68-75

NOTA: Nessun fago contro *Campylobacter* spp. è stato attualmente registrato per l'utilizzo in fagoterapia



Riconoscimento recettoriale



http://viralzone.expasy.org/all_by_species/3996.html



RESEARCH ARTICLE

Primary Isolation Strain Determines Both Phage Type and Receptors Recognised by *Campylobacter jejuni* Bacteriophages

Martine C. Holst Sørensen¹, Yilmaz Emre Gencay^{1*}, Tina Birk², Signe Berg Baldvinsson¹, Claudia Jäckel³, Jens A. Hammer³, Christina S. Vegge¹, Horst Neve⁴, Lone Brøndsted^{1*}

RIFERIMENTI BIBLIOGRAFICI

BMC Microbiology

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BioMed Central

Research article

Open Access

Characterization of *Campylobacter* phages including analysis of host range by selected *Campylobacter* Penner serotypes

Vinni Mona Hansen^{†1}, Hanne Rosenquist^{†1}, Dorte Lau Baggesen^{†1}, Stanley Brown^{†2} and Bjarke Bak Christensen^{*†1}

JOURNAL OF BACTERIOLOGY, Dec. 2011, p. 6742–6749
0021-9193/11/\$12.00 doi:10.1128/JB.05276-11

Vol. 193, No. 23

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Bacteriophage F336 Recognizes the Capsular Phosphoramidate Modification of *Campylobacter jejuni* NCTC11168[∇]#

Martine C. Holst Sørensen,¹ Lieke B. van Alphen,² Anne Harboe,¹ Jianjun Li,⁴ Bjarke Bak Christensen,³ Christine M. Szymanski,² and Lone Brøndsted^{1*}

Available in
CELLULAR AND INFECTION MICROBIOLOGY

ORIGINAL RESEARCH ARTICLE
published: 20 February 2012
doi: 10.1371/journal.cimb.100011



Phase variable expression of capsular polysaccharide modifications allows *Campylobacter jejuni* to avoid bacteriophage infection in chickens

Martine C. Holst Sørensen^{†1}, Lieke B. van Alphen^{†2}, Christopher Fodor², Shauna M. Crowley², Bjarke Bak Christensen³, Christine M. Szymanski^{2*} and Lone Brøndsted^{1*}

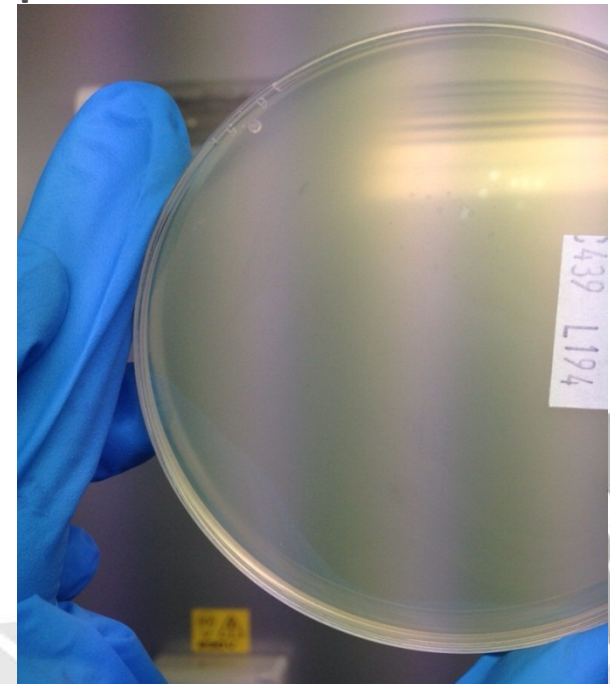
Numero campioni analizzati: 196

Di cui:

- **12** acque di condensa della filtrazione d'aria di capannoni avicoli
- **32** materiale fecale raccolti mediante calzari
- **103** tamponi cloacali
- **49** pool derivanti da feci fresche

Positivi da confermare: **36**, di cui

- **7** campioni di tamponi cloacali
- **29** pool di feci fresche, dei quali 22 provenienti da allevamenti diversi tra loro



Speciali ringraziamenti:

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- Arianna Boni, Daniela D'Angelantonio, Noemi Battistelli e Krizia D'Agostino, Silvia Scattolini, dott. Francesco Pomilio

