

PROPOSAL Prokaryotes SC
Genus "N15-like viruses"

- 2002.140B.02** to establish a new Genus, within the Family *Siphoviridae*, Order *Caudovirales*
2002.141B.02 to provisionally call this new genus 'N15-like viruses'
2002.142B.02 to designate *Escherichia coli bacteriophage N15 (N15)* as the Type Species of the new Genus.
2002.143B.02 to designate *Klebsiella* phage ϕ K02 as Tentative Species of the new Genus.

Rationale

N15 has been under study since its isolation in Moscow, Russia in 1964. It is a temperate phage which differs from other well characterized phages in having a linear plasmid as its prophage form. Recent studies, including genetic and biochemical experiments and determination of the genome sequence, have firmly established the major features of its life style and have shown that it is significantly different in aggregate from other established Genera within the *Siphoviridae*.

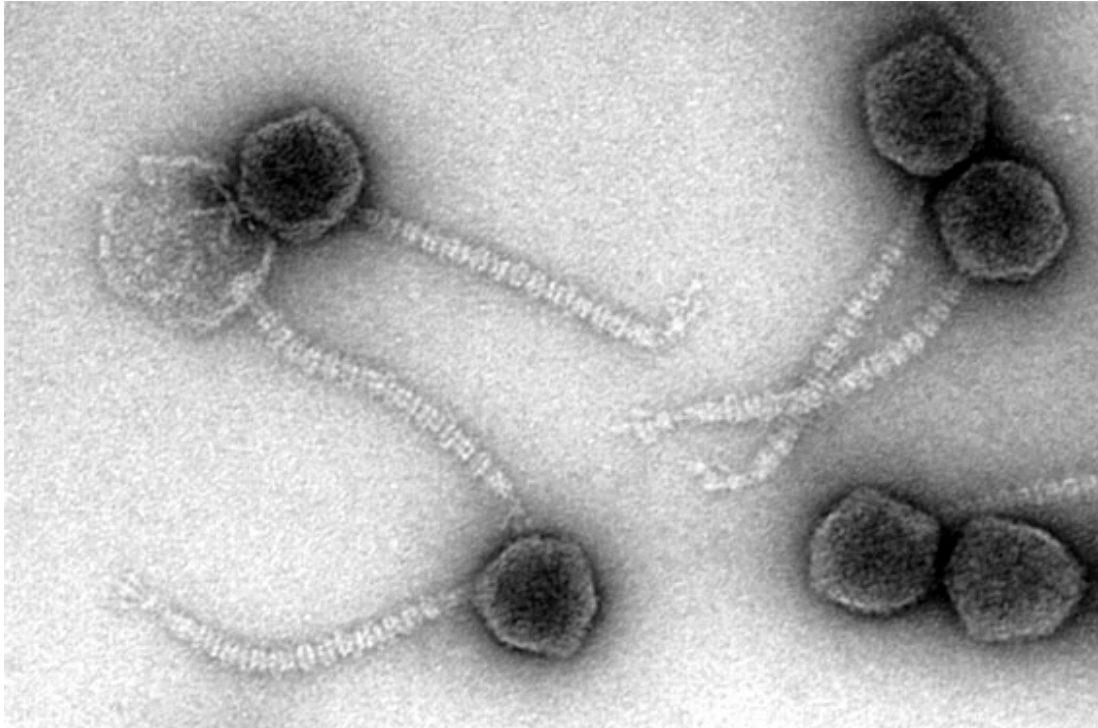
Distinguishing Features

Prophage DNA is present as a linear plasmid with covalently closed hairpin telomeres. Virion DNA has cohesive ends and is packaged as a unit-size filament.

Virion Properties

Morphology

Phage heads are hexagonal in outline (probable icosahedra) about 60 nm in diameter. Tails are non-contractile, flexible, measure 140 x 8 nm, and have short brush-like terminal fibers.



Physicochemical and physical properties

Not characterized in detail.

Nucleic acid

Genome is 46,363 bp in length, has G+C content of 51.2%, has twelve nucleotide 5'-protruding cohesive ends and is nonpermuted. The genome has been fully sequenced.

Proteins

Virion proteins have not been studied, but their high level of similarity to those of lambda heads and HK97 tails suggests that they are very like those phages.

Lipids

None reported

Carbohydrates

None reported

Genome Organization and Replication

The virion genome includes about 50 genes and has cohesive ends. Related functions cluster together. The infecting DNA circularizes and replicates or becomes established as a linear plasmid which is a circular permutation of the virion DNA. Details of DNA replication have not been studied. Organization and sequences of the

late expressed virion structural protein and lysis genes are similar to lambda, but the early expressed genes are very different. An anti-repressor system and putative DNA polymerase gene (primase type) have been identified in the early left operon. Unique to this phage type is the presence of a protelomerase gene that encodes an enzyme that resolves a circular genome molecule at the *telRL* site into the linear molecule with covalently closed hairpin telomeres. An unusually large number of phage genes are expressed from the prophage (2).

Antigenic Properties

Not studied

Biological Properties

Phages are temperate and mitomycin C inducible. Prophages are linear plasmids with covalently closed hairpin telomeres.

Species in the Genus

Escherichia coli phage N15 [AF064539]

Tentative species in the Genus:

Klebsiella phage ϕ K02

References

- Malanin, A., Vostrov, A., Rybchin, V., and Sverchevsky, A. (1992). The structure of the linear plasmid N15 ends. *Mol. Genet. Microb. Virusol.* **5-6**: 22-24. (in Russian)
- Ravin, V., Ravin, N., Casjens, S., Ford, M., Hatfull, G., and Hendrix, R. (2000). Genomic sequence and analysis of the atypical temperate bacteriophage N15. *J. Mol. Biol.* **299**: 53-73.