# Lambda

48,502 base pairs
GenBank Accession #: NC_001416
See page 128 for ordering information.

There are no restriction sites for the following enzymes: AbsI(x), AsiSI, FseI, MauBI(x), MreI(x), NotI, PacI, SfiI, SpeI, SrfI, SwaI

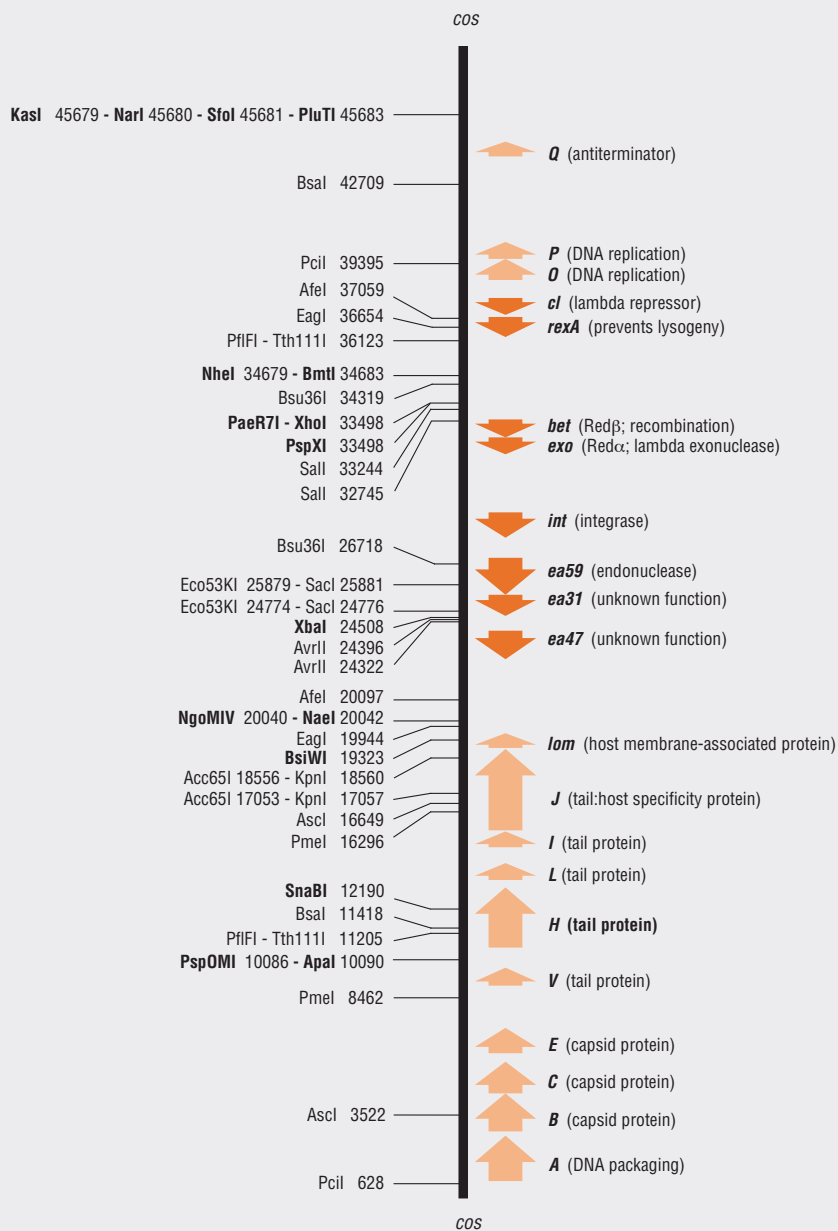(x) = enzyme not available from NEB

✂ **We recommend NEBcutter at NEBcutter.com to identify the restriction sites within your DNA sequence. NEBcutter indicates cut frequency and methylation-state sensitivity.**

Lambda (λ) is a large, temperate *E. coli* bacteriophage with a linear, largely double-stranded DNA genome (1-5). At each end, the 5´ strand overhangs the 3´ strand by 12 bases. These single-stranded overhangs are complementary and anneal to form a *cos* site following entry into a host cell. Once annealed, the genome is a circular, completely double-stranded molecule which serves as a template for rolling-circle replication.

Many laboratory strains of lambda are derivatives of the strain λ *cI*857*ind*1 *Sam*7, which contains four point mutations relative to the wild type strain. The *ind*1 mutation in the *cI* gene creates a new HindIII site at 37584 not present in the wild type. All lambda products sold by NEB are λ *cI*857*ind*1 *Sam*7.

Numbering of the genome sequence begins at the first (5´-most) base of the left end (bottom of diagram below) and continues rightward from late genes *nu1* and *A* towards the early genes. The map below shows the positions of all known ORFs larger than 200 codons.

Enzymes with unique restriction sites are shown in **bold** type and enzymes with two restriction sites are shown in regular type. **Coordinates indicate position of cutsite on the top strand. In previous catalogs, coordinates referred to the position of the 5´ most base on the top strand, please make note of new numbering system.**



*cos*

**KasI** 45679 - **NarI** 45680 - **SfoI** 45681 - **PluTI** 45683

*Q* (antiterminator)

BsaI 42709

PciI 39395 — *P* (DNA replication)
AfeI 37059 — *O* (DNA replication)
EagI 36654 — *cI* (lambda repressor)
PflFI - Tth111I 36123 — *rexA* (prevents lysogeny)
**NheI** 34679 - **BmtI** 34683
Bsu36I 34319
**PaeR7I - XhoI** 33498 — *bet* (Redβ; recombination)
**PspXI** 33498 — *exo* (Redα; lambda exonuclease)
SalI 33244
SalI 32745

*int* (integrase)

Bsu36I 26718

Eco53KI 25879 - SacI 25881 — *ea59* (endonuclease)
Eco53KI 24774 - SacI 24776 — *ea31* (unknown function)
**XbaI** 24508
AvrII 24396
AvrII 24322 — *ea47* (unknown function)

AfeI 20097
**NgoMIV** 20040 - **NaeI** 20042
EagI 19944 — *lom* (host membrane-associated protein)
**BsiWI** 19323
Acc65I 18556 - KpnI 18560
Acc65I 17053 - KpnI 17057 — *J* (tail:host specificity protein)
AscI 16649
PmeI 16296 — *I* (tail protein)

**SnaBI** 12190 — *L* (tail protein)
BsaI 11418
PflFI - Tth111I 11205 — *H* (**tail protein**)
**PspOMI** 10086 - **ApaI** 10090 — *V* (tail protein)

PmeI 8462

*E* (capsid protein)

*C* (capsid protein)

AscI 3522 — *B* (capsid protein)

*A* (DNA packaging)

PciI 628

*cos*

## References

(1) Echols, H. and Murialdo, H. (1978) *Microbiol. Rev.,* 42, 577–591.
(2) Szybalski, E.H. and Szybalski, W. (1979) *Gene,* 7, 217–270
(3) Daniels, D.L., de Wet, J.R. and Blattner, F.R. (1980) *J. Virol.,* 33, 390–400.
(4) Sanger, F., Coulson, A.R., Hong, G.F., Hill, D.F. and Petersen, G.B. (1982) *J. Mol. Biol.,* 162, 729–773.
(5) Daniels, D.L. et al. (1983). In R.W. Hendrix, J.W. Roberts, F.W. Stahl and R.A. Weisberg (Eds.), *Lambda II: Appendix,* New York: Cold Spring Harbor Press.