

PUC

PUC plasmids were first developed by Joachim Messing and his co-workers. It is a commonly used cloning vector in the bacteria *E. coli*.

pUC19 is 2686 bp in length. It is a small plasmid with a high copy number. It contains the *lacZ* gene and has multiple cloning sites.

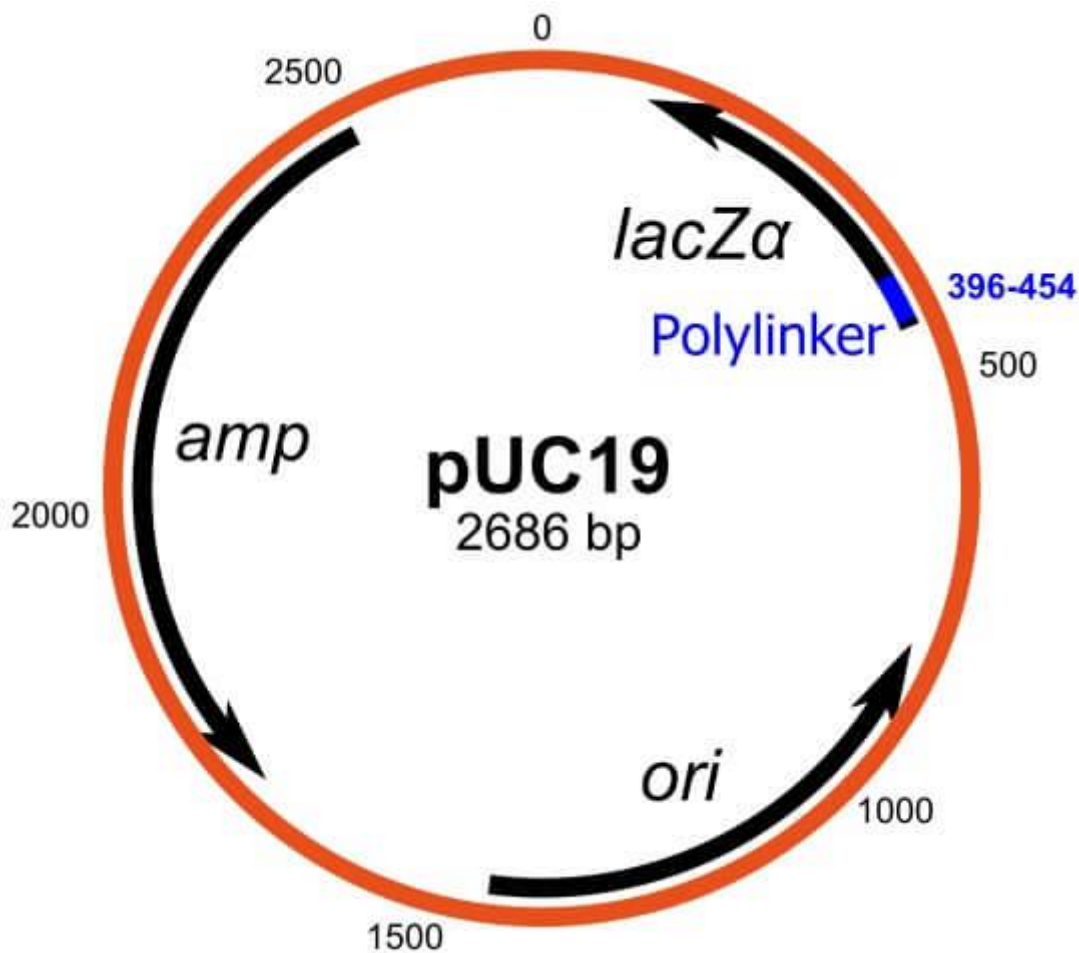
Hence, it is widely used as a cloning vector. pUC19 plasmid is similar to [pBR322 plasmid](#) in structure.

PUC19 full form

P = plasmid

UC = University of California

19 = numerical designation



PUC19 Vector

Structure of pUC19

- It is a 2686 base pair long plasmid.
- **Multiple Cloning Sites** – There is a short sequence of 2.8 kb which contains sites for various restriction enzymes. This increases the number of potential restriction sites available, enabling the production of the desired fragment for cloning.

- **Selectable markers** – The pUC19 plasmid contains an Ampicillin resistance gene which can be used to screen the recombinants. The plasmid also contains the *E. coli* gene lacZ, which encodes for β -galactosidase (β -galactosidase hydrolyses lactose).
- **Restriction sites** – The pUC19 vector carries a 54 bp long multiple cloning site poly-linker containing 13 different hexanucleotide-specific restriction endonucleases sites.

Some of the restriction sites are EcoR1, HindIII, BamH1, and many more.

Advantages

- This is a small cloning vector and has large industrial applications.
- It has one step selection process for the recombinants, hence is used on a large scale.
- It has a high copy number.
- The presence of many restriction sites makes it suitable for cloning.