Dr. Suman Chauhan

Botany Deptt.

N.A.S. College (P.G.)

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Charon Phage

A part from containing useful target sites for restriction enzymes. λ vector should also satisfy some other requirement.

- Firstly they should allow cloning of DNA molecules of a broad size range.
- Secondly it should be possible to distinguish recombinant and parent phages by plaque morphology or marker inactivation.
- Thirdly recombinant phages should be obtainable with high yields.
- Fourthly such vectors should generates a sufficient level of biological safety.
- A set of Charon phages (λ vectors) meets almost all the requirements mentioned above.

Charon Phages are named for the ferryman of greek mythology who conveyed the spirits of the dead across the river styre which separated the realnm of the dividing from hades, the under world. The **E.coli** I replacement vector Charon 4 A for example. Contains three E. co RI sites in its non essential region cleavage with E co RI therefore yields DNA fragments. The central fragments can be easily purified away from the two others fragments at the ends of the molecules by centrifugation.

Since left and right arms are 19.9 and 11.04 kb in length this vector can accommodate insertion between 7 and 20 kb. Charon 4 A is therefore used for cloning large E CORI fragments separation of the interval fragment also eliminated the two markers lac 52 co 256.

Another vector Charon 16 A possess only one ECO RI site for the insertion of foreign DNA. The vector itself can be packaged because it sixe is smaller than the critical 38 Kb which are essential for packaging Charon phage is not restricted to ECOR. target sites. A second generation of vectors has been developed to allow cloning at a no. of other restriction sites Charon 30 is a Bam HI replacement vector.

Most and vector contain genetic markers important for their biological safety Charon 34 and 35 are replacement vectors which different from each other only in their central fragment and will accept fragment 9-20 kb long.

Shuttle vectors

These are the vectors which can replicate in 2 different species.

They contain two origins of replications, one specific for each host sps.

They contain those genes necessary for their replication not provided by the host cells.

These vectors are created by recombinant technique some can be grown in two different prokaryotic species while others can propagate in a prokaryotic sps usually E.coli and a Eukaryotic sps eg. Yeast plants animals **shuttle vectors** because they can be grown in one host and their moved into another without any extra manipulation.

Some yeast plasmid vectors are often used as shuttle vector provided they contain replication origin that is active in both yeast and other host cell such as **E. coli.**

Example of Shuttle Vector

Shuttle vectors designed to replicate in **E.Coli** and Streptomyces.

Constructions of such a vector can be done as follows:-

a) Modules for DNA replication in streptomycres and methylenomycin.
b) A resistance are derived from a streptomy ces plasmid.

This shuttle vectos allow the initial cloning of streptomyces. DNA insert in **E.coli** and their subsequent tests in steptomyces. Shuttle vectors have been specifically designed to satisfy this need. Other example of shuttle vectors are

E. coli and **Bacillus subtilies**
E. coli and **Agrobacterium tumefacien**
E. coli and **corynebacterium**

In case of **E. coli** and cary me bacterium shuttle vectors the E. coli portion of the plasmid could encode resistance to the antibiotic tetracycline chloramphenied or kanomycin. Because both E.coli and carynebacterium sp. Are susceptible to these antibiotics they could be used as selectable marker in both organisms. Most of the Eukaryotic vectors are shuttle vectos.

Most broad host range plasmid vectors replicate only in gram negative organism.

Most of the eukaryotic vectors are shuttle vectors.