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Bacteriophage another common vector system used for cloning DNA. These are viruses which 'infect' E. coli. The M13 bacteriophage is a single-stranded DNA virus which replicates in E. coli in a doublestranded form that can be manipulated like a plasmid. It can be used to produce single-stranded DNA copies which are useful for **DNA sequencing**.

Bacteriophage common vector system used to make DNA libraries. It allows the cloning of larger fragments of DNA than can be incorporated into plasmids.

Transformation is the process by which plasmids (or other DNA) can be introduced into a cell. For E. coli transformation with plasmids is quite straightforward. Plasmids can be introduced by electroporation or by incubation in the presence of divalent cations (usually Ca^{2+}) and a brief heat shock (42°C) which induces the E. coli cells to take up the foreign DNA

1. Two antibiotic selection and replica plating
2. Color selection: blue/white selection using the lacz gene

Insertional inactivation :-

Subcloning a DNA fragment into an active gene (usually a marker gene whose function can be easily detected) will disrupt the function of that gene. This can be detected by looking for colonies that no longer display that phenotype.

Colour selection :-

A more common method to determine which transformants contain plasmids with inserts is to use **colour selection**. For E. coli, this involves the **lac complex** and **blue/white screening**.