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Editorial

Editorial Note on Molecular Cloning

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EDITORIAL

Molecular cloning is a series of molecular biology experimental methods for assembling recombinant DNA molecules and directing their replication in host organisms. Cloning refers to a technique that requires the replication of a single molecule to create a population of cells with similar DNA molecules. In most cases, DNA sequences from two different organisms are used in molecular cloning: the source of the cloned DNA and the species that will act as the living host for recombinant DNA replication. Many contemporary areas of modern biology and medicine depend on molecular cloning methods. In a traditional molecular cloning experiment, the DNA to be cloned is harvested from a target organism and then treated with enzymes in the test tube to produce smaller DNA fragments. After that, these fragments are mixed with vector DNA to make recombinant DNA molecules.

After that, the recombinant DNA is implanted into a host organism (typically an easy-to-grow, benign, laboratory strain of E. coli bacteria). This will result in a population of species that replicate recombinant DNA molecules alongside host DNA. These are transgenic or genetically engineered microorganisms since they contain foreign DNA fragments (GMO). The fact that a single bacterial cell can be induced to take up and replicate a single recombinant DNA molecule is used in this process. This single cell can then be multiplied indefinitely to produce a large number of bacteria, each containing a copy of the original recombinant molecule.

As a result, both the recombinant DNA molecule and the resulting bacterial population are generally referred to as "clones." Molecular cloning refers to the experimental methods used to assemble DNA molecules, while rDNA refers to the DNA molecules themselves. Different DNA sequences could be inserted into a plasmid, and these foreign sequences could then be taken into bacteria and digested as a part of plasmid. While virtually any DNA sequence can be cloned and amplified, some factors can restrict the process' success. Inverted repeats, replication bases, centromeres, and telomeres are examples of difficult-to-clone DNA sequences. The large size of the DNA sequence is another factor that reduces the chances of success. Insertions greater than 10 kbp have a low success rate, but bacteriophages like bacteriophage can be changed to insert sequences up to 40 kbp successfully.

Molecular cloning takes advantage of the fact that the chemical composition of DNA in all living organisms is essentially the same. As a consequence, any fragment of DNA from any organism can be inserted into a DNA segment containing the molecular sequences needed for DNA replication, and the recombinant DNA can then be incorporated back into the organism from which the replication sequences were collected. The foreign DNA would then be repeated in the transgenic organism alongside the host cell's DNA. In that it allows the replication of DNA sequences, molecular cloning is similar to polymerase chain reaction (PCR). The primary distinction between the two approaches is that molecular cloning requires DNA replication in a living microorganism, while PCR involves DNA replication in an in vitro solution.

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