Transgenic Bacteria

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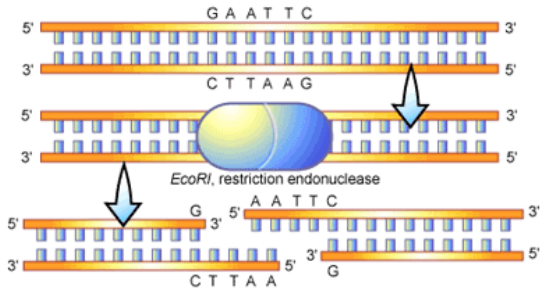
The functions of the human body are controlled by an unstable code, which often fails resulting in the absences of particular, often critical enzymes and proteins. The absence of these compounds is often deadly, and replacing them by using animals is beyond the financial means of most people. Genetic engineering has provided a solution to this problem: the use of bacteria to grow molecules, this allows mass production of exact proteins at low costs. By far the most prominent example of this is insulin, which was first artificially produced in 1978. Several of the proteins that are now being produced mass produced via E. coli also include HGH, tPA, and the Hepatitis B Vaccine.

The procedure used to modify a bacteria's genome is extremely straight forward and nature inspired. Viruses reproduce by cutting a host cells chromosome, and then it inserts a strand of its own genetic code into the bacteria. The code is then expressed, eventually resulting in copies of the virus to be formed.

In order to produce specific proteins a plasmid vector is utilized. In order to insert the structure endonuclease enzymes, which cut at particular palindrome sequences, are utilized. The target sequence, which must be present in both the host and the plasmid are cut, and at a certain low frequency the plasmid strand is inserted in host chromosome. The plasmid is required to have certain critical features, first the needed gene along with a promoter must be inserted. Also the plasmid must have a large number of different endonuclease sites in order to provide flexible insertion options.



The final pair of critical features is an identification gene, something that gives the bacteria a particular unique color or chemical signature, or an enzyme that provides resistance to a particular pathogen. When done en mass a small percentage of E. coli will be recombinant, and using identification or resistance genes can be isolated and grown.

Reference:

"Principles of Biotechnology." UCSA Library. 28 Nov. 2007 <http://www.library.ucsf.edu/collres/archives/bio/principles.html?printfriendly=1&>.

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