Recombinant dna technology

Technology

The men were attending a conference on plasmids, and discussed the ability to introduce plasmid DNA into the bacterium E Coli that would allow researchers to actually clone the plasmids In the bacteria. Borer and Cohen eventually chose different paths, both affected by the growing concerns about the safety of recombinant DNA technology, but this meeting Is marked as the beginning of the biotechnology revolution. Cohen stayed In academia and defended recombinant DNA technology In US congressional hearings.

During the same time, in 1976 Herbert Borer partnered with venture fatalist and MIT graduate Robert Swanson to set up and develop the worlds first biotechnology company, Genetic (Russo, 2003). Since its introduction in the sass's the biotechnology industry has exploded, revolutionized science and agricultural as well as pharmaceutical production. In 2011, Ernst stated in the US alone there were 1, 870 public and private biotechnology companies, their revenues worth over 60 billion US dollars (www. Y. Com, 2012). To better understand how biotechnology has Impacted the world we live in, it is good to have a broad understanding of the underlying principles of recombinant DNA technology. Firstly, two types of DNA are Isolated. The first Is bacterial plasmids that will act as the " gene carriers" and the second Is DNA from another organism with a gene of Interest (Campbell essential biology, 1967). The plasmid is cut in one place, and the DNA is cut in the area of interest for a specific gene.

Restriction enzymes cut double- stranded DNA molecules at highly specific locations, called restriction sites, into fragments that can be manipulated (Harrison, Sampson, 1992). The specificity of the different enzymes depends on the base sequence of the DNA. Some enzymes cut tooth strands at the

same point to produce " blunt ends", others cut strands at different points producing staggered ends " sticky ends" (Harrison, Sampson, 1992). The DNA fragments are then mixed with the cut plasmids, joining together at their base pairs, or " sticky ends" (G with C and T with A in a sequence).

The union Is made permanent by a " pasting enzyme" called DNA liaise, thus creating recombinant DNA. (Campbell essential biology, 1967). The bacterium contacting the recombinant plasmid Is then mass-produced creating clones of the recombinant DNA to be grown in large quantities. The success of biotechnology companies reflects the high and breeding has been altered, giving animals more meat, as well as giving cows growth hormones to produce more milk (Donnelley & McCarthy, 1994). Biotechnology is responsible for the synthesis of useful proteins to create vaccines and drugs that fight acute or chronic diseases and illnesses.

Due to recombinant DNA technology, insulin is readily available to diabetics. Alternatively, genetically modified organisms (Smog's) have been responsible for advancements in agar-business. In agriculture, biotechnology has allowed for genetically modified crops to produce more yield, and hush more revenue for farmers, by creating pest-resistant, weather- resistant crops (Federate, 2010). Genetically modified food products can be given a longer shelf life through altering the genetics of an organism. To farmers, and a world with a growing population, genetically modified crops are looking more and more attractive.

Weather resistant Smog's that can grow in otherwise detrimental climates have even been suggested as a solution to world hunger. There is concern

about the safety and ethics of genetically modified and engineered organisms. In many European entries, GM foods are clearly labeled, in the US and Canada, there is no mandatory labeling laws for genetically engineered foods or products (Federate, 2010). Scientific data has indicated in some circumstances that animals fed by GM crops have been harmed or died. In some instances animals exposed to GM crops developed abnormally and displayed detrimental reproductive issues (Magmata & Arden, 2011).

Increasing prevalence of food allergies has also lead to blaming untested genetically modified crops as the source of the allergies (Magmata & Arden, 2011). Environmentalists are also enraged at the introduction of genetically modified organisms. GM seeds, once planted, and harvested, yield seeds of their own and often mix with wild, organic seeds, thus producing offspring that are hybrids of the genetically modified organism. Loss of biodiversity due to the GM resistant strains overtaking natural plant breeds in nature is a serious concern for environmentalists and biologists (Burke, 2012).

They claim that the effects of Smog's have not been researched or experimented long enough to determine if there are any long-term side effects to humans (Magmata & Arden, 2011). Although the biological advancements in medicine and science have greatly improved the quality of life of unmans, the effects of genetically modified foods and GM animals is concerning. By providing vaccines otherwise unavailable to humans through biotechnology, many people experience longer then expected life spans. Usefulness of recombinant DNA technology in the worlds healthcare system can not be denied.

However, the dependence on GM food in sustaining the world's population should be examined more in depth. Has enough research been conducted on the effects of Smog's on humans, animals, biodiversity, and the environment? I would disagree that sufficient data exists to be exploiting the science of biotechnology as vastly as humans have.