Biotechnology Timeline

Natalie Braun

1857

Louis Pasteur
Fermentation

Pasteur proved that a microscopic plant caused the souring of milk. Pasteur was able to prove that living cells, the yeast, were responsible for forming alcohol from sugar, and that contaminating microorganisms found in ordinary air could turn the fermentations sour.

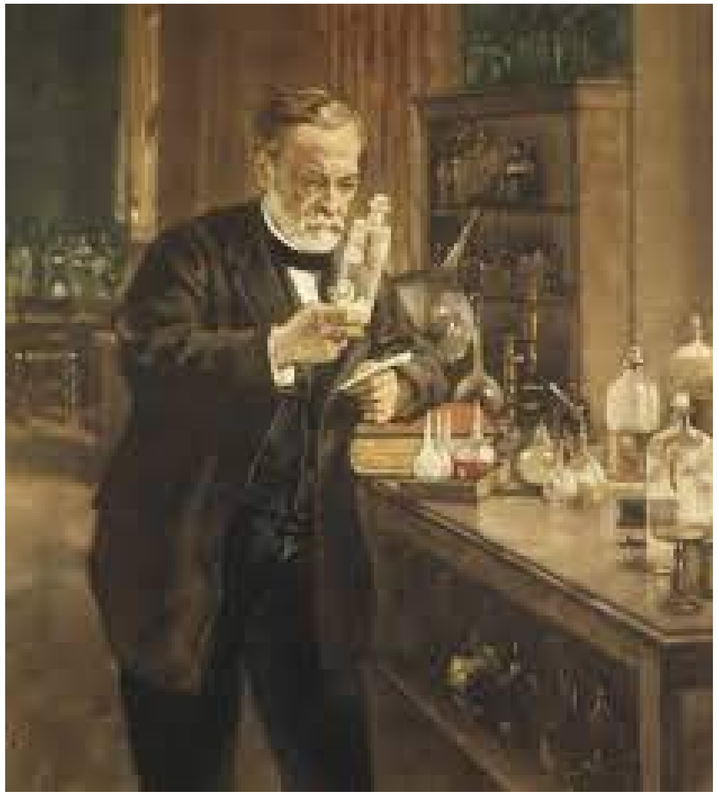
Pasteur was able to devise a process, now known as pasteurization, to kill microbes and preserve certain products.

1928

Alexander Fleming discovered penicillin. This discovery led to the introduction of antibiotics that greatly reduced the number of deaths from infection.

Discovery of penicillin by Alexander Fleming

Louis Pasteur - fermentation - 1857



Discovery of penicillin by Alexander Fleming - 1928

Biotechnology Timeline

Watson & Crick
Double Helix Structure
of DNA

1953

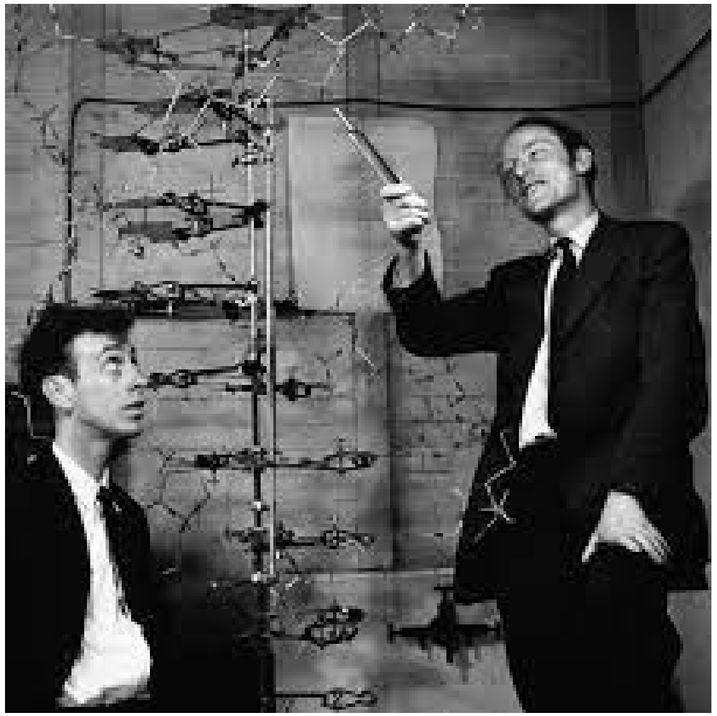
The discovery in 1953 of the double helix, the twisted-ladder structure of deoxyribonucleic acid (DNA), by James Watson and Francis Crick marked a milestone in the history of science and gave rise to modern molecular biology, which is largely concerned with understanding how genes control the chemical processes within cells.

Gregor Mendel, through his work on pea plants, discovered the fundamental laws of inheritance. He deduced that genes come in pairs and are inherited as distinct units, one from each parent. Mendel tracked the segregation of parental genes and their appearance in the offspring as dominant or recessive traits. He recognized the mathematical patterns of inheritance from one generation to the next.

1965

Gregor Mendel
Genetics & Heredity

Watson & Crick - Double Helix Structure of DNA - 1953



Gregor Mendel - genetics hereditary - experiment w/ pea plants (1856-1863) results published in 1965

Biotechnology Timeline

Cohen & Boyer
Synthetic human
insulin gene

1978

The discovery of insulin now allows people who suffer from diabetes to get treatment. Before, many people didn't live for long as there was not much doctors were able to do for them.

Now, people with diabetes can choose from a variety of formulas and ways to take their insulin based on their personal needs and lifestyles. From Humalog to Novolog and insulin pens to pumps, insulin has come a long way.

The first genetically modified plant (GMP) was a tobacco resistant to antibiotics in 1983

Some benefits of genetic engineering in agriculture are increased crop yields, reduced costs for food or drug production, reduced need for pesticides, enhanced nutrient composition and food quality, resistance to pests and disease, greater food security, and medical benefits to the world's growing population.

1983

First genetically
modified plant

Synthetic version of the human insulin gene - 1978

First genetically modified plant - 1983

Biotechnology Timeline

1984

DNA Fingerprinting

DNA fingerprinting was invented in 1984 by Professor Sir Alec Jeffreys after he realized you could detect variations in human DNA, in the form of these minisatellites. DNA fingerprinting is a technique that simultaneously detects lots of minisatellites in the genome to produce a pattern unique to an individual. This is a DNA fingerprint.

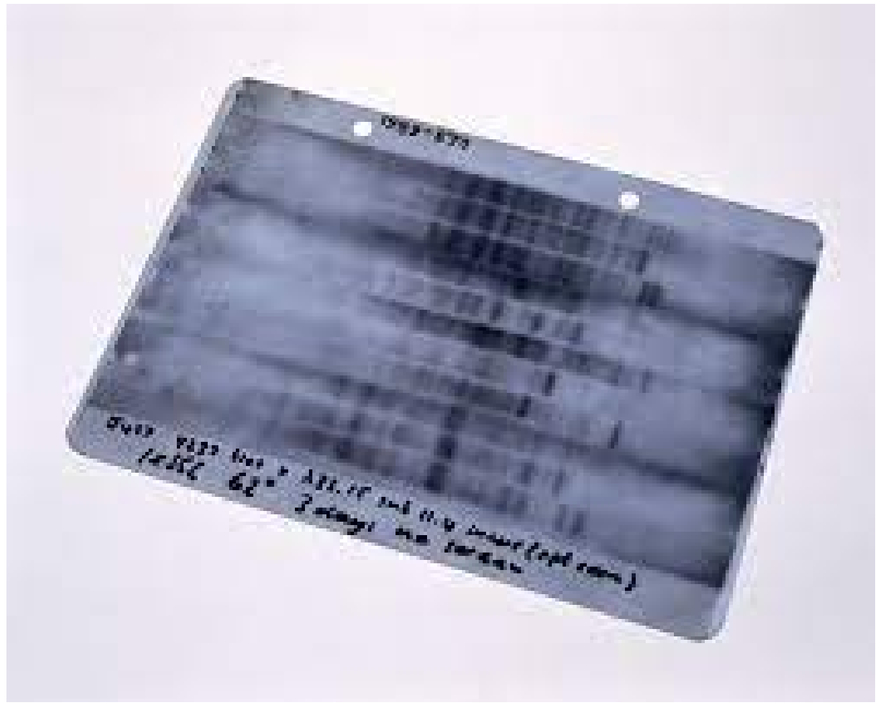
1985

Discovery of PCR

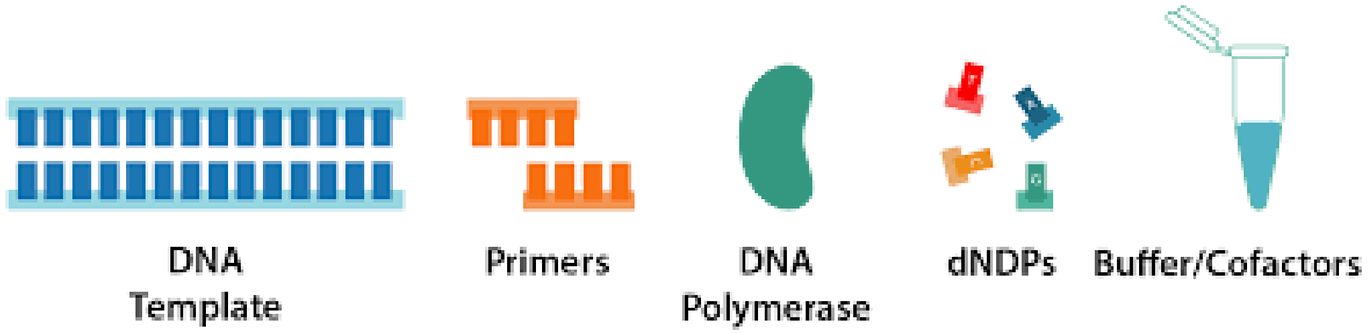
In 1985, Kary Mullis invented the process known as polymerase chain reaction (PCR), in which a small amount of DNA can be copied in large quantities over a short period of time.

New DNA chains are formed and the process can then be repeated. PCR has been of major importance in both medical research and forensic science.

DNA Fingerprinting - 1984



Discovery of PCR - 1985



Biotechnology Timeline

1990

Development of human genome project (HGP)

The HGP was developed in collaboration with the United States Department of Energy and began in 1990 to map the human genome.

In 1993, NCHGR expanded its role on the NIH campus by establishing the Division of Intramural Research to apply genome technologies to the study of specific diseases.

The Human Genome Project (HGP) was declared complete in April 2003

1993

CRISPRs were first identified in E. coli in 1987 by a Japanese scientist, Yoshizumi Ishino, and his team. However, due to the lack of sufficient DNA sequence data, the function of these arrays remained a mystery.

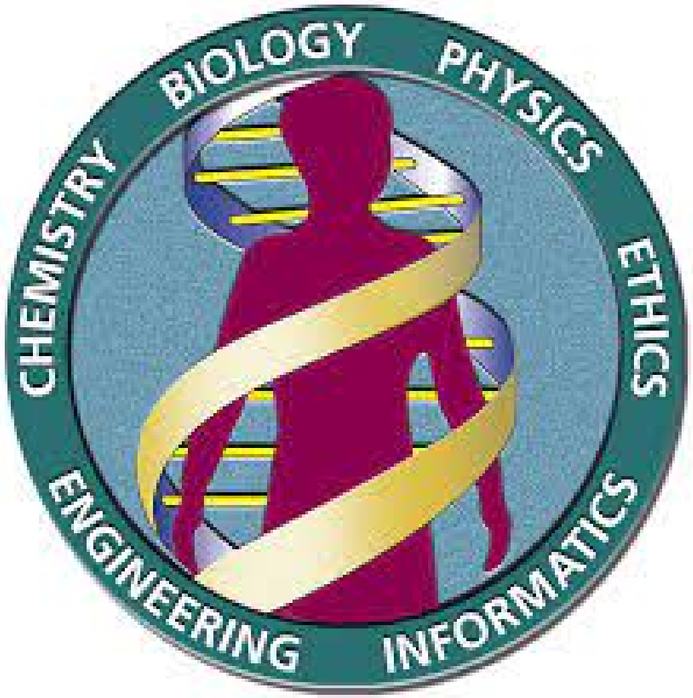
In 1993, researchers led by J.D. van Embden in the Netherlands discovered that different strains of Mycobacterium tuberculosis had different spacer sequences between the DNA repeats. They characterized M. tuberculosis strains based on their spacer sequences.

Subsequently, these sequences were identified in several other bacterial and archaeal genomes. Researchers Francisco Mojica and Ruud Jansen were the first to refer to them as CRISPRs.

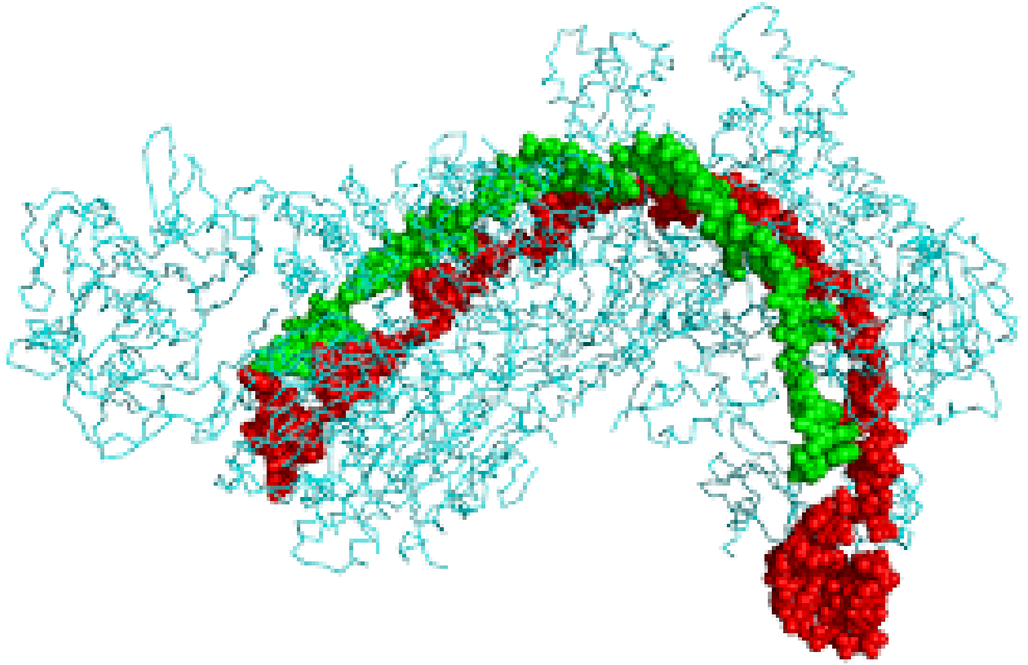
CRISPR

Clustered **R**egularly **I**nterspaced **S**hort **B**alindromic **R**epeats

Development of human genome project - 1990



CRISPR - 1993



Biotechnology Timeline

The first cloned animal
(Dolly the sheep)

Born July 5, 1996

1996

Dolly was part of a series of experiments at The Roslin Institute that were trying to develop a better method for producing genetically modified livestock. If successful, this would mean fewer animals would need to be used in future experiments.

Dolly was important because she was the first mammal to be cloned from an adult cell. Her birth proved that specialised cells could be used to create an exact copy of the animal they came from. This knowledge changed what scientists thought was possible and opened up a lot of possibilities in biology and medicine, including the development of personalised stem cells known as iPS cells.

The National Gene Bank was established in 1996 to preserve the seeds of Plant Genetic Resources (PGR) for future generations and has the capacity to preserve about one million germplasm in the form of seeds.
preserve cultivated biodiversity when land races began to be substituted by modern varieties. This move was generally accepted as a necessary step to safeguard the future.
secures the long-term conservation of plant genetic resources, which are essential elements of agricultural research and development

1996

Development of National Gene Bank

The first cloned animal (Dolly the sheep)

Development of National Gene Bank