

TECHNIQUES IN GENETIC ENGINEERING

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“Most people say that it is the intellect which makes a great scientist.

They are wrong: it is character.”

Albert Einstein

CHAPTER 1

Introduction to Genetic Engineering

“Science may set limits to knowledge, but should not set limits to imagination.”

Bertrand Russell (1872-1970)

between 8000 -1000 BC	horses, camels, oxen and many other species were already domesticated;
by 6000 BC	yeast was used to make beer;
by 5000BC	plants such as maize, wheat and rice were bred.
420 BC	Socrates speculated on why children don't necessarily resemble their parents;
by 400 BC	Hippocrates would propose that male contributes to his child's character in his semen: the idea of ' heredity ' was thus established

17th century	Antoni van Leeuwenhoek's homunculi
19th century	Mendel's pea study (took him 8 years)
1868	DNA is discovered
1883	eugenics movement
1944	DNA was shown to carry genetic information (Avery and colleagues)
1945	William Astbury (a biophysicist in the field of X-ray analysis) coined the term molecular biology
1953	Franklin, Wilkins, Watson, and Crick discover the structure of DNA (three of them receive Nobel Prize)
1966	Genetic code is cracked (Nirnberg and colleagues receive Nobel Prize)
1970	Restriction enzymes are discovered
1976	The first biotech company Genentech is born

1980s	first transgenics via microinjection and germline transmission
1982	Human insulin produced in bacteria
1983	Karen Mullis devised Polymerase Chain Reaction
1986	Human Genome Initiative is launched
1990s	first gene therapy
1994	Genetically engineered Flavr-Savr tomato out in market
1997	Dolly the Sheep cloned by Wilmut and colleagues at Roslin Institute
1998	Human embryonic stem cell lines are established

2000	Rough draft of the Human Genome announced
2002	Rice Genome sequenced
2007	Included pluripotent stem cells produced
2010	First synthetic cell produced (J. Craig Venter Institute)
Early 2000s	expanding genetic code with unnatural amino acids and unnatural nucleotides
Late 2000s	optogenetic technologies
Late 2000s	genome editing Technologies

..... FUTURE ????