Herbert Wayne Boyer Biography

Herbert Wayne Boyer

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Biography

In 1973 Herbert Boyer was part of the scientific team that first described the complete process of **gene** splicing, which is a basic technique of genetic engineering (recombinant **DNA**). Gene splicing involves isolating DNA, cutting out a piece of it at known locations with an enzyme, then inserting the fragment into another individual's genetic material, where it functions normally.

Boyer was born in Pittsburgh and received a bachelor's degree in 1958 from St. Vincent College. At the University of Pittsburgh he earned an M.S. in 1960 and a Ph.D. in bacteriology in 1963. In 1966 Boyer joined the **biochemistry** and biophysics faculty at the University of California, San Francisco, where he continues his research.

Boyer performed his work with Stanley Cohen from the Stanford School of Medicine and other colleagues from both Stanford and the University of California, San Francisco. The scientists began by isolating a plasmid (circular DNA) from the **bacteria** *E. coli* that contains genes for an **antibiotic resistance** factor. They next constructed a new plasmid in the laboratory by cutting that plasmid with restriction endonucleases (**enzymes**) and joining it with fragments of other **plasmids**.

After inserting the engineered plasmid into *E. coli* bacteria, the scientists demonstrated that it possessed the DNA nucleotide sequences and genetic functions of both original plasmid fragments. They recognized that the method allowed bacterial **plasmids** to replicate even though sequences from completely different types of cells had been spliced into them.

Boyer and his colleagues demonstrated this by **cloning** DNA from one bacteria species to another and also cloning animal genes in *E. coli*.

Boyer is a co-founder of the genetic engineering firm Genentech, Inc. and a member National Academy of Sciences. His many honors include the Albert and Mary Lasker Basic Medical Research Award in 1980, the National Medal of Technology in 1989, and the National Medal of Science in 1990.