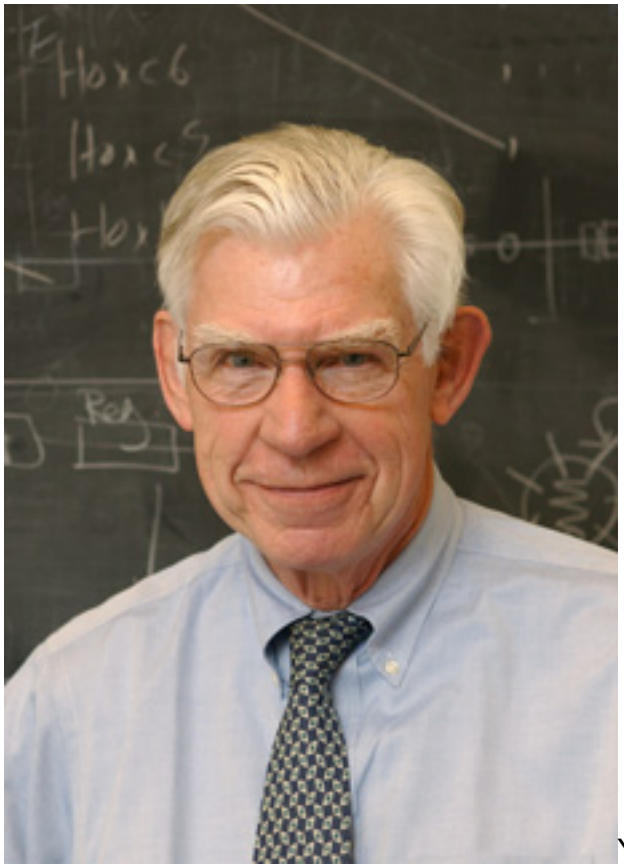
In memoriam: Francis (Frank) Ruddle

Yale UniversityYale University



Yale scientist Francis Hugh (Frank) Ruddle, a pioneer in genetic engineering and the study of developmental genetics, died March 10 in New Haven. He was 83 years old.

Ruddle’s research, along with that of Dr. Jon W. Gordon of Mount Sinai School of Medicine, led to the production of transgenic animals, which allowed scientists to study the function of genes in living organisms and helped launch the biotechnology revolution that continues today. Ruddle, who held a faculty appointment as Sterling Professor of Biology at Yale, was known almost as much for his gentle and courtly demeanor, his dedication to New Haven, and his passion for art, as for his scientific brilliance, note his colleagues.

“Frank Ruddle was a true pioneer in the genetics of mice and humans,” said Francis Collins, director of the National Institutes of Health. “He laid important parts of the foundation for the Human Genome Project, and he was a gentle and encouraging friend to many, including me.”

Ruddle enlisted in the U.S. Army Air Force and served in Japan after World War II, and joined the Yale biology department in 1961 after getting his doctorate at the University of California–Berkeley.

He studied somatic cell genetics and was particularly interested in how DNA could

be shuffled or recombined. He developed laboratory techniques that allowed for the mapping of genes on chromosomes and created the Human Gene Map at Yale, a precursor to the Human Genome Project that was launched in 1989. Throughout the 1970s, Ruddle explored the possibility of using gene transfer to create a mouse model to study human disease and development. Along with his then-postdoctoral student Gordon, Ruddle introduced foreign genes into the mouse, creating the first transgenic animals. The research was published in seminal papers published in 1980 and 1981, and set the stage for an explosion of research using genetically modified organisms.

“Importantly, the mice grown from these cells continue to pass on these new genes to their offspring, and thus he could create entirely new breeds of mice,” said Ronald Breaker, chair of Yale’s Department of Molecular, Cellular, and Developmental Biology. “Variations of this key discovery are commonly used today to study genetic diseases and to help reveal the mysteries of many animal genes.”

Ruddle left work in traditional genetics just as efforts to catalogue the human genome began to draw global interest during the 1990s. Instead, he began to investigate the mechanisms by which a few nearly identical genes oversee the development of multicellular organisms — a discipline known as developmental genetics. His study of Hox genes, which contain body plans for species as diverse as mice and humans, became crucial to modern understanding of how evolution shaped life’s diversity. The importance of such developmental genes became evident at the dawn of the 21st century with the study of embryonic stem cells, from which all cell types arise.

“I personally was amazed at how Frank always could take a complex and apparently intractable problem, on science or on some topic of great importance, to the department and bring instant clarity with only a few words,” Breaker said. “I don’t think you learn this skill — Frank just had it.”

“He was a serial visionary,” agreed Gunter Wagner, the Alison Richard Professor of Ecology and Evolutionary Biology at Yale, who worked with Ruddle extensively. “He also had a broad appreciation of life and in his retirement turned to drawing and art.”

Ruddle was a member of the National Academy of Sciences, the Institute of Medicine, and the American Academy of Arts and Sciences. He was the recipient of many prizes and awards, including the Dickson Prize in Medicine and the William Allan Award of the American Society of Human Genetics

He served 10 years on the board of Science Park in New Haven, helping to launch several biotechnology companies, including Genaissance Pharmaceuticals and CuraGen Corp. Ruddle cofounded both Molecular Diagnostics Inc. and Molecular Therapeutics Inc., which became the basis for Research and Development at Miles Laboratories (now Yale’s West Campus) in West Haven, Connecticut.

Ruddle is survived by his wife of 48 years, Nancy Ruddle, professor emeritus and senior research scientist in epidemiology (microbial diseases) at the Yale School of

Medicine; his daughters, Kathlyn Ruddle and Amy Ruddle Shohet; grandchildren, Alexis Shohet, Calista Shohet, and Leo Shohet; sister, Mary Haenschke; sisters-in-law, Josephine Chaplin and Kirsten Hartman; and several nieces and nephews.