Clifford Grobstein (1916-1998) [1]

By: Jacobson, Brad Keywords: Biography [2] Medicine [3] Anatomy [4] Education [5]

Clifford Grobstein [6] was a traditional, influential, and highly innovative biologist of the mid-twentieth century, gifted with many character facets and pragmatic talents. His early adulthood passion of linking classical embryology [7] with developmental anatomy and medicine was joined by his later pursuit of combining research ethics and science education with public policy.

Grobstein was born in New York City on 20 July 1916 to Birdie and Aaron Grobstein. Raised in a Jewish family of five, including a brother (Richard) and a sister (Fern), he quickly assessed his talents for science at a New York public educational institution that later, in 1938, became the acclaimed Bronx High School of Science. After graduating from high school at age sixteen, Grobstein enrolled at the City College of New York (CCNY) and by the close of his junior year had committed himself to becoming a graduate student in the blossoming fields of embryology [7] and biology. City College was among the country's earliest liberal colleges, providing affordable education to anyone with the proper intellectual qualifications and denying sex, race, income, and religious preference as relevant categories for admission.

Grobstein graduated from CCNY with a BS in 1935, and after a long talk with one of CCNY's only Jewish professors, who candidly explained to him that there were only six Jewish biologists in the country (of which he was one), Grobstein received a rare but highly influential letter of recommendation to attend graduate school. After a brief visit to Los Angeles, California, where rumors of his credentials had preceded his arrival, Grobstein was asked to join the zoology graduate program at the University of California at Los Angeles (UCLA).

During his studies at UCLA, Grobstein became interested in the inductive qualities of endocrine signaling chemicals as they pertain to anal fin regeneration in marine fish [8]. Grobstein's graduate studies at UCLA helped to broaden the scope of biology as it probed the relatively new field of morphogenesis and inductive cell interactions. Grobstein received his PhD in zoology in 1940.

Grobstein received his first postgraduate academic appointment at Oregon State University in 1940. There he continued his research on tissue morphogenesis and appendage differentiation [9] in fish [8]. In 1942 Grobstein's academic career went on hold. At this point World War II had been raging for several years and now that the United States was involved, President Franklin D. Roosevelt needed science and technology innovation to help bring the war to a close. As a matter of duty, and personal interest, Grobstein enlisted in the US Air Force. He studied aviation physiology for three years from the height of the war in 1943 until 1946, just after its conclusion.

After completion of his military service, Grobstein was appointed as a senior research fellow at the National Cancer Institute [10] in Bethesda, Maryland. As a member of the biology division, and perhaps due to his close proximity to mammalian scientists, Grobstein began to shift his focus from developmental fish [8] studies towards the promising field of mouse [11] genetics.

Using the mouse [11] model as a platform for studying developing cell interactions *in vitro* [12], Grobstein was able to hone his skills by reaching out to interdisciplinary scientists within his department. By implementing multiple disciplinary methodologies, Grobstein was able to master techniques in tissue culture, mouse [11] genetics, and developmental oncology. By the mid-1950s he had published four highly influential papers ranging from tissue interactions to cell specialization, determination [13], and patterning. Within these papers he illustrated the importance of using certain techniques such as interposing Millipore filter paper between the epithelium [14] and mesenchyme [15] layers of developing mouse [11] embryos to show that even in the absence of cell-to-cell contact, organogenesis [16] could still occur via transduction of morphogenetic signaling molecules through the filter paper.

After publishing a series of papers in 1953, Grobstein began to attract a large number of highly successful graduate students, undergraduate students, and postdoctoral fellows to his laboratory. Some of the more notable people who worked with and around Grobstein at this time were William J. Rutter, now a member of the National Academy of Sciences [17]; Julius S. Youngner, whose work on pancreatic and kidney tissues facilitated Jonas Salk's mission to develop a working vaccine for polio in 1955; and Howard Holtzer, who published several papers on somite development while working with Grobstein.

In 1957 Grobstein's strong work ethic and growing status as a leading developmental biologist—dogmatically referred to by some as "embryologists" at the time—made him a prime candidate for Stanford's quest to bring the three most productive

biologists in the country onto its staff. The team consisted of Arthur Kornberg, Joshua Lederberg, and Grobstein. The primary task of the team was to develop novel inquiries into the fundamental role of DNA and genetics as they pertain to cell differentiation [9] and morphological growth during embryogenesis [18]. While at Stanford, Grobstein also became interested in improving the biology curriculum in public and secondary education. This interest eventually helped shift his primary focus from developmental biology to bioethics and public policy.

Amidst the remixing of scientific disciplines during the post-World War II era, Grobstein's field of developmental biology was no exception. Interactions between the once segregated fields of biology, ecology, biochemistry, biophysics, mathematics, statistics, and electron microscopy [19] paved the way for interdisciplinary interaction and exponential scientific growth. Grobstein's awareness of this revolution was acute. In the mid-1960s he began to lobby through the National Science Foundation to push new biology teaching curricula into high school and college classrooms. In 1965 he authored a book called *The Strategy of Life* outlining the interconnectedness of all living and nonliving systems. Interspersed within the book are various clues which illuminate his views surrounding the evolution [20] of human knowledge and social systems.

Grobstein's progressive ideas about science education at Stanford were noticed by the nearby University of California, San Diego. In 1965 UCSD appointed Grobstein as chair of the Department of Biology. Shortly after his move he was promoted to dean of the School of Medicine just before the medical school opened its doors in 1968. Before the first round of students had graduated, Grobstein had already written two highly influential papers addressing the fundamental role of the medical community as it pertained to discourse, research, and curriculum.

By the mid-1970s Grobstein had adopted an almost entirely new academic direction by immersing himself in the ethical controversies surrounding the fields of biomedicine and embryology [7]. By the close of the 1970s, he was heavily affiliated with the political movements regarding the regulation [21] of DNA research and recombinant technology, so much so that he published a book in 1979 called *A Double Image of the Double Helix: The Recombinant-DNA Debate*. By the turn of the decade, and just a few years after the first *in vitro* [12] fertilization [22] (IVF) success story, he became fully committed to bringing rationality and objectivity to the emerging field of IVF research. In 1983 and 1985 he co-published two papers in *Science* and the *New England Journal of Medicine*, respectively, outlining the current state of affairs in the field of IVF as well as the proper handling of frozen embryos left over after successful implantations. These papers, along with his contributions to public policy, helped to shape debates revolving around the ethical use of stem cell research up to the time of his death on 6 September 1998 in La Jolla, California.

Clifford Grobstein [6] was a preeminent embryologist and creative experimentalist of the twentieth century. His ability to balance motivation and curiosity with discipline and objectivity made him one of the most credible and influential policy innovators from the field of developmental biology, embryology [7], bioethics, and research.

Sources

1. Grady, Denise. "Clifford Grobstein, 82, Biologist Who Applied Ethics to Research." *New York Times*, September 13, 1998, US section, New York edition.
2. Jaques Cattell Press, ed. "Grobstein, Clifford." *American Men and Women of Science* 2. New York: Jaques Cattell Press, 1972, 2337.
3. Koertge, Noretta. "Grobstein, Clifford." *Dictionary of Scientific Biography* 3: 186–190.
4. Wessells, Norman K. "Clifford Grobstein, 1916–1998." *Biographical Memoirs* National Academy of Sciences [17] 78 (2000): 65–93. http://books.nap.edu/html/biomems/cgrobstein.html [23].

Clifford Grobstein was a traditional, influential, and highly innovative biologist of the mid-twentieth century, gifted with many character facets and pragmatic talents. His early adulthood passion of linking classical embryology with developmental anatomy and medicine was joined by his later pursuit of combining research ethics and science education with public policy.

Subject
Grobstein, Clifford, 1916-1998 [24]

Topic
People [25]

Publisher
Arizona State University. School of Life Sciences. Center for Biology and Society. Embryo Project Encyclopedia.

Rights

Format

Articles [26]

Last Modified

Wednesday, July 4, 2018 - 04:40

DC Date Accessioned

Thursday, May 10, 2012 - 14:01

DC Date Available

Thursday, May 10, 2012 - 14:01

DC Date Created

2010-11-19

DC Date Created Standard

Friday, November 19, 2010 - 07:00

- Contact Us

- The Embryo Project at Arizona State University, 1711 South Rural Road, Tempe Arizona 85287, United States

---

Source URL: https://embryo.asu.edu/pages/clifford-grobstein-1916-1998

Links
[1] https://embryo.asu.edu/pages/clifford-grobstein-1916-1998
[2] https://embryo.asu.edu/keywords/biography
[3] https://embryo.asu.edu/keywords/medicine
[4] https://embryo.asu.edu/keywords/anatomy
[5] https://embryo.asu.edu/keywords/education
[6] https://embryo.asu.edu/search?text=Clifford%20Grobstein
[7] https://embryo.asu.edu/search?text=embryology
[8] https://embryo.asu.edu/search?text=fish
[9] https://embryo.asu.edu/search?text=differentiation
[10] https://embryo.asu.edu/search?text=National%20Cancer%20Institute
[11] https://embryo.asu.edu/search?text=mouse
[12] https://embryo.asu.edu/search?text=in%20vitro
[13] https://embryo.asu.edu/search?text=determination
[14] https://embryo.asu.edu/search?text=epithelium
[15] https://embryo.asu.edu/search?text=mesenchyme
[16] https://embryo.asu.edu/search?text=organogenesis
[17] https://embryo.asu.edu/search?text=National%20Academy%20of%20Sciences
[18] https://embryo.asu.edu/search?text=embryogenesis
[19] https://embryo.asu.edu/search?text=microscopy
[20] https://embryo.asu.edu/search?text=evolution
[21] https://embryo.asu.edu/search?text=regulation
[22] https://embryo.asu.edu/search?text=fertilization
[23] http://books.nap.edu/html/biomems/cgrobstein.html
[24] https://embryo.asu.edu/library-congress-subject-headings/grobstein-clifford-1916-1998
[25] https://embryo.asu.edu/topics/people
[26] https://embryo.asu.edu/formats/articles