

S. Jonathan Singer: A man who loved ideas and detested walls

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S. Jonathan Singer, “Jon” to one and all, died February 2, 2017, at the age of 92. Educated as a physical chemist, he transitioned gracefully by way of protein and immunochemistry to become a cell and molecular biologist of huge renown. His initial bout with fame came in 1949 when Jon was a postdoctoral fellow with Linus Pauling at the California Institute of Technology and, together with Harvey Itano, showed that sickle cell hemoglobin differed from normal hemoglobin by Tiselius electrophoresis (1). The years at the California Institute of Technology also led Jon into the antibody field by way of a collaboration with the immunologist Dan Campbell, something that would stand him in good stead later. After his postdoctoral stint, Jon was appointed to the faculty at Yale in the Department of Chemistry, where he remained until 1961. At that point Jon joined the microbiologist David Bonner, who was leaving the Yale School of Medicine, to set up an innovative department of biology at a new branch of the University of California, La Jolla in San Diego (UCSD).

Bonner had strong feelings about how molecular biology was changing the teaching of science in general and medicine in particular. His untimely death in May of 1964, forced Jon to take over as department chair. Fortunately, he and Bonner shared the same unbridled and idealistic views of science and education, and Jon set about ensuring that these views became an integral part of the new university. Theirs was the philosophy of the big tent: the Department of Biology would embrace all aspects of the subject; geneticists, biochemists, physiologists, all together; no separate departments to impede cross-fertilization or the flow of knowledge. And, if there must be any boundaries at all, let them be

porous. At UCSD, the departments of Chemistry and Biology would not only be housed in the same building, they would have their laboratories alternately placed and would share general equipment as well as cold and warm rooms. Moreover, the undergraduate curriculum would be particularly fashioned to integrate principal fields of knowledge, and a planned school of medicine would have its first-year curriculum seamlessly rooted in the Biology and Chemistry departments.

I first met Jon in July 1964, when I arrived to take a research position in his laboratory at UCSD after 2 years of postdoctoral work in Sweden. The timing was inauspicious. The fledgling Biology Department was still located in temporary space at the Scripps Institution of Oceanography, a long distance from a not quite completed new building on the main campus up on the hill. Laboratories were in a half-packed mode preparing for the move, and Jon was heavily involved in planning the curriculum for the first undergraduate students due in September. None of this seemed to me favorable for getting a new research project off the ground and I was nervous that I might be lost in the shuffle.

I needn't have worried. During that chaotic year, between long-distance phone calls recruiting new faculty, dictating letters, and attending countless committees involved in the launching of a new university, somehow Jon managed to find time for drinking coffee in the laboratory with his group and entertaining us at his home. He shepherded us into the new building, recruited a crop of talented young faculty, and wooed a luminary from Stanford (Clifford Grobstein) to be the new chair of Biology. By then, a faculty position had opened up for me in the Chemistry Department, undoubtedly with Jon's help.

Jon's seminal work on proteins, including the affinity-labeling of antibodies (2), had by 1969 earned his election to the National Academy of Sciences, but he is certainly best known today for the Fluid Mosaic Model of cell membranes, the most cited rendering of which appeared in a 1972 *Science* article (3). The model was the culmination of an extended series of experiments begun after Jon moved to La Jolla but



S. Jonathan Singer. Image courtesy of Nazneen Dewji (Cenna BioSciences, La Jolla, CA).

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