
The master of the art of living makes little distinction between his work and his play, his labor and his leisure, his mind and his body, his education and his recreation, his love and his religion. He simply pursues his vision of excellence in whatever he does, leaving others to decide whether he is working or playing. To him, he is always doing both.

Lao-Tzu

Richard Orkand died on January 13, 2002 from complications of cancer. His family was with him at the end. Mercifully, he was sick only a short time before his death. Richard, or Dick as most of us knew him, was a revered colleague whose personal journey in science made him an eyewitness to the emergence of the modern era of research on glial cells. Beyond the void his passing leaves in the field of glial neurobiology is the larger emptiness felt by those of us who loved his company and cherished his friendship. More research will be done in Dick's absence, of course, but his mischievous and affecting presence is not replaceable.

Dick grew up in New York City and had an appealing brashness and sharp wit that one associates with the Northeast. He received his B.S. degree in Pharmacy from Columbia University and a Ph.D in Pharmacology from the University of Utah in 1961. He was trained as an electrophysiologist and had a lifelong affinity for the directness and immediacy of well-designed physiological experiments.

His first papers were on neuromuscular junction and skeletal muscle fibers. From the beginning, he preferred amphibian or invertebrate preparations to mammals. During a first postdoctoral experience during the early 1960s in the laboratories of Bernard Katz in London, he studied the electrical properties of heart cells. This work, in collaboration with R. Niedergerke, resulted in landmark papers published in the Journal of Physiology and Science that established important details about the ionic dependence of cardiac action potentials.

A second postdoctoral period followed with Stephen Kuffler at Harvard, and this fateful association provided his career inspiration. The laboratory was filled with talented people, and Dick was at the epicenter of the first modern efforts to decipher the features and functions of glial cells. In keeping with “Kufflerian” tradition, the key to probing these physiological mysteries was choosing the right preparation to study. In the case of glial cells, it was the optic nerve of the mudpuppy and the CNS of the leech that proved especially useful. The excitement in the laboratory must have been intense as information accumulated, for the first time, about the basic physiologic characteristics of glial cells. The resulting publications, elegantly written, are considered classics in the field. This work spawned the theory of glial “spatial buffering,” i.e., glial-mediated redistribution of K⁺ ions that accumulated in brain extracellular space during neural activity. Moreover, it introduced an important theme of glial function: glial cells play a critical role in regulating the neuronal microenvironment. The observations on K⁺ led Dick to frame a question that motivated many of his subsequent studies and remains incompletely answered to the present: what physiological processes are activated by this neuronal–glial interaction? In attempting to address this important question, he and his many collaborators worldwide showed, among other things, that glucose metabolism, intracellular pH and gap-junction coupling in glial cells were altered by neural activity-evoked changes in [K⁺]o. Along the way, he contributed a long list of valuable papers on glial topics ranging from temperature effects on membrane potential to characteristics of single ion channels. He was a charter member of Glia’s editorial board and published in the journal regularly.

Science truly became international during Dick's lifetime, and he loved it that way. During the early 1980s, he spent more than 2 years in Europe becoming familiar with novel preparations and techniques. In Heidelberg and Munich, in collaboration with Helmut Kettenmann, Melitta Schachner, and Hans-Dieter Lux, he applied the patch-clamp technique to study single ion channels in cultured glial cells. In Geneva, he joined Jonathan Coles and Marco Tsacopoulos to use the honeybee retina as a model for studying neuron–glia interactions. He also spent time in Prague, working on extracellular K⁺ regulation with Eva Sykova, and in Bristol working on intracellular Ca²⁺ homeostasis in snail neurons with Roger Thomas. He was widely knowledgeable in neurobiology and worked on non-gliaal topics throughout his long investigative career. But glial cells and all the unsolved questions about their function were his true loves.

Personally, Dick was charming, warm, and witty. He loved to talk about science and prized the art of clear and logical argument. He abhorred pretentious postur...
Picture from 1969 at UCLA where I first met Dick. From the left: Alan Grinnel, myself, Roger Eckert, and Dick. We established a neuroscience graduate group, worked hard at our experiments and played even harder. I have never had a more loyal and sensitive friend. I will never forget his devastating sense of humor, candor and humility. Martin Horad, Georgetown University

Dick Orkand at the Neurobiology Department in Heidelberg during a collaboration with Helmut Kettenmann and Melitta Schachner, 1981. Pictured here resting after ‘poking’ a lot of glial cells.

This image captures Dick’s personality rather well. The center is a beer coaster from the Prague Marathon, autographed by the African winner, Timothy Mbegana. I was in Dick’s department for many years and he was always tolerant of my marathoning activities. He had a wonderful sense of humor about it, as he did about everything! (the note, not perfectly legible, says "Brian--- I beat this guy by 4 seconds downing a liter of beer. Dick". Brian Galzberg, University of Pennsylvania

Dick spent 1981-82 in Geneva. He and I spent months measuring ions in one room while next door Marcos Toscanpilos and Serge Poitry measured the kinetics of oxygen consumption. The two kinds of data did not seem to fit. Then one day, while walking to lunch together, we decided to believe the data, not the theory. Dick saw it all, quick as a flash (Nature, (1983) 301:604-6). In the photo, he is relaxing at his farewell party. Jonathan Coles, Grenoble.

Dick and Paula Orkand at a Halloween party at the Institute of Neurobiology in Puerto Rico (1988).
Dick Orkand at a glial symposium held at Castle Ringberg, Bavaria in 1991. The group photo was taken on an antique train ride during the conference. In the foreground, from the left: Brian MacVicar, Dick (concentrating on his food), Bruce Ransom and Steve Waxman.

Picture from Eric Newman.

Dick’s 60th Birthday (April, 1996) in Arcachon, France. From Left: Eva Sykova, Jonathan Colas, Marcus Tsacopoulos, Brenda and Murdoch Ritchie, Dick and others.

Dick Orkand with Sir Andrew Huxley and Robert Banks at the Joint Meeting of The Physiological Society and Czech Physiological Society in Prague, June 1998.

Dick Orkand with four US minority students during their training course in Eva Sykova’s department in Prague, summer 1998.
ing, not unheard of among scientists, and corrected this
tendency with well-timed humorous barbs. No one was exempt. He had a wonderful sense of humor and knew how to enjoy life. An image we can all remember, from one meeting or another, is Dick surrounded by scientific colleagues and laughing so hard his eyes are nearly closed.

During his distinguished academic career, Dick served on the faculties of the University of Utah, UCLA, and the University of Pennsylvania, where he was professor and chair of the Physiology and Pharmacology Department in the School of Dental Medicine from 1974 until 1986. Although he was a truly gifted teacher, and therefore an asset to any faculty, he was not fond of university politics. World politics also fascinated and frustrated Dick. He felt strongly about promoting science in countries disadvantaged by stifling political regimes. He understood, and was vocal about, the need to attract minorities to careers in science. It was not entirely unexpected, therefore, when he moved to Puerto Rico to become Director of the Neurobiology Institute at the University of Puerto Rico (1986–1996). He worked successfully to encourage high-quality, NIH-funded research at the Institute, which is situated on a cliff overlooking the Caribbean Sea. During this period, he always began his lectures with a slide showing the magnificent views from this vantage point. As a result of his enthusiastic promotion of this special facility, more than a few of us signed up for visits as guest investigators. He and Paula, his first wife, and son Adam were wonderful hosts and impromptu tour guides. Rarely did one leave without planning another visit. After relinquishing his directorship in 1996, he continued a loose affiliation with the Institute and its faculty.

The several years before his final illness represented a new period in Dick’s life. He married Lourdes Berlingeri, a native of Puerto Rico, in 1999, and was spending a good deal of time working with Eva Sykova’s group in Prague on a variety of research projects. He was enthusiastic about his work and having fun. Seattle was a regular stopping place for Dick in order to spend time with his son Adam and Adam’s wife, Anne Theisen. As passionate as he was about science, his top priority was always his family and his closest friends.

We miss our friend and colleague, Dick Orkand. His contributions to glial research were greater than the sum of his many papers, reviews, and chapters, as substantial as those contributions were. He long acted as an ambassador for this area of research, and gradually became its historian as well. When the field needed vitality and credibility, he provided these in abundance. Perhaps we can find others to carry on in a similar manner, but the rare blend of talent, humor, and joie de vivre that was Dick Orkand is truly lost.

Bruce R. Ransom
Helmut Kettenmann
Seattle, June 27, 2002