

Obituary

## Peter W. Hochachka (1937–2002)

Peter Hochachka, a pioneer in studies of biochemical adaptation to the environment, died from cancer at his home in Vancouver on 16 September 2002. Traditionally, biochemistry and molecular biology focused on the similarities between living things. This ‘unity concept’ served biology well but provided a somewhat restricted view of the living world. Biologists were well aware of the wide range of temperatures compatible with life, that certain animals can live without oxygen or at extreme pressures in the deep sea. Yet the idea of biochemical adaptation to the environment was largely overlooked or even dismissed.

During his graduate-student and postdoctoral years (1959–66) at Dalhousie and Duke universities, Hochachka was subjected to the influences of enzymology and metabolic regulation as well as comparative and environmental physiology. The field of ‘adaptational biochemistry’ was born of the marriage between these disciplines.

In 1966, he moved to the University of British Columbia, where he spent his entire career. There, he embarked on breathtaking and original research that resulted in the development of entirely new lines of inquiry. The world was both his laboratory and his lecture hall — species, lifestyles and habitats were his variables. He led, or participated in, at least nine research expeditions on the RV *Alpha Helix*, to regions as diverse as the Amazon and the Arctic. He also took part in six expeditions to the Antarctic, four to the high Andes and one to the Himalayas. He was the biochemist in what was perhaps the first collaboration (along with specialists in engineering, anaesthesiology, paediatrics and surgery) to study metabolism in Weddell seals, free-diving from a hole in the Antarctic ice. He assembled research teams to study Andean Quechuas and Himalayan Sherpas, the first to be conducted in modern laboratories, and identified the adaptations that allow Quechuas and Sherpas to function normally at high altitude.

Hochachka brought out the best in his students and postdoctoral researchers, providing intellectual stimulation and support, as well as the freedom to be creative and to develop as independent scientists. The synergy between studies in his laboratory and those of his collaborators produced an amazing diversity of research. In the 1960s, work on enzyme adaptations led to discovery of the

evolutionary conservation of enzyme–substrate affinity and catalysed an explosion of research around the world. Investigations of enzyme adaptation to pressure uncovered the pressure-insensitivity of enzymes from deep-sea animals. Research into the tolerance of animals to anoxia began in the 1970s and resulted in the discovery of the enzyme alanopine dehydrogenase and a new metabolic pathway in marine molluscs. Subsequent studies revealed that goldfish produce ethanol as an anaerobic end-product and, ultimately, led to the realization that ‘good’ animal anaerobes respond to anoxia by depressing their metabolic rates.

Research on bioenergetics and exercise

### Innovator in studies of biochemical adaptation

included species such as rainbow trout, thoroughbred racehorses, tunas, marlin, shrews, seals, whales and hummingbirds. No hummingbird or elephant seal would have ever seen the inside of an NMR magnet had it not been for Hochachka’s daring and creativity. The first of three books with George N. Somero, *Strategies of Biochemical Adaptation* (Saunders, 1973), provided the synthesis of this research and laid the groundwork for the new field of adaptational biochemistry.

Hochachka was a profound thinker with an enormous intellectual field of play. With nearly 400 publications, including seven books, his influence went far beyond adaptational biochemistry and extended into clinical medicine, exercise science, ecology and evolutionary biology. His contributions have been recognized with the highest awards that Canada can give to its scientists. In 2000, he was appointed an Officer of the Order of Canada. Later this year, he is to receive, posthumously, the Commemorative Medal marking the golden jubilee of Queen Elizabeth II. His work has helped put Canada on the global scientific map.

Hochachka will be missed for his ebullience, enthusiasm and boundless energy. To him, scientific conferences were big parties, and to socialize was to talk

about science. He wrote children’s books. He made films of his research expeditions that ranged in content from action-packed sequences of tunas to the romance of monkeys holding hands in a tree while watching the African sunset. Like Albert Szent-Gyorgyi, he believed that doing science should be fun.

When he became ill with prostate cancer, this too became a matter of science. His reading of the literature led to insights into the hypoxia connection in prostate cancer-cell metabolism, which he published with his surgeons as co-authors. When a subsequent lymphoma was found to be incurable, he wrote a moving letter of thanks and farewell. In it, he said that, having consulted the powers that be, he had accepted the “assignment of examining parallel universes and the possibilities of entanglement”. The curiosity that made him a great scientist and human being sustained him until his death.

Raul K. Suarez and David R. Jones  
Raul K. Suarez is in the Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara, California 93106-9610, USA.

e-mail: suarez@lifesci.ucsb.edu

David R. Jones is in the Department of Zoology, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada.

e-mail: jones@zoology.ubc.ca



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