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## OBITUARY

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### Britton Chance



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On November 16, 2010 Britton Chance died in the University of Pennsylvania Hospital (Philadelphia).

The name of Chance evokes an epoch in biochemistry and biophysics. Chance was the scientist who first observed the formation of an enzyme–substrate complex, invented the double-beam and dual-wavelength spectrophotometer named after him (for determination of spectral changes of enzymes in turbid media), developed a method for *in vivo* magnetic tomography in humans, formulated an approach for cancer diagnostics using near infrared light, etc. He was a founder of a new science – bioenergetics – and he was the first who succeeded in treatment of an apparently incurable patient using knowledge and approaches of bioenergetics. This patient was a young American girl who suffered from muscular weakness and could move only in a wheelchair. The biopsy revealed an absence of a protein in the middle region of the respiratory chain which could *in vitro* be by-passed with vitamin K<sub>3</sub>. Already the first injection of this vitamin combined with ascorbic acid forced the patient to her feet. Taking this medicine, she abandoned her wheelchair, successfully graduated from university, and was happily married. Unfortunately (or fortunately), this disease is so rare that no similar case has been described in the literature. But this does not diminish the merit of

Chance, who created a precedent for diagnostics and successful treatment of a *mitochondrial* disease.

Britton Chance was born on July 24, 1913 in Wilkes-Barre, Pennsylvania. When still a schoolboy, he took great interest in inventions. A method for automated navigation of ships invented by Chance when still a schoolboy was patented and then contracted by the British General Electric Company, and this new system was applied in a 20,000-ton cargo steamer plying the waters between England and Australia. In 1935 Chance received a B.A. degree at the University of Pennsylvania, and then he started working at the Johnson Foundation for Research in Medical Physics, where he received his first Ph.D. degree. In 1942 he received his second Ph.D. in Cambridge (England). Then Britton was mobilized and sent to the Radiation Laboratory in Boston (Massachusetts Institute of Technology) where he developed new systems of radar and of targeting of bombs. By the end of the Second World War he was a group leader, and despite his young age he had about 300 subordinates. For these works Chance was awarded the U. S. President's Certificate of Merit in 1950.

After his time in Boston, he studied enzymes for two years at a Nobel Institute laboratory in Sweden, and in 1949 he returned to the Johnson Foundation already as a

Professor of Biophysics and Biochemistry. Soon Chance became Director of the Johnson Foundation, and he held this post until 1983. Here many fundamental discoveries in bioenergetics were made by the great scientist. During his whole life, B. Chance worked to apply in biology the newest approaches of physics, the most powerful science of the twentieth century. The great success of these works is evidenced by the fact that six papers by Chance are cited more than 1000 times. Note that his last publication dates to 2010.

Chance received the National Medal in Science of the USA in 1974, the Benjamin Franklin Medal for Distinguished Achievements in the Sciences of the American Philosophical Society in 1990, the Christopher Columbus Discovery Award in Biomedical Research of the National Institutes of Health of the USA in 1992, and many other awards. He was a member of the National Academy of Sciences (USA), the Royal Society (London), and the Royal Swedish Academy of Sciences. From 1990 to 1999 Chance was the Director of the Institute for Biophysical and Biomedical Research in Philadelphia, and from 1998 he was the President of the Medical Diagnostics Research Foundation. When a reporter asked the 90-year-old patriarch if he was planning to retire, Chance answered: "Retire? Why should I? I have the pleasure of doing experiments and I am working with an excellent team. I enjoy the feeling of discovery, going ahead, finding new things".

However, science was not the only passion of this wonderful man. Among athletes he was not less famous as a gold medalist of the 1952 Summer Olympics in the 5.5 Meter Class yachting. Once Chance had to participate in the regatta near Tallinn, and he decided to sail from Finland to its course. All participants of the regatta went to meet the champion but were captured by a sudden squall. Many yachts capsized, and the yachtsmen were saved by motor launches. In the full swing of this rescue, Chance appeared among three-meter waves on his yacht with the biochemical name *Complex I* and successfully reached the harbor without any assistance.

I made my acquaintance with Chance in 1961 at the Fifth International Biochemical Congress in Moscow. At that time I had just finished my post-graduate degree and certainly was timid before the 48-year-old American

coryphee to whom I was introduced by S. E. Severin. Chance looked at me, smiled very warmly, and repeated my nickname Volodya without an accent.

After three years we met again at his farm near Philadelphia where Chance organized *Compostium* – a symposium on mitochondria in a hayloft which was a good half of a huge barn. A blackboard was leaned against the wall of the barn, a speaker stood near the board, and disputants put questions to him from the loft. Chance and Martin Klingenberg disputed especially furiously. At first the latter rose to put a question, then he put questions already sitting on the hay. The discussion came to its logical end when it became clear that Klingenberg had fallen asleep on the hay.

In 1973 I visited Chance at the Johnson Foundation. After my talk at the seminar, Chance came to the hostel where I stayed in a room together with Marten Wikstrom and Angelo Azzi. The conversation lasted until midnight, then Chance arose, said goodbye to us, and went home on foot because he lived nearby in the university campus two blocks from our hostel. We, closed the door behind the guest, and were ready to go to bed. Suddenly somebody rang the doorbell, and Chance entered the hall. Standing for some minutes he said nothing, and then disappeared in the darkness again. I asked Marten what it meant. "What, what, he saw a man, that is". The meaning of this strange ritual I understood a good time later when Volodya Sled', a young researcher of the Chair of Biochemistry, Moscow State University, who became a post-doc in the Johnson Foundation and lived in the same hostel, was killed by a drug addict on his leaving the laboratory after work. A Pennsylvania native, Chance was more careful and happier: he lived until to be 97 years old. Chance was married three times (the last marriage was certificated in the beginning of 2010); he left 16 children, 27 grandchildren, and 5 great-grandchildren.

In the Department of Bioenergetics, Moscow State University, the word "Chance" has two meanings: the great scientist and a wonderful device. Earlier, when it was impossible to buy dual-wavelength spectrophotometers, physicists of this department E. N. Mokhova and A. Yu. Borisov created three hand-made "Chances". Later we bought a commercial "Aminco-Chance" analog. And this device faithfully serves us up to now.

V. P. Skulachev