



Dr. Joel D. Wallach, BS, DVM, ND

Has Been Awarded the

2011 Klaus Schwarz Commemorative Medal

For his research in 1978 which uncovered the cause and
cure of Cystic Fibrosis

Dr. G. N. Schrauzer PhD, M.S, B.Sc, FACN, CNS, Founder and Chairman of the Board of the Biological Trace Element Research Institute announced in November of 2011 that Dr. Joel Wallach BS (Agriculture), DVM, Post Doc (Comp. Pathology), ND has been awarded the 2011 Klaus Schwarz Commemorative Medal. The Biological Trace Element Research Institute has awarded the commemorative medal annually starting in 1978.

Dr. Wallach is the first veterinarian and the first naturopathic physician to receive the prestigious award.

According to Dr. Schrauzer, the 2011 Commemorative Medal was awarded to Wallach for his 1978 discovery of the first animal model and the first non-human case of cystic fibrosis (CF).

According to investigators (The International Laboratory Animal Research Journal – the official journal of the National Science Foundation), Wallach’s discovery of CF in an infant rhesus monkey is considered to be the greatest serendipitous discovery resulting from basic research in laboratory primates in the 20th century.

In the text of the award, the awards committee stated, “From a historical perspective, Wallach is to be regarded as one of the first practitioners, if not founders, of EPIGENETICS, the new research discipline that investigates heritable alterations in gene expression by mechanisms other than changes in DNA sequence.”

In 1962, Dr. Barry Commoner, Prof. Dept. of Biology, Washington University; and Marlin Perkins, Director of the St, Louis Zoological Gardens and the Shaw’s Botanical Gardens were looking for a pathologist to head up a research program funded, in part, by for The Center for the Biology of Natural Systems. The intention of the study was to determine the effects of pollution and nutritional deficiencies as contributing factors in the genesis of birth defects and chronic diseases in captive exotic species held in zoological collections and humans living in close proximate. In effect the zoological collections were to be used as modern day “canaries in the coal mine.” Dr. Wallach was chosen to fill this position because he was the only person in the world that had a knowledge base in all three areas of the research’s concern – agriculture, veterinary science, and comparative pathology. Additionally, while pursuing dual degrees in Veterinary medicine and Comparative Pathology, Wallach had already published a paper documenting agricultural pollution as being the cause of a mass die-off of sheep.

As head of this research project, Wallach performed more than 20,000 autopsies in animals and humans and reviewed millions of blood chemistries and tissue slides with special stains.

Wallach's findings were numerous and were published in many peer reviewed veterinary, medical and pathology journals, as well as multi-author Reference and Teaching text books. One of Wallach's more noteworthy findings was that coronary artery disease was due to inflammation of the arterial lining rather than elevated blood cholesterol (1971). His Opus Maximus, The Diseases of Exotic Animals (1983 – W.B. Saunders – a 1,200 page medical reference text book), is in the Smithsonian Institute and is recognized as a National Treasure.

Additionally, Dr. Wallach was a member of Site Visit Committees for the National Science Foundation for five years and was a co-author of the 1967 Animal Welfare Act that provided for the first time clear requirements for laboratory animal care and management including full-time veterinary supervision of laboratory animal studies (procedures, feed, water, air, space, etc.).

Dr. Wallach was fired from his position as a pathologist at the Yerkes Regional Primate Research Center, Emory University, Atlanta, Georgia in April of 1978 (10 days after the death of his wife) seven months after his discovery and identification of the first case of non-human CF in a rhesus monkey and one month after an official news release by Emory University announcing Wallach's confirmed discovery.

Dr. Wallach was fired for daring to say that CF might not be genetically transmitted in the classical DNA transfer manner but rather appeared to be a congenital deficiency of the trace mineral selenium in the embryo.

In an interesting twist of fate, in a special issue of the Institute for Laboratory Animal Research's Journal (Serendipitous Insights Involving Nonhuman Primates - June 2, 2011) Wallach's 1978 findings of CF in nonhuman primates was again confirmed and lauded as *one of the most important findings in primate research in the 20th Century*. However, in the body of this report, the authors (Dr. William R. Morton, VMD - Prof. of Comparative Medicine, U. of WA and Director of the Washington National Primate Research Center, Seattle, WA; and Kathryn Swindler, Technical specialist at the WNPRC) made the interesting remark that, "Emory University *refused* to release the name of the young pathologist (Wallach) who had made the (CF) discovery."

In the 33 years since Wallach's termination from the Yerkes Primate Regional Research Center (Emory University), Wallach has sued the FDA in Federal courts to get useful but withheld information released to the general public (folic acid-neural tube defects; selenium and cancer prevention; omega-3 essential fatty acids and the prevention of thrombosis; antioxidants and reduced rates of disease; etc). He has identified the causes, prevention and cures for numerous birth defects (Cystic Fibrosis; Muscular Dystrophy; congenital deafness; Down syndrome; Multiple Sclerosis; etc.), asthma, eczema, dermatitis, psoriasis, celiac disease, IBS, inflammatory bowel disease, ulcerative colitis, Chron's Disease, GERD, ADD, ADHD, autism, Amyotrophic Lateral Sclerosis; Parkinson's Disease; all four dementias; cardiomyopathy; congestive heart failure; coronary artery disease; atrial fibrillation; aneurysms; kidney failure; primary sclerosing cholangitis; sleep apnea; lupus, fibromyalgia, osteoporosis, osteoarthritis; rheumatoid arthritis; peripheral neuropathies, degenerative disc disease; obesity; Type 2 diabetes, Metabolic syndrome.

Joel D. Wallach D.V.M.: 2011 Klaus Schwarz Medallist

Gerhard N. Schrauzer

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Klaus Schwarz (1914–1978) was a leading trace element researcher and is best known for his discovery of the nutritional essentiality of selenium. To honor trace element researchers that have made major discoveries in this field, the Klaus Schwarz Commemorative Medal was created in 1978 by G.N. Schrauzer, the Founder and President of the International Association of Bioinorganic Scientists, Inc.

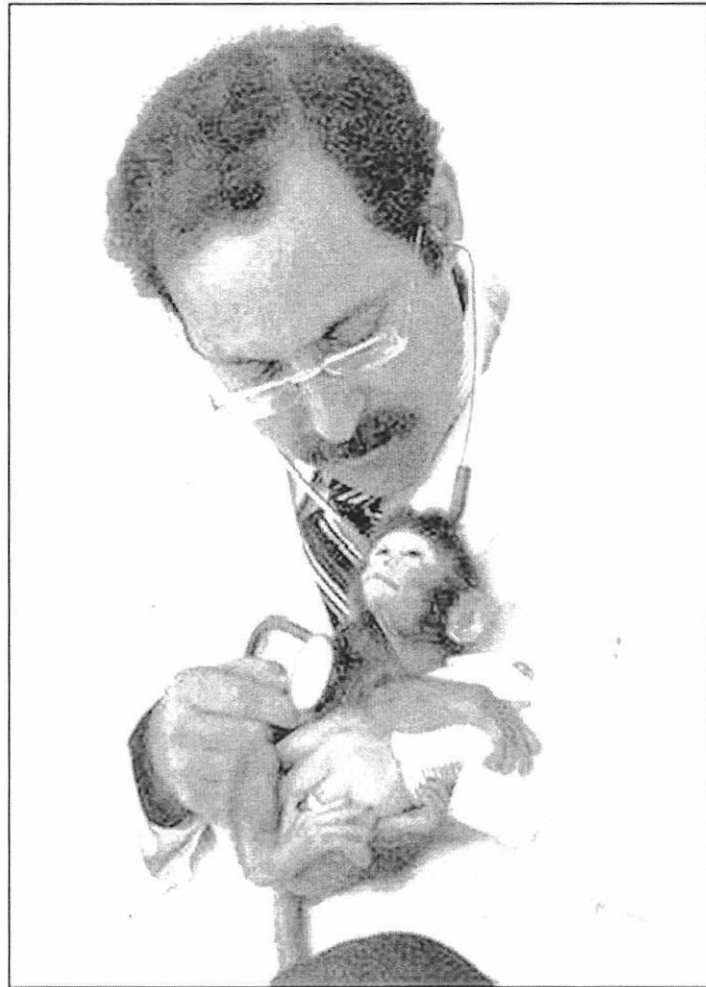
This year, the Klaus Schwarz Medal is awarded to Joel D. Wallach D.V.M., N.D., for his 1978 discovery of an animal model of cystic fibrosis (CF) in the offspring of a family of inadequately fed rhesus monkeys (see Fig. 1). The discovery of this first animal model of CF demonstrated that pancreatic lesions histologically identical to those observed in patients with CF can be produced by dietary means, i.e., nutritional imbalances such as selenium deficiency, and that some forms of CF are, in principle, nutritionally preventable.

Joel D. Wallach was born in West St. Louis County on June 4, 1940. After finishing high school, he enrolled in the University of Missouri at Columbia, first to study Agriculture with a major in animal husbandry and a minor in field crops and soils. In 1962, he received a B.S. Degree in Agriculture from Missouri and continued on to study veterinary medicine at the same institution, which in 1964 awarded him the degree of Doctor of Veterinary Medicine. From 1966 to 1967, he held a postdoctoral fellowship in comparative medicine at the Center for the Biology of Natural Systems, Washington University, St. Louis. Thereafter, he worked at Iowa State University Diagnostic Laboratory, Ames, Iowa, and subsequently, for 2 years, at Natal Fish & Game Department, Natal, Republic of South Africa.

During the early 1960s, environmental pollution and other ecological factors were thought to cause the premature death of captive animals and possibly of humans. The National Institutes of Health awarded the St. Louis Zoological Gardens a large grant to identify these factors. The project required a well-rounded wildlife veterinarian and pathologist. Wallach was hired for this position, which provided him with the opportunity to autopsy a wide variety of captive wild animals dying of natural causes in zoos at

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Fig. 1 J.D. Wallach, in 1979, examining a rhesus monkey with nutritionally induced cystic fibrosis



St. Louis, Chicago, Los Angeles, Jacksonville, and Memphis. Later, working as a veterinary pathologist at the Atlanta/GA-based Yerkes Regional Primate Research Center, Wallach conducted comparative autopsic studies on primates as well as on humans. His work was progressing well until 1978, when he discovered pancreatic lesions in the offspring of a family of inadequately fed rhesus monkeys. Since these lesions were identical histologically to those observed in patients with CF, this led him to propose that some forms of human CF were caused by nutritional imbalances and/or trace element deficiencies.

However, as CF was at that time generally considered to be a genetic disorder, his proposal seemed so inadmissible that he was summarily dismissed from his position at the Yerkes Research Center. As the story of his firing was widely covered by the media, this deprived Wallach of any chance of finding an appropriate position in his profession, forcing him to change his career.

In 1980, Wallach joined the Faculty of the National College of Naturopathic Medicine in Portland, Oregon, where he taught in the area of nutrition while pursuing an N.D. degree in 1982. After obtaining his N.D. degree and license, he went into private practice in Cannon Beach, Oregon, specializing in the nutritional treatment of CF patients. Continuing his CF research, he conducted a survey of 120 families with one or more CF children and found the patient profiles to be consistent with CF as an acquired environmental disease caused by

a prenatal deficiency of selenium, zinc, and riboflavin, and/or exacerbated by diets low in vitamin E and rich in polyunsaturated fatty acids. Based on these findings, Wallach proposed a diet for the prevention and treatment of CF. To demonstrate that CF-like pancreatic lesions develop in populations living in regions naturally low in selenium, he traveled to China in 1987 with his wife, Dr. Ma Lan, a Chinese physician, to conduct a study at Harbin Medical University. The Wallachs, in collaboration with researchers at Harbin Medical University, showed that hitherto unrecognized pancreatic lesions occurred in 35% of 1,700 documented cases of Keshan disease, the endemic cardiomyopathy occurring in low-selenium regions of China [1, 2]. Other researchers have since drawn attention to the aberrant oxygen radical activity and the low selenium and antioxidant status in CF patients [3–5]. It is now also agreed that selenium deficiency may develop in CF children because of digestive malabsorption or after prolonged total parenteral nutrition [6–9]. In addition, a case of cardiomyopathy in a CF patient caused by selenium deficiency has also been described [10]. The therapy of CF patients with selenium and antioxidant vitamins has also been tested in a clinical trial. One German group [11] concluded:

"In cystic fibrosis (CF) patients the antioxidative-oxidative balance is chronically disturbed. Free radicals were generated by bronchial/pulmonary infection and additionally (there) exists a deficiency of antioxidative substances by enteral malabsorption especially (of) vitamin E and selenium. For CF patients, therefore, we recommend a sodium selenite substitution therapy, best in combination with vitamin E."

From 1990 to 1993, Wallach worked as a naturopathic physician for Hospital Santa Monica in Tijuana/Mexico. In 1997, he founded his own vitamin-mineral supplement company, American Longevity, now named Youngevity.

From a historical perspective, Wallach is to be regarded as one of the first practitioners, if not founders, of *epigenetics*, the new research discipline that investigates heritable alterations in gene expression caused by mechanisms other than changes in DNA sequence. With the award of the Klaus Schwarz Medal, Wallach is belatedly honored for a serendipitous discovery that will be of benefit to many.

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James Cecil Smith

Recipient of Klaus Schwarz Medal for 1982

The International Association of Bioinorganic Scientists annually selects a leading trace element researcher for the award of the *KLAUS SCHWARZ MEDAL*. The recipient for 1982 is JAMES CECIL SMITH.

JAMES CECIL SMITH

Laboratory Chief, Vitamin and Mineral Nutrition Laboratory, Nutrition Institute, USDA. Smith was honored for his role in the development of methods for the maintenance of laboratory animals in controlled environments. Working in Schwarz's Laboratory for Experimental Metabolic Disorders, Long Beach, California, from 1964-1966, Smith designed the all-plastic isolators in which rats could be maintained under trace element sterile conditions for extended periods (1). The application of this technique allowed Schwarz and other investigators to generate specific trace element deficiencies in test animals and thus to prove the essentiality of a number of additional trace elements. The use of isolators has since become a necessary prerequisite for any further research in this area. Presently working at the Nutrition Institute of the USDA in Beltsville, Maryland, Smith is engaged in research leading to the development of new methods of trace element analysis and in studies on zinc and vitamin A metabolism. He is also a Professorial Lecturer at the Department of Biochemistry, School of Medicine, George Washington University, Washington DC. He is a member of the American Institute of Nutrition, the American Society for Bone and Mineral Research, the American Association of Nutritionists, and the Society for Environmental Geochemistry and Health. Smith received the Klaus Schwarz Medal during the 3rd International Conference on Inorganic and Nutritional Aspects of Cancer, Nov. 11-13, 1982, in La Jolla, California.

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Announcement

Chinese Keshan Disease Research Groups Recipients of *Klaus Schwarz* Medals for 1984

THE KESHAN DISEASE RESEARCH GROUP OF THE CHINESE ACADEMY OF MEDICAL SCIENCES, BEIJING

The Keshan Disease Research Group of the Chinese Academy of Medical Sciences, Beijing, Fig. 1, was organized in 1968 and since then consisted of about 35 researchers of various disciplines affiliated with the Chinese Academy of Medical Sciences. Most members were from the Department of Nutrition of the Institute of Health, which now is a part of the "China National Centre for Preventive Medicine." Keshan Disease (KD), is an endemic cardiomyopathy affecting mainly children and young women. It was very common in a long belt of rural areas of China spanning from the northeast to southwest. Working in Dedu county, Heilong-jian province in the China, the Beijing KD research group in 1968 began exploring the value of selenite supplements as a preventive measure after finding that white muscle disease, a classical Se deficiency syndrome in farm animals, was also prevalent in the high KD areas. Large-scale Se supplementation trials were begun in 1969 in various endemic areas. Definite conclusions could be drawn after termination of extensive control studies in 1974-1975 in Mianning county. In the course of this work about 10,000 samples of human blood, hair, and of locally grown cereals were collected and analyzed for selenium. In addition, measurements of glutathione peroxidase and urinary Se excretion were conducted to determine the selenium status of the population in the affected and unaffected regions. A dose relationship between a lack of selenium and KD was observed. The group presently is investigating the biochemical functions of selenium and the human dietary selenium requirements. Other research focuses on the search for additional pathogenic factor(s), such as viral infection and hypoxia in the etiology of KD. The work of the Beijing KD research group led to the general adoption of selenite supplementation for preventing KD; the total treated population by now exceeds 1 million.

Arthur Furst

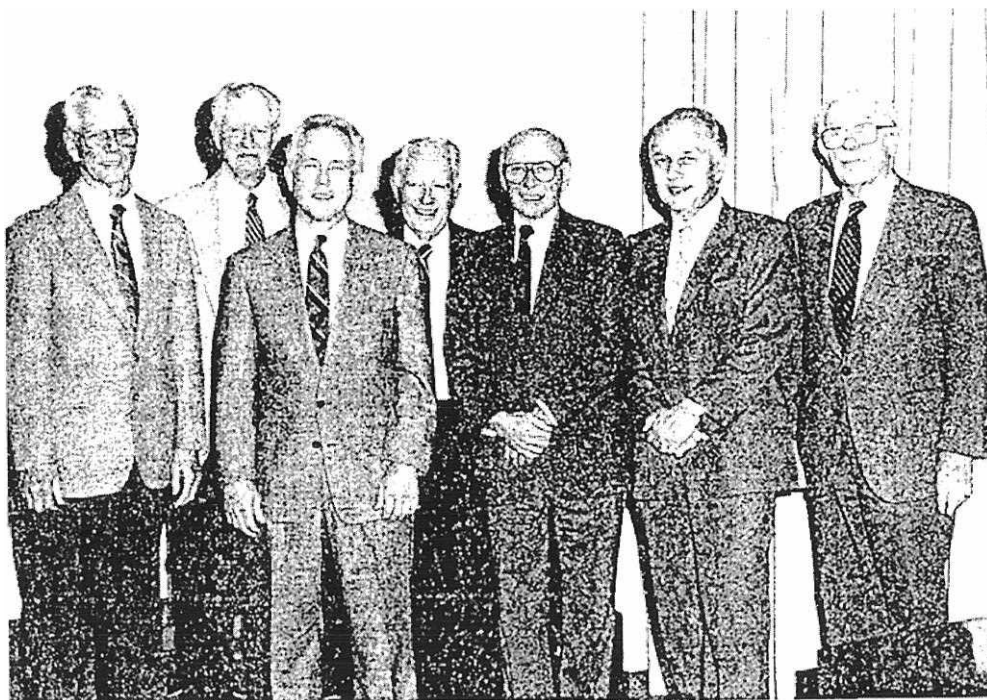
Recipient of Klaus Schwarz Medal for 1986

The International Association of Bioinorganic Scientists annually selects a leading trace element researcher for the award of the KLAUS SCHWARZ Medal. The recipient for 1986 is:

Arthur fourst, Ph.D. , Sc. D.
Distirguished University Proiessor Emeri tus,
Inst itute of Chemical Biology
University of San Francisco

Arthur Furst was born in Minneapolis, Minnesota, on Dec. 25, 1914. He received his undergraduate education at UCLA and, in 1948, a Ph.D. in Chemistry from Stanford University. He joined the University of San Francisco (USF) in 1947 as an Assistant Professor of Chemistry and stayed there until his retirement in 1980. Furst was the Director of the Institute of Chemical Biology at USF from 1961 to 1980 and served as the Dean of the Graduate Division at USF from 1976 to 1980. In recognition of his services to USF he was named Distinguished University Professor in 1979 and received a Doctor of Science degree (Honoris Causa) in 1983. In addition to his USF posts he has taught pharmacology and medicinal chemistry at Stanford University School of Medicine (1952-1961) and was a Research Associate of Mount Zion Hospital, San Francisco from 1949 to 1982. In 1984, he was nominated Diplomat by the Academy of Toxicological Sciences and was elected President of the American College of Toxicology in 1985.

Furst received the Klaus Schwarz Medal primarily in recognition of his pioneering contributions in the field of metal carcinogenesis. In a book entitled *Chemistry of Chelation in Cnllccr*, published in 1963 (Charles C. Thomas Publisher, Springfield, Illinois), Furst drew scientifically well-founded parallels between the chemical phenomenon of chelation and the action of carcinogens and of cancer chemotherapeutic agents and thus directed attention to the roles of metals in carcinogenesis and cancer therapy. In the same book, and thus years prior to the discovery of the antineoplastic actions of cis-platinum, Furst suggested that platinum compounds should be tested as cancer chemotherapeutic agents.



Participants of Klaus Schwarz Medal Award Ceremony at the University of California, Berkeley, April 28, 1988. From left: Robert Stokestad, James Oldfield, Richard Jacobs, George Briggs, R. Kretschnauer, G. N. Schrauzer, and Thomas H. Jukes.

Recipients of Klaus Schwarz Medal for 1987

The International Association of Bioinorganic Scientists annually honors one or more leading trace element researchers with the award of the Klaus Schwarz Medal. Four scientists were selected to share the award for 1987 in recognition of their pioneering work on the nutritional essentiality of selenium. They are: Thomas H. Jukes, Roger Milstrey, Ernest Patterson, and Robert Stokestad. They all previously worked at the Lederle Laboratories Division of the American Cyanamid Company, Pearl River, NY.

Although the priority of this discovery goes to Klaus Schwarz and C. M. Foltz (1957, *J. Am. Chem. Soc.* 79, 3292), the Lederle scientists came in as close seconds (1957, *Proc. Soc. Exp. Biol. Med.* 95, 617-620), only a few weeks after Schwarz and Foltz.

The award ceremony was held at the campus of the University of California, Berkeley, and was chaired by Dr. Norman Kretschmer, Director of the Koret Center for Human Nutrition of UC Berkeley. Keynote speakers included Drs. James Oldfield (Oregon State University), George Briggs (UC Berkeley), Thomas H. Jukes (UC Berkeley), G. N. Schrauzer (UC San Diego), and Richard Jacobs (US Food and Drug Administration, San Francisco). The award for Drs. Patterson and Milstrey,



Thressa C. Stadtman

Recipient of Klaus Schwarz Medal for 1988

The International Association of Bioinorganic Scientists is pleased to announce the award of the Klaus Schwarz Medal for 1988 to Thressa C. Stadtman, Chief, Section on Intermediary Metabolism and Bioenergetics, Laboratory of Biochemistry, National Heart, Lung and Blood Institute, NIH, Bethesda, MD.

Thressa Campbell Stadtman was born in Sterling, NY. She received a BS degree in Microbiology from Cornell University in 1940, a MS degree from the same institution in 1942, and a PhD degree from the University of California, Berkeley, in 1949. She joined the National Heart Institute of the National Institutes of Health in 1950, working at first in the Laboratory of Cellular Physiology and Metabolism, later in the Laboratory of Biochemistry. In 1974, she was named Chief, Section on



Forrest H. Nielsen Recipient of Klaus Schwarz Medal for 1990

The International Association of Bioinorganic Scientists annually selects a leading trace element researcher for the award of the Klaus Schwarz medal. The 1990 recipient is Forrest H. Nielsen.

Dr. Nielsen was born on October 26, 1941 in Junction City, Wisconsin and received his graduate training in biochemistry from the University of Wisconsin. After receiving his PhD degree in 1967, he spent the next two years at the US Army's Medical Research and Nutrition Laboratory in Denver, Colorado, and subsequently, in 1967, joined the Human Nutrition Research Laboratory of the US Department of Agriculture (USDA), first in Beltsville, Maryland, and from 1970 to the present at Grand Forks, North Dakota, where he advanced to Director and Supervisory Research Nutritionist in 1986, his present position. He is also Adjunct Professor at the University of North Dakota, Grand Forks.

Dr. Nielsen is honored primarily for his recent discovery of the role of boron in calcium metabolism, which suggests that this element is nutritionally essential, and for his studies on the other trace elements, notably nickel, arsenic, silicon, and vanadium.

Dr. Nielsen is the author of 250 research publications and has chaired and cochaired numerous symposia. He is a member of the Editorial Boards of *Biological Trace Element Research*, *the Journal of Nutrition*, *AIN Nutrition Notes*, *Trace Elements in Experimental Medicine*, and Associate Editor-in-Chief of *Magnesium and Trace Elements*. In 1989 he was elected to the Governing Board, International Society for Trace Element Research in Humans and, in 1990, for a four-year term as Chairman of the Nomination Committee, North Dakota Academy of Science.

G.N.S.

Klaus Schwarz Medalists of 1992



Drs. William C. Hoekstra (left) and John T. Rotruck, recipients of the Klaus Schwarz Commemorative Medal for 1992, during the Award Ceremony in New Orleans, LA, March 30, 1993.

William G. Hoekstra, formerly at University of Wisconsin, Madison, and John T. Rotruck were jointly honored with the Klaus Schwarz Medal on March 30, 1993 in New Orleans for their work on glutathione peroxidase, especially for their discovery that this enzyme contains selenium as a functional unit. William G. Hoekstra was born in 1928 in Golden, Colorado and received his PhD degree in Biochemistry in 1954 where he remained with few interruptions until his retirement in 1990. He received the prestigious Borden Award in Nutrition in 1975 and the Gustav Bohstedt Award for Research in Minerals and Trace Elements from the American Society of Animal Science in 1967. He served on numerous National committees and editorial boards of professional journals and was elected President of the American Institute of Nutrition in 1980.

Klaus Schwarz Medal Recipient for 1995



Orville A. Levander

The International Association of Bioinorganic Scientists annually selects a leading trace element researcher for the award of the Klaus Schwarz Medal. The recipient for 1995 is Orville A. Levander, Research Leader, Nutrient Requirements and Functions Laboratory, Beltsville Human Nutrition Research Center.

Orville A. Levander received his BA in chemistry from Cornell University in Ithaca, New York in 1961. In 1965 he was awarded a PhD in biochemistry from the University of Wisconsin, Madison, Wisconsin. This was followed by an appointment as a Postdoctoral Fellow at the Institute of Cancer Research, Columbia University College of Physicians and Surgeons in New York and then a term as a Research Associate at the Department of Nutrition of the Food and Drug Administration in Washington, DC as a Research Chemist. In 1994 he was named Research Leader of the Nutrition Requirements and Functions Laboratory at Beltsville.

Dr. Levander has been selected for the Klaus Schwarz Medal Award for his past and present work on selenium, especially his most recent research on the effect of selenium, Vitamin E, and oxidative stress on the pathogenicity of Coxsackie virus. The award was presented on September 27, 1995 at the Fourth Congress of the International Society for Trace Elements Research in Humans held at Taormina, Sicily.

Biological Trace Element Research

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Klaus Schwarz Medalists of 1996

The Klaus Schwarz Medal is presented each year to a scientist in recognition of his or her contributions to biological trace element research. The recipients for 1996 were Mo Dongxu, Professor Emeritus at the Institute of Endemic Bone Diseases, Xi'an Medical University in Xi'an, China, and Shu Yu Yu, Professor of the Biochemistry Department, Cancer Institute, Chinese Academy of Medical Sciences in Beijing, China.



Mo Dongxu



Shu Yu Yu

Mo Dongxu

Dr. Mo Dongxu was born November 11, 1928 in Canton City, China. He graduated from the Medical College of Zhongshan University in 1952. After his postdoctoral work at the Institute of Pathology, Zhongshan University in 1953, he joined the faculty at Xi'an Medical College as a teaching assistant in the Department of Pathology. During his academic career, he has held several positions that include those of Vice-Director of the Research Laboratory of Kashin-Beck Disease (1980-1983), Vice-Director of the Research Laboratory of Endemic Bone Diseases (1983-1988), Vice-Director of the Institute of Endemic Bone Diseases, and Director of the IEBD Laboratory of Pathology (1988-1991). Dr. Dongxu demonstrated low-selenium content in the cereals and drinking water from KBD-endemic areas in 1972-1973. In 1979, he described the ultrastructural alternation of

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James E. Oldfield

Recipient of the Klaus Schwarz Award for 1998



The Klaus Schwarz Medal is presented each year to a scientist or a team of scientists who have contributed to biological trace element research. The recipient for 1998 was James E. Oldfield, Professor Emeritus of Animal Nutrition, Department of Animal Sciences, Oregon State University, Corvallis, Oregon. Oldfield is one of the leading pioneers in the study and eradication of white muscle disease (WMD). He began publishing on this subject in 1955, showing how the disease can be produced experimentally and as early as 1958 demonstrated (with O. H. Muth, L. F. Remmert, and J. R. Schubert) the protective effects of selenium and vitamin E. The study of WMD and other selenium-responsive conditions in ruminants as well as various aspects of selenium in animal nutrition continued to occupy him during the next four decades. As the result of

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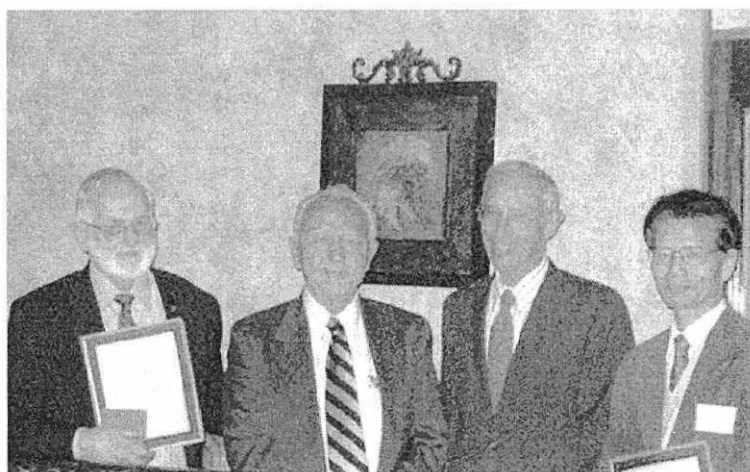
Award of Klaus Schwarz Medals to Leaders in Selenium Research

Klaus Schwarz, one of the most prolific leaders in trace element research of the 20th Century, was the co-founder of the International Association of Bioinorganic and Environmental Chemists (IAB) and served its first Vice Presidency from 1975 until his death in 1997. Since 1974, the Klaus Schwarz Medal has been awarded to leading international researchers. The Award Committee of the IAB is pleased to announce this year's winners of the Klaus Schwarz Medal for their contributions to the field of selenium research.

Holvard E. Ganther, University of Wisconsin, for his pioneering studies in selenium biochemistry and selenium-mercury interactions.

Dolph Hatfield, National Cancer Institute, in recognition of his contributions to understanding of selenoprotein biochemistry and genetics.

Kazuo T. Suzuki, National Institute of Child Health and Human Development, for his studies of selenoproteins with hemoglobin.



Dolph Hatfield, C. S. Sutherland, Holvard E. Ganther, and Kazuo T. Suzuki, recipients of the 2007 Klaus Schwarz Medal.

