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## Govinda S. Visvesvara: A Tribute

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Govinda Visvesvara officially retired from the Centers for Disease Control and Prevention, Atlanta, Georgia, USA on September 30, 2013 after a distinguished career in identifying, diagnosing, and improving methods for culturing free-living and pathogenic protists. A prolific researcher and author, he has consistently contributed to the literature with publications over his career, many of which have been with collaborators from all parts of the world. His research has earned him numerous honors and awards including election to fellowship in the American Academy of Microbiology and the CDC's McDade Award for Lifetime Scientific Achievement. This Festschrift is dedicated to him by colleagues in recognition of his pioneering studies and professional accomplishments.

Govinda Visvesvara ("Vish") was born in Bangalore City, India on September 28, 1931. After earning his M.Sc. degree from the University of Nagpur, he accepted a lectureship position in Dibrugarh City, Assam State in northeast India, which took him a long five and a half days to reach by train via circuitous routes crossing several states and skirting East Pakistan (Bangladesh). Vish taught zoology to undergraduates at a small college that lacked many basic supplies and equipment. He recalls having glass Petri dishes that he boiled to keep them clean and then filled them with water samples from puddles in nearby tea gardens. He and his students were delighted and fascinated by what they saw under a microscope that included nematodes and ciliates such as *Spirostomum* and pink *Blepharisma*. After 5 yr of teaching, he decided on doing research and eventually was mentored by B.N. Singh, a noted protozoologist working near the city of Lucknow. There he was introduced to *Entamoeba histolytica*, *Acanthamoeba*, and *Naegleria* and learned how to maintain these amoebae in culture. As a budding scientist, Vish found this experience and the protists he nurtured exhilarating. Thus, when he received a Fullbright award in 1967, he chose to work on his Ph.D. with William (Bill) Balamuth at the University of California, Berkeley. Vish later paid tribute to his former mentor by designating the name of a new genus of amoeba *Balamuthia*, which he described in a 1993 article in the *Journal of*

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[Corrections added on October 17, 2014, after first online publication: The name of the institution from which Govinda S. Visvesvara retired was erroneously mislabeled in two instances. In both cases, the institution name has been updated appropriately to read "Centers for Disease Control and Prevention".]

*Eukaryotic Microbiology*. While a graduate student at Berkeley, he was a teaching assistant and associate helping Balamuth grow protozoa such as *Paramecium*, *Trypanosoma rangeli*, *Acanthamoeba*, and *Naegleria gruberi*. There he also met and married Marika, who was studying for her Ph.D. in comparative literature. They were a devoted and inseparable couple and attended many scientific meetings together for many years until her death in 2001.



Govinda S. Visvesvara – This festschrift is to honor “Vish” upon his retirement from the Centers for Disease Control and Prevention, USA. As a long-time member of the International Society of Protistologists (Society of Protozoologists) and organizer of the International Workshops on Opportunistic Protists, I was impressed with the high regard his colleagues had of him, his research, professional contributions, his approachable nature, and

willingness to help anyone who asks. It has been gratifying to organize this special section on these important organisms that fascinated Vish throughout his career. – Edna S. Kaneshiro

Vish's fate as a member of the public health service was sealed when Bill Balamuth recommended him for a postdoctoral position at the CDC in 1972 just as Vish finished his Ph.D. and was looking for a postdoctoral position. At that time, the CDC needed a person with expertise in *Naegleria fowleri* and primary amoebic meningoencephalitis (PAM), a disease that was difficult to diagnose and Vish was selected for this task. His initial postdoctoral appointment led him to spend the rest of his career at the CDC. There he mentored doctoral students, postdoctoral fellows, and guests who came from all corners of the globe. He gained the respect of colleagues as a gentle, supportive, and caring mentor and friend, a truly kind and wonderful human being. Vish is a generous scientist as well. A number of people who he mentored and helped in improving isolation and identification of protists of public health importance became collaborators and co-authors in several joint publications over the years. In 2003, Vish was honored in the naming of a new species, *Monopylocystis visvesvarai*, for a microaerophilic amoeba isolated from a marine sediment.

During his tenure at the CDC, Vish had a big impact on public health. His laboratory participated in the investigation of outbreaks of several different "unknown" diseases. He isolated several organisms from clinical samples and correlated with these species found in the patients' environment, which is a critical step for better understanding of how a disease is spread and most importantly how to prevent other people from becoming infected. Vish identified *Acanthamoeba* as the agent of keratitis in soft contact lens wearers and indicated that *Brachiola algerae* also could cause keratitis and other infections in humans. He discovered *Balamuthia mandrillaris* as the agent of meningoencephalitis in humans and other animals, *N. fowleri* as the agent of PAM in animals and identified *Sappinia* as the agent of a human brain infection. He established *Giardia intestinalis* cultures in cell-free medium and developed methods for immunofluorescence and other staining protocols for identifying *Brachiola algerae*, *G. intestinalis*, and *Cyclospora*. He worked with *Trichomonas vaginalis* and isolated and grew several strains of this sexually transmitted disease identifying drug-resistant strains. After the onset of HIV/AIDS and the recognition that several protists were the agents of "opportunistic infections" among immunodeficient patients, he added the microsporidia such as *Encephalitozoon hellem*, *E. cuniculi*, *E. (Septata) intestinalis*, *Enterocytozoon bieneusi* as well as *Nosema algerae*, *N. bombycis*, and *Vittaforma corneae* to his areas of expertise. Because cultivation and characterization of protists was a big task in Vish's lab, there were times when over 40 different species/isolates were being carefully carried out at the same time and Vish was always working in the lab at the hood helping out with the work.

The highlight of the International Meeting on the Biology and Pathogenicity of Free-Living Amoebae (FLA), held every 2 yr in different countries, has been the presentations by Vish on his identification of the latest new species of amoeba, on challenges related to the diagnosis of *Balamuthia* infections, and on studies of immunocompromised individuals with FLA infections. Throughout the years, Vish has provided specimens to investigators throughout the world and, because of this, colleagues have learned more about the causes of

fatal infections induced by FLA. His work has provided novel insights into the medical relevance of protists in human disease.

Thus, while Vish is probably best known for his expertise and authority on FLA, he is also well known for his work on microsporidiosis and a number of other diseases of immune-deficient hosts. Vish has always been a scientist ahead of his time. He has published over 350 articles, book chapters, and reviews reporting work from morphologic, immunologic, and molecular aspects of protists to proteomics and mass spectrometry with more than 50 articles appearing in this journal (formerly the *Journal of Protozoology*).