The Biology of Cryptosporidium Infection

Keynote Lecture

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Boris grew up in Germany in an industrial area then dominated by coal and steel. He studied zoology, botany and cell biology at the universities of Bonn and Marburg and conducted undergrad research on liver flukes in Bonn and trypanosomes in Bobo Dioulasso, Burkina Faso. Boris earned a PhD for work on parasite biochemistry with Ralph Schwarz in 1995, was a postdoc with David Roos studying parasite cell biology, and joined the faculty of the University of Georgia in 2000. In 2017, Boris and his lab moved to the University of Pennsylvania in Philadelphia. Boris studies the biology of apicomplexan parasites and how they interact with their hosts, his current research focus is the parasite Cryptosporidium, a leading global cause of diarrhea and mortality in young children. Boris is also engaged in education and training. He taught undergraduate and graduate classes, directed an NIH training grant program in parasitology, and served as faculty and director of the Biology of Parasitism summer research course at the Marine Biology Laboratories in Woods Hole. Boris is married to a social worker with remarkable patience for scientists and has three children, two are scientists – all are awesome.

S-1. The Biology of *Cryptosporidium* Infection

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The protozoan parasite *Cryptosporidium* is a leading cause of severe diarrhea in young children and an important contributor to early childhood mortality. Effective drugs and vaccines are lacking, in part due to the overall poor tractability of this parasite. To overcome this, we established molecular genetics for *Cryptosporidium* and a natural mouse model of infection. This seminar will focus on recent and largely unpublished work to understand the cell biology of *Cryptosporidium* infection. First, I will discuss how the parasite manipulates the host cell by injecting proteins using two independent delivery systems. Then I will describe what we are learning about the parasite's lifecycle. The entire cycle, including an asexual and a sexual phase unfolds over three days and is tractable in culture and in animals for a significant portion. This is a remarkably simple model that can be interrogated by live cell imaging, single cell sequencing and genetic manipulation.