

NIH R13 Research Conference Grant Report

Application Number: 1 R13 AI108190-01

Meeting Dates: October 8-11, 2013

Meeting Title: **8th Scientific Meeting of the International Leptospirosis Society**

Meeting Location: Kyushu University, Fukuoka, Japan

Principal Investigator: David Haake, MD

Organizing Committee Chair, Shin-ichi Yoshida, MD, PhD

Organizing Committee Vice-Chair, Koichi Akashi, MD, PhD

We are pleased to provide this report on the highly successful 8th Scientific Meeting of the International Leptospirosis Society (ILS), which was a recipient of an NIH Research Conference Grant. The meeting was held from October 8-11, 2013 at Kyushu University in Fukuoka, Japan. We are extremely grateful for the support of the Office of Rare Disease Research (ORDR) because it greatly elevated the scientific quality of the meeting by providing travel awards for our most talented researchers.

The location of this year's meeting had special significance for researchers in our field, as it was an opportunity to commemorate the centennial of the discovery of the causative agent of leptospirosis at the same university where the original discovery was made. In July 1913, Professor Ryokichi Inada and his colleagues began a series of experiments at Kyushu University that led one year later to the identification of the causative organism of Weil's disease, the hepatorenal form of leptospirosis. Their discoveries, including original photomicrographs of the spirochete, microscopes, notebooks and photographs of the researchers in their laboratories were on display at a wonderful exhibit at the meeting hall.

Scientific meetings of the International Leptospirosis Society have been held every 2-3 years since the inaugural meeting in 1996 in Nantes, France. Many of the attendees agreed that the 2013 meeting was our best meeting so far both in terms of attendance and scientific quality. There were 249 registered attendees (45% males, 55% females), of whom 43 were students. 64 oral presentations and 77 poster presentations were given. Reflecting the fact that leptospirosis is a global public health problem, attendees to the 2013 meeting represented 31 countries representing Asia, Africa, North America, South America, Europe and Australia.

Based on funding of the R13 NIH Research Conference Grant from the ORDR, we invited applications for travel support to attend the 2013 Scientific Meeting of the International Leptospirosis Society. 25 travel award applications were received from graduate students, trainees, fellows, and junior faculty members. A Scientific Review Committee was recruited from among senior researchers in the field who did not have conflicts of interest with any of the applicants. Recipients of travel awards were scored by the Scientific Review Committee based on scientific quality of their abstract, novelty, and importance to the field.

A total of 13 travel award recipients were selected, whose research encompassed the full range of leptospirosis research areas, including epidemiology, diagnostics, veterinary microbiology, molecular genetics, genomics, pathogenesis and pathophysiology. ILS travel award recipients whose work we were especially proud of include **Elsio Wunder**, a postdoctoral student at Yale University working in the laboratory of Albert Ko. In one of his two presentations, Dr. Wunder described molecular genetics studies demonstrating that a novel leptospiral protein, Fcp1, determines the coiled morphology of leptospiral flagella. This was a somewhat surprising result because previously, Fcp1 had been described as a candidate outer membrane protein. Dr. Wunder demonstrated the function of Fcp1 by first knocking out and then complementing *L.*

interrogans. While these types of experiments are relatively routine in some bacteria, genetic manipulation of *Leptospira interrogans* remains technically challenging.

Another important study of an ILS Travel Awardee was that of **Jason Lehmann**, a graduate student at the University of California, San Diego working in the laboratory of Joe Vinetz. Jason presented work elucidating the molecular determinants of virulence by analyzing the genome sequences of *L. interrogans* strains that had become attenuated. Leptospiral culture attenuation is a well-known phenomenon but little was known about the molecular details of how this occurs. One of the genes implicated by Mr. Lehmann's studies for a role in virulence was a cAMP-elevating toxin that has structural homology with the adenylate cyclase cytotoxin of *Bordetella pertussis*. This discovery is of great interest considering that this would be the first leptospiral toxin to have been described.

The following is a complete list of the ILS travel awardees and the titles of their projects:

Elsio Wunder, (1) "*Leptospira* Fcp1 is a key protein in determining the coiled morphology of purified flagella and conferring translational motility and virulence for the spirochete"; (2) "Diagnostic performance of a *Leptospira lipL32*-based real-time PCR assay during urban epidemics of leptospirosis".

Douadi Benacer, "Genomic Diversity of *Leptospira* spp. by Pulsed-Field Gel Electrophoresis and Randomly Amplified Polymorphic DNA".

Eneida Aurora Lopez de Delgado, (1) "Application of Pulse Field Gel Electrophoresis (PFGE) for Serovar identification of *Leptospira* clinical isolates in Venezuela "; (2) "Contribution of laboratory investigation to human Leptospirosis Surveillance in Venezuela from 1998-2012"

Kyosuke Takabe, "Microscopic analysis of *Leptospira* motility in highly viscous environments".

Huang-Yu Yang, "Risk for chronic disease after leptospiral infection".

Kathryn Allan, (1) "Leptospirosis in northern Tanzania; investigating the role of rodents and cattle in a neglected public health problem"; and (2) "Leptospirosis in Africa: a systemic review of the epidemiology of an important but neglected cause of febrile disease".

Mariko Matsui, "Renal pathophysiology during chronic leptospirosis depending on animal models".

Dian Widiyanti, "A novel immunochromatography-based method for detection of leptospiral antigen in human urine".

Kanae Shiokawa, "Use of recombinant LigA and LipL32 to the lateral flow immunoassay for the detection of pathogenic *Leptospira* spp. specific IgG in rodent sera".

Emilie Vallee, "Subclinical effects of *Leptospira borgpetersenii* serovar Hardjo on New Zealand sheep production".

Jason Lehmann, "Pathogenomic inference on virulence-associated genes in *Leptospira interrogans*".

Juan Sanhueza, "Occupational exposure and risk factors for *Leptospira* in New Zealand workers".

Weilin Hu, "Identification of predominant T- and B-cell epitopes in genus-specific outer membrane proteins of *Leptospira interrogans*".