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JDIP News

In This Issue:

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JDIP News is published periodically to enhance intramural communications and ensure that JDIP participants and stakeholders are updated on news of relevance to our community.

Please direct any comments, contributions and suggestions via email to: Vivek Kapur, JDIP Program Director, at vkapur@psu.edu

National Institute of Food and Agriculture

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Johne's Disease Risk Assessment for Producers (JD-RAP)

By: Jeannette McDonald, Ph.D. and Kenneth Olson, Ph.D.

We are pleased to announce that JD-RAP, an educational tool for producers, is expected to be available this spring. JDIP funds were granted through the RFA process to create an interactive, web-based simulation that helps producers explore the effects of management and testing on reducing the risks of Johne's disease, including the economic impacts. Based on the results of The National Dairy Producer Survey, it was decided to use the Risk Assessment that is a part of the Voluntary Bovine Johne's Disease Control Program (VBJDCP) as a framework for producers to learn the importance, and explore the impact, of management and testing changes for their herd. JD-RAP is designed for producers to go through each of 6 management areas of their farm, entering information about their own operation to customize the management recommendations. Along the way they learn about risks and management options, with recommendations that they discuss these with their veterinarian. This was an expansion of the original plan, requiring additional time and resources for completion of the project. The National Milk Producers Federation (NMPF) has graciously partnered with JDIP to make the needed funds available. It is anticipated that a beta version will be shown at the ICP with a final version available for use in the spring. JD-RAP will join other online resources that have been made available through the University of Wisconsin – Madison, School of Veterinary Medicine, Continuing Education program.

Additionally, working with Dairy Herd Improvement Association representatives, a series of three modules for field and lab technicians who work with milk ELISA testing was completed earlier this year. They are designed to help technicians:

- discuss the transmission and progression of Johne's disease;
- describe why the animals develop diarrhea and weight loss;
- describe the milk ELISA testing process as a screening tool for Johne's disease; and
- explain the impacts of Johne's disease on producers.

The modules are used as a part of the DHIA Quality Certification program, with generic versions available to all users. You can find them and a range of other educational tools at: http://ce.vetmed.wisc.edu/Johnes_Disease_Individual_Courses

The 11th International Colloquium on Paratuberculosis 2012

February 5-10, 2012 in Sydney, Australia at the University of Sydney Campus
By: Tiffany Cunningham, J.D. and Kenneth Olson, Ph.D.

If you haven't done so already, now is the time to make your plans and register to attend the 11th ICP, which will be held February 5-10, 2012 in Sydney, Australia. This five day colloquium, held on the historic and beautiful campus of the University of Sydney, brings together a vast array of international expertise in an exciting scientific program that includes a focus on diagnostics, the host immune response, genotyping and microbial diversity, microbiology, molecular biology, pathobiology, genomics, epidemiology, national and international disease control and an important session on food safety, and Crohn's disease and MAP in the environment. It will feature keynote presentations from speakers of international repute. The valuable contributions of early career researchers will not be overlooked at this meeting.

It is often difficult to keep up with rapidly advancing technologies. In order to appeal to as broad an audience as possible, a series of optional 'Technology Refresher' sessions are included in the program. In addition, there will be specific sessions to review and discuss practical initiatives for the control of Johne's disease. With a view to developing strategic partnerships that will help overcome this global disease, many formal and informal networking opportunities are also planned throughout the meeting.

There will be a Pre-Colloquium Workshop on Bayesian tools in the control of Paratuberculosis lead by Dr. Ian Gardner from February 3-4, 2012 at the University of Sydney. The cost per day is $120 for graduate students and $180 for all others. Registration for the workshop is now available at www.icp2012.com.au . Registration is open to the first 20 participants.

JDIP will have an exhibit booth at the ICP to share information on JDIP activities with the international Johne's community. Dr. Vivek Kapur will also be speaking on the International Johne's Disease Initiatives and JDIP at 4:50pm on Wednesday, February 8, 2012. The presentation of the JDIP Travel Awards will directly follow this lecture at 5:10pm.

There will also be plenty of opportunities to catch up with old friends, meet new ones while enjoying the beauty of Sydney and the surrounding area during a Welcome reception, Harbour cruise, Taronga Zoo excursion and the highlight Colloquium dinner.

Many other sessions will be held during the week. The full schedule is available on the ICP site www.icp2012.com.au .

For further information please contact the ICP2012 Secretariat at:
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Travel Awards to Attend the 11th International Colloquium on Paratuberculosis (ICP)

By: Tiffany Cunningham, J.D.

The JDIP would like to once again congratulate the recipients of the JDIP travel award to assist in attending the 11th International Colloquium in Paratuberculosis (ICP). This award recognizes the outstanding research of graduate students and post-doctoral appointees from all over the world. This year, JDIP received twenty abstracts for its travel award.

The submitted applications were reviewed by the Executive Committee of the JDIP. As usual, any Executive Committee member that had a conflict of interest with an application was excluded from the discussions. Overall, JDIP was able to award seven scholarships spanning five institutions and three countries. Based on a review of the applications, the following graduate students and post-doctoral appointees were selected for support (listed alphabetically by last name):

- Bhattari, Bikash (Texas A&M University - USA) *
- Bradner, Laura (Iowa State University - USA)
- Dobson, Brooke (University of Otago - New Zealand)
- Lamont, Elise A. (University of Minnesota - USA) **
- Mortier, Rienske (University of Calgary - Canada)
- Osman, Mohamed A. (Iowa State University - USA)
- Wolf, Robert (University of Calgary - Canada)

* Helping Hand Fellowship Recipient
** Richard Merkal Memorial Fellowship Recipient

The JDIP Travel Award Presentation will be held on Wednesday, February 8, 2012 at 5:10 pm. Congratulations again to our awardees!

In addition to the JDIP Travel Awards, partial scholarships were provided to Bikash Bhattarai, Texas A&M University (USA), and Dr. Jagdip Singh Sohal, Canadian Food Inspection Agency, St. Hyacinthe, Canada, to facilitate their participation in the Pre-ICP workshop on Bayesian tools in the control of Paratuberculosis.

Multistate Initiative and Future

By: Tiffany Cunningham, J.D. and Kenneth Olson, Ph.D.

JDIP has submitted for consideration as a multi-state project a request entitled, "Mycobacterial diseases of animals." The proposed multi-state initiative will focus on two mycobacterial disease complexes - paratuberculosis (Johne's disease; JD) and the tuberculosis complex of diseases (TBc). These diseases represent some of the most prevalent and significant diseases of livestock in the world. Each has a long and rich history, sharing many common areas where further work is needed. We have proposed five research objectives as part of the initiative that will carry forward work initiated through JDIP. They include: (1) focus on understanding the epidemiology and transmission of Mycobacterial diseases in animals, including predictive modeling; (2) seek to develop and implement new generations of diagnostic tests for JD and TB; (3) focus on improving our understanding of the biology and pathogenesis of Mycobacterial diseases, as well as the host response to infection; (4) focus on development of programs to develop and evaluate new generations of vaccines for JD and TB; and (5) develop and deliver education and outreach material related to JD and TB in electronic and print form for use by extension specialists, veterinarians, government agencies, producers and other stakeholders. Projects within each of these objectives, with cross-cutting

contributions, will be designed to address the major animal, human, and societal issues surrounding detection and control of mycobacterial infection and how these organisms move and spread within both cattle and wildlife populations. Currently, the multistate project has been approved at the first level and submitted to The Multistate Activity Committee for final approval. If approved, in addition to the Pennsylvania State University, JDIP would be collaborating with institutions including Cornell University, Michigan State University, the University of California – Davis, and the University of Minnesota as lead institutions in furthering this project. However, we will seek to maintain the strong working relationships that are in place with all existing JDIP members.

While multistate initiatives have limited funding directly associated with them, advantages include: (a) continued building of the cooperative framework and capacity to respond to emergent issues surrounding mycobacterial diseases; (b) ability to coordinate ideas and resources to combat the targeted mycobacterial diseases, and (c) use of a multidisciplinary approach to solve complex problems.

We invite your support and participation in this new effort as we continue work that will aid producer efforts to address both TB and Johne's disease.

JDIP / APHIS Vaccine Project Update

By: John Bannantine, Ph.D., Murray Hines II, Ph.D., and Kenneth Olson, Ph.D.

The JDIP / APHIS Vaccine Project, initiated in 2009, is progressing on schedule. The primary objective of the project is to evaluate vaccine efficacy, with the expectation of identifying one of more Johne's Disease vaccine candidates for possible commercial development. It will also serve to validate the Goat Johne's Disease Experimental Challenge Model proposed in the 2007 AMSC manuscript "Experimental Challenge Models for Johne's Disease: A Review and Proposed International Guidelines" by Hines et. al.

Eighteen knockout mutants were evaluated in Phase I, the *in vitro* macrophage phase of the study, to identify those showing the best attenuation. These results, coupled with an apoptosis study in Dr. Paul Coussens' lab identified the top eight candidates that were moved into Phase II, the mouse vaccine efficacy trial. This part of the study measured MAP cfu in tissues after experimental infection to assess protection from the test vaccines. Samples were also retained for immunological monitoring of the mice, to be performed at a separate lab. Five mutant vaccines showing the best protection after MAP challenge were identified and moved forward into the final phase of the vaccine project, Phase III, the goat challenge study that is currently in progress in the lab of Dr. Murray E. Hines II at the University of Georgia. Five treatment groups and three control groups of 10 goat kids each are being evaluated. Goat kids were vaccinated in mid-September 2011 with the 5 test vaccines and a commercial control vaccine, then challenged four weeks later with a K10 strain of MAP following the parameters of the Goat Experimental Challenge Model proposed and published by the JDIP AMSC committee. Monthly fecal cultures are being collected for HEY culture and PCR, and monthly serum samples are being collected for ELISA and AGID testing. Periodic comparative cervical intradermal skin testing is also being performed. Whole blood is being provided to Dr. Torsten Eckstein's lab at Colorado State University monthly for other immunologic testing with MAP cell wall lipids. At necropsy, the gross and microscopic lesions detected will be graded for statistical analysis. Select tissues will be collected at necropsy then PCR and HEY culture will be performed on these samples. Limited amounts of goat serum, feces and tissues samples will be archived during the Phase III study. It is anticipated that final results will be available in the spring of 2013.

Ian Gardner Takes on a New Challenge

By: Ian Gardner, Ph.D.

Although he still continues to be active in JDIP, Ian Gardner is now the University of Prince Edward Island's Canada Excellence in Research Chair (CERC) in Aquatic Epidemiology at the Atlantic Veterinary College (AVC). This prestigious research Chair is one of only 19 CERCs awarded to Canadian universities by the Government of Canada, each of which is valued up to $10 million over 7 years. The CERC program supports Canadian universities to build their reputation as a global leader in research and innovation in a specific research area or discipline.

Gardner's research focus is on developing cost-effective testing strategies and surveillance programs for the prevention and control of aquatic animal diseases, while investigating disease dynamics and health interactions between farmed and wild fish populations. His research at AVC will assist aquaculture regulators in Canada in making science-based decisions to maintain healthy food production in marine environments, as well as provide the knowledge needed to help improve nutrition for human populations around the world. One of his current collaborative projects involves developing and validating a multiplex assay to differentiate pathogenic from non-pathogenic strains of Infectious Salmon Anemia (ISA) virus, which caused major outbreaks of disease in Chile, Norway and Canada in the last 10 years.

Congratulations Ian on being selected for this prestigious position, from all of your JDIP friends!

"The new scientific frontier of aquatic epidemiology being developed at the Atlantic Veterinary College will make a difference in people's lives," says Gardner. "This research deals with the health of our oceans, but is also about what goes on our plate at dinnertime. This knowledge will help improve nutrition for human populations around the world."

The overarching goals of the CERC program in Aquatic Epidemiology at UPEI are to:

- Provide the evidence-based science and research leading to the identification of determinants of aquatic food animal health, and early detection of disease events.
- Provide the evidence-based science and research central to the sustainability of aquatic food animal industries (for both farmed and wild-caught fish).
- Monitor the industry and their interactions with aquatic ecosystems, both domestically and abroad, for emerging disease threats.
- Provide innovations in science and research central to predictive modeling of population health, disease control and mitigation.
- Inform national and international risk-assessment, food security and nutritional security policies and decisions.
- Inspire confidence that public concerns regarding aquaculture, aquaculture products and their environmental consequences are being addressed through epidemiological research.
- Facilitate capacity-building, both domestically and internationally, promoting high standards of professional practice, leadership and education.

JDIP Community-based Test Evaluation and Sample Repository Project Update

By: Raymond W. Sweeney, VMD

The JDIP Diagnostics Project was initiated in mid-2011. Goals of the project include 1) the creation of a repository of well-characterized samples for use in the study of Johne's disease diagnostic test accuracy, and 2) compare performance of multiple diagnostic tests for paratuberculosis in dairy herds.

Ultimately we will have a repository of well-characterized fecal, serum, and milk samples from 900 cows (500 from infected herds, 400 from uninfected herds). Care has been taken to assure that appropriate demographic data is available to meet the "STRADA" guidelines published in Preventive Veterinary Medicine in August (volume 101:18-34). The samples will be used in this project to compare the performance of multiple diagnostic tests for paratuberculosis in dairy herds and also be available to other researchers for future work.

Since September, cooperating "sample collectors" from around the United States have been visiting herds on a nearly weekly basis. Samples have been collected from dairy herds in California (3), Georgia (3), Pennsylvania (2), and Tennessee (1). Over 1300 cows have now been sampled, with nearly 400 of the target 900 serum, milk, and fecal samples preserved in the repository. As of the end of December 2011, we have 91 (6.7%) ELISA positive, 8 suspect and 1260 negatives out of the total of 1359 samples with results.

The project has been an exercise in logistics, with Dr. Murray Hines II, University of Georgia, seamlessly coordinating the labeling and shipping of sampling containers, receiving samples from the collectors, aliquoting into individual portions, sending serum samples to the ELISA lab for screening, and maintaining coded sample id's and results in a database. Dr. Ian Gardner is providing statistical support and identifying ELISA-positive and age-matched ELISA-negative controls from which to keep samples for the repository.

The median size of the nine herds from which we have samples is 348 (range 138 - 1400). Eight herds employ free stall housing, and one herd is pastured based. Seven of the herds feed monensin. Seven of the herds had a history of prior Johne's testing, primarily by ELISA, with prevalence up to 10.7%. This reflects our desire to sample from higher prevalence herds as a way to maximize the number of positive cows available to include in the repository.

Status level 4 herds, from the Voluntary Bovine Johne's Disease Control Program, have been identified and scheduled for sample collection in early 2012. It is hoped that sampling will be complete by the end of February, since only 1 or 2 more infected herds and 1 or 2 Status herds are needed. Once the repository is complete, Phase 2 will begin, with repository samples being sent to selected laboratories for HEYM culture, liquid culture, PCR, and milk ELISA testing.

JDIP – 2011 Highlights

By: Kenneth Olson, Ph.D.

The past year has been a busy one for JDIP and JDIP members, as we continue work to find new and improved tools that will aid in efforts to control and reduce the spread of Johne's disease. As we conclude some of our past activities, we are looking to the future seeking new and innovative ways for our network of collaborators to continue working with industry and other partners to answer the many questions that remain. The following are several highlights from the past year:

Year 7 RFA: A major role for JDIP has been to identify and help fund innovative work to address Johne's disease. Last year we received and reviewed a total of 14 proposals in response to the Year 7 Request for Applications (RFA). Funding requested exceeded $1.2 million, but since only about $500,000 was available for support of JDIP programs and operations difficult decisions needed to be made. Following our standard protocol, each proposal was reviewed externally, as well as by the JDIP Scientific Advisory Board (SAB) at an in-person meeting. Based on this input, seven (7) proposals were selected for funding:

- Luiz Bermudez (Oregon State University), "M. paratuberculosis interaction with intestinal mucosa"
- Paul Coussens (Michigan State University), "MAP inhibition of macrophage apoptosis: A key immune evasion tactic"
- Sandra Godden (University of Minnesota), "Clinical Trials in Johne's Disease Control: Heat-treatment of Colostrum and Maternity Pen Management"
- Yrjo Grohn (Cornell University), "Epidemiology and Biostatistics Core"
- Jeannette McDonald (University of Wisconsin), "Education and Outreach"
- Ynte Schukken (Cornell University), "Epidemiology and Transmission Project"
- Srinand Sreevatsan (University of Minnesota), "Defining the characteristics of sporulation in Mycobacterium avium paratuberculosis"

This was the final year that JDIP had funding available to distribute through the competitive grants process. We are now looking to assure that work initiated through the grants is completed and that the greatest use and benefits are gained from the work that has been done.

JDIP at the JAM: For the second consecutive year, the JDIP Annual Conference was held in conjunction with the Joint Annual Meeting (JAM) of the American Dairy Science Association and the American Society of Animal Science. This provided an opportunity to network with the international audience of over 3,100 dairy and animal scientists, and industry representatives attending the meeting. JDIP activities included a Sunday session with reports from the Core and Project leaders and participation in the scientific sessions at the JAM. On Monday, JDIP collaborators had 15 oral and 8 poster presentations in the Animal Health sections. To support and encourage young scientists, JDIP provided travel awards to 11 graduate and post-doctoral students who presented their work at the JAM. JDIP was also a meeting sponsor and had a display in the exhibit area, providing additional opportunities to share information about Johne's work with meeting participants.

US Animal Health Association (USAHA): JDIP EC, SAB and EAB members were active participants in National Johne's Work Group and Johne's Disease Committee meetings held during the USAHA Annual Meeting, providing updates on current work and future plans. JDIP also had a display at this meeting, providing attendees with additional information about JDIP.

DC Visits: Dr. Karen Jordan, a dairy producer and veterinarian from North Carolina, who serves as chair of the National Milk Producers Federation (NMPF) Animal Health and Well Being Committee, joined Drs. Vivek Kapur and Ken Olson in visits to USDA leadership and Congressional staff in Washington, DC. The message communicated was that agricultural research uses the dollars allocated very effectively, leveraging additional public and private resources to address priority issues. JDIP was highlighted as an example of the effective use of public funds. It was emphasized that while much has been accomplished, there is an ongoing need for research funding to address remaining challenges and maximize the return on dollars already invested.

Industry Outreach: While many industry groups are actively involved in JDIP, we have worked to reach out more broadly with information about what has been accomplished through JDIP and to share our future plans. Information was shared through special "JDIP News and Notes" which were provided to attendees at the National Institute for Animal Agriculture Annual Meeting, the Animal Agriculture Alliance Stakeholder meeting, and the World Dairy Expo. While at Expo, we also met with writers and broadcasters covering dairy issues, providing information on JDIP and JDIP activities.

Discovery research: Dr. John Bannantine, USDA ARS, a member of the JDIP executive committee, and coworkers at USDA's National Animal Disease Center produced a monoclonal antibody that specifically binds to only MAP strains. This is breakthrough work as it is the only antibody in the world for which such a claim can be made. The USDA was recently awarded a U.S. patent for the antibody. Details of the work are included in a paper published July 26, 2011 in *Frontiers in Cellular and Infection Microbiology*. The abstract and full text is available on-line at:

http://www.frontiersin.org/cellular_and_infection_microbiology/10.3389/fmicb.2011.00163/abstract

Project Work: Three areas, reported on in detail in other sections of this newsletter, had major activities during the year. They include the Diagnostics project, the Vaccine project and the development of additional educational modules. All are ongoing efforts, scheduled for completion during the year.

Multistate Initiative: JDIP is nearing the end of current funding that has been provided through a USDA NIFA CAP grant. It appears unlikely that there will be an opportunity to compete for similar funding in the near-term, so JDIP is exploring other ways through which the networking and collaboration that has been developed through JDIP over the past seven years might be maintained. To this end, a proposal for a multistate initiative, focused on mycobacterial diseases (Johne's and bovine TB) has been developed and is moving through the approval process by USDA and Land Grant Universities. If successful, the initiative will help to maintain the infrastructure and working relationships as other funding sources are explored. We invite your participation in this effort.

2011 was an interesting and productive year for JDIP. We do look forward to exploring new ways to continue these efforts. Please contact Dr. Ken Olson, JDIP Outreach Coordinator, at keolson@prodigy.net if you have additional questions on any of these items.

Upcoming Meetings and Events

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February 1-4, 2012
The 114th Cattle Industry Convention (NCBA Annual Meeting)
Nashville, Tennessee. USA
http://www.beefusa.org/cattleindustryannualconvention.aspx

February 5-10, 2012
The 11th International Colloquium on Paratuberculosis 2012
Sydney, Australia
www.icp2012.com.au

March 6-8, 2012
National DHIA Annual Meeting
Fort Worth, Texas. USA
http://www.dhia.org/

June 16-19, 2012
112th General Meeting - ASM
San Francisco, California. USA
http://www.asm.org/index.php/meetings/general-meeting12.html

July 15-19, 2012
2012 JAM (ADSA / ASAS Joint Annual Meeting)
Phoenix, Arizona. USA
http://www.jtmtg.org/2012/

August 4-7, 2012
AVMA Annual Meeting 2012
San Diego, California. USA
http://www.avma.org/

September 20-22, 2012
AABP Annual Conference
Montreal, Quebec, Canada
http://www.aabp.org/

October 2-6, 2012
World Dairy Expo at the Alliant Energy Center of Dane County in
Madison, Wisconsin. USA
http://www.worlddairyexpo.com/

October 18-24, 2012
116th USAHA Annual Meeting
Greensboro, North Carolina. USA
http://usaha.org/Meetings.aspx

October 29-31, 2012
NMPF, NDB, UDIA Joint Annual Meeting
Dolphin Hotel: Orlando, Florida. USA
http://nmpf.org/nmpf-joint-annual-meeting

JD In Print – Producer Press

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JD In Print – Peer Review
Johne's Disease Related Publications

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