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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



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Travel Awards to Attend the JDIP 2011 Annual Meeting

JDIP would like to once again congratulate the recipients of the JDIP travel award to assist in attending the 2011 JDIP Annual Meeting. This award recognizes the outstanding research of graduate students and post-doctoral appointees from all over the world. Pictured below are the awardees and JDIP Executive Committee (EC) members.



pictured from left to right: Elise A. Lamont, Ian Gardner (EC), Jamie L. Everman, Scott Wells (EC), Edward Kabara, John Bannantine (EC), Rebecca L. Smith, Zhao Lu, Vivek Kapur (EC), Ashutosh Wadhwa, Yrjö Gröhn (EC), and Kenneth Olson (EC)

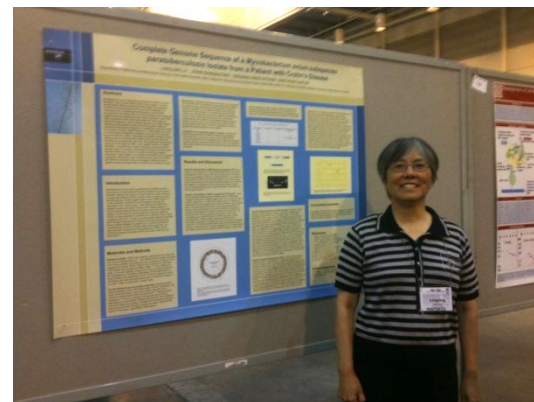
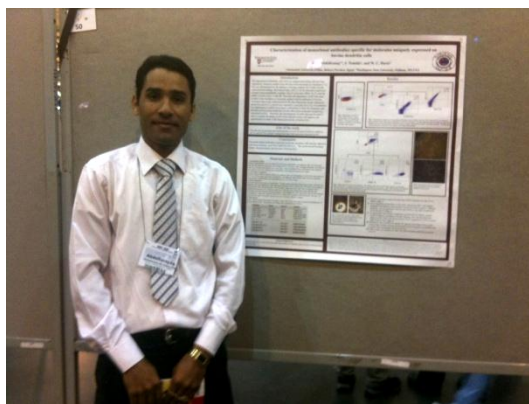
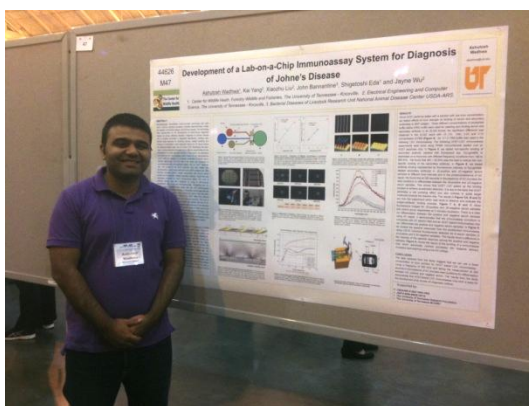


JDIP 2011 Annual Meeting with the JAM Update

By: Kenneth Olson, Ph.D.

The **2011 JDIP Annual Conference** was held in conjunction with the Joint Annual Meeting (JAM) of the American Dairy Science Association® (ADSA®) and the American Society of Animal Science (ASAS) in New Orleans, Louisiana from July 10-11, 2011. By meeting in conjunction with the JAM, the JDIP research abstracts were included as part of the scientific content of the full meeting and thus readily available to a world-wide audience of interested dairy and animal scientists, as well as industry professionals. JDIP Core and Project efforts, including the Vaccine development project and the Diagnostic project, were discussed in the Sunday JDIP Session. Research efforts were highlighted in 15 oral and 8 poster presentations during the JAM. The program book, which includes all of the abstracts and PowerPoint's from most Sunday presentations, is available at:

http://www.jdip.org/index.php?option=com_content&task=view&id=141&Itemid=223



pictured with their poster presentations: Gaber Abdellrazeq (lower left); Lingling Li (above); and Ashutosh Wadhwa (upper left)

Meeting at the JAM also provided JDIP members with the opportunity to network with over 3,100 other meeting participants and share information about JDIP through our display in the Exhibition Hall.

Johne's Disease Initiative Under Way for Atlantic Canada

Modified from the version published in JAVMA News on July 15, 2011



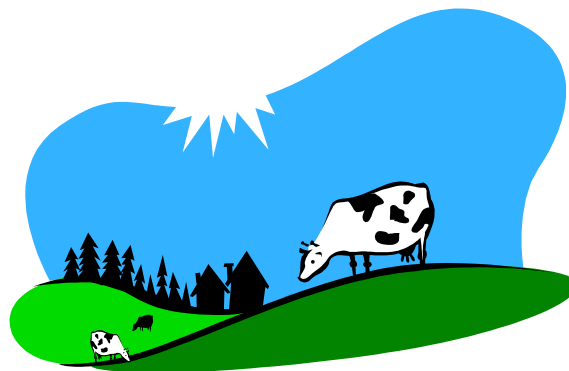
Atlantic Johne's Disease Initiative

Dairy health specialists from the Atlantic Veterinary College have partnered with the 4 dairy boards of Atlantic Canada—the Dairy Farmers of Nova Scotia, Prince Edward Island, New Brunswick, and Newfoundland and Labrador—to create the Atlantic Johne's Disease Initiative (AJDI). The program strategy was developed by the AVC's Maritime Quality Milk (MQM) in conjunction with a team of veterinarians from around the region (Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland). Its goal is to sustainably reduce the prevalence of the disease in infected herds and prevent its spread from herd to herd. The program is led by Greg Keefe, a faculty member at AVC.

The three-year research and education program will cost \$1.1 million, with the expense shared by the federal government, the four Atlantic Canada dairy boards, and Maritime Quality Milk.

The AJDI has three main activities: herd testing using environmental samples collected by a single technician, risk assessment by program-certified veterinarians annually for 3 years, and selective cow testing in positive herds. These procedures are designed to strategically, and in a cost-efficient manner, reduce the impact of Johne's disease on the regional dairy industry by decreasing the number of existing infections and reducing the development of new infections. Laboratory support for the program is provided by the MQM Johne's research laboratory at AVC. There are about 700 herds in the region and the goal is to enroll about 60% (420 herds) in the study. Historically, there has been lots of internal trade in animals, at least with in Prince Edward Island. Most herds are housed in tiestalls or freestalls. Asked about the likely herd and animal prevalence, Keefe speculated that approximately 30% of dairy herds would be infected with an average cow prevalence of 10% to 20% in infected herds.

Participation in the program is voluntary. Resources will be made available to assist herds with the disease, as indicated by positive environmental samples and to decrease the overall prevalence of infection on the farm and the likelihood of spread to other herds. This will be done through subsidized ELISA testing for owners of positive herds. Additionally, test-negative herds will be provided with management plans to maintain their status. A register of test-negative herds (sequential negative tests results from environmental sampling in the first 2 years) will be available to owners interested in purchasing females for introduction in their herds. Details about the program are available at www.atlanticjohnes.ca.



The Cornell Workshops: “Tools for Infectious-Disease Epidemiology”

By: Yrjö Gröhn, Ph.D.

In addition to offering statistical and epidemiological consulting services and developing new statistical and mathematical methodology, the Epidemiology and Biostatistics Core offers training workshops to the members of the JDIP community. To support the training mission, the summer course in epidemiological methods was offered at Cornell University on July 20-22, 2011.

Our original course covered three major topics: diagnostic test evaluation, infectious disease models, and risk assessment. Based on the previous years' feedback, the focus of the course this year was on infectious-disease modeling. The course was shortened to three days and covered an introduction to deterministic “SIR” models, stochastic models, and beyond “SIR” models (within host models).

Nine participants attended the course. Drs. Yrjö Gröhn and Ynte Schukken along with their Postdoctoral Associates Zhao Lu, Rebecca Mitchell and Rebecca Smith were this year's instructors. Teaching methods were mini lectures and case studies with hands on computer exercises. Case study examples were chosen to be relevant to veterinary medicine, such as paratuberculosis, salmonella and mastitis.



pictured from left to right: Zhao Lu, Ynte Schukken, Rebecca Mitchell, Yrjö Gröhn and Rebecca Smith

Based on teaching evaluations, the workshop was well received. As the instructors, we felt that the level of the participants and motivation were excellent. A three day format gave more time to work with and understand how infectious disease modeling works. There was discussion whether the material should be divided into two separate three session blocks (introduction and more advanced material). However, the consensus was that a three day workshop is the maximum length one can take in one sitting.

Suggestions, ideas, and comments given in evaluation forms at the end of the course assist us in developing and modifying our future courses.

The partial funding by JDIP to support the course is greatly appreciated.

Epidemiological and Immunological Models for Johne's Disease: Should They Be Integrated?

By: Ian Gardner, Ph.D. and Shigetoshi Eda, Ph.D.

An investigative workshop for mathematical modeling of Johne's disease (JD) epidemiology and immunology was held in Knoxville, Tennessee from July 6-8, 2011. The workshop was sponsored by the National Institute for Mathematical and Biological Synthesis (NIMBioS) (www.nimbios.org), which is based at the University of Tennessee, Knoxville.

The objectives of the JD workshop were to gather diverse groups of scientists for facilitation of interdisciplinary discussions on the mathematical modeling of MAP epidemiology, to establish an initiative in mathematical modeling for immunology of JD, and to investigate methods for linking the epidemiology and immunology models. NIMBioS has sponsored similar workshops on tuberculosis, malaria, and toxoplasmosis bringing together scientists with expertise in the biology of the organism, mathematics, epidemiology, diagnostic methods, immunology, and modeling to map out future research directions of common interest.

Forty participants, including 11 international scholars and 4 JDIP Executive Committee members, attended the workshop. In the first two days, 11 presentations were made on the epidemiology, immunology and their mathematical models, followed by breakout sessions to discuss challenges, opportunities, and future directions for each objective of the workshop. On the last day, two scientific presentations were made, concluding remarks presented for each objective, and a final group discussion was held. In addition, the Directors of the NIMBioS (Louis Gross) and the JDIP (Vivek Kapur) programs described possible synergies between the two programs. During the workshop, new mathematical models were proposed, new research opportunities emerged, and future activities/goals were identified. A proposal for a NIMBioS Working Group will be made to continue this initiative. In addition, an abstract was submitted to the 11th ICP in Sydney, Australia and Shigetoshi Eda will provide updates on activities of the group at that meeting.



For a list of participants, please visit,
http://www.nimbios.org/workshops/WS_JohnesDisease_participants

JDIP Community-Based Test Evaluation Project Starts

By: Ian Gardner, Ph.D.

“The first batch of 100 samples was submitted last week from a California dairy herd as a ‘shakedown run’ to test protocols and standard operating procedures for the project,” said Ray Sweeney, the overall project coordinator. Murray Hines and his staff at the Tifton Diagnostic laboratory are coordinating distribution, testing and banking of samples for the JDIP repository. Their role is critical, including giving blinded identification numbers to ensure unbiased evaluation by testing laboratories. Once the samples from this first herd visit have been

processed and banked in the repository, scheduling of the remaining sample collections will begin in earnest throughout the autumn months. Sample collection and processing are expected to take about 6 months given laboratory processing constraints.

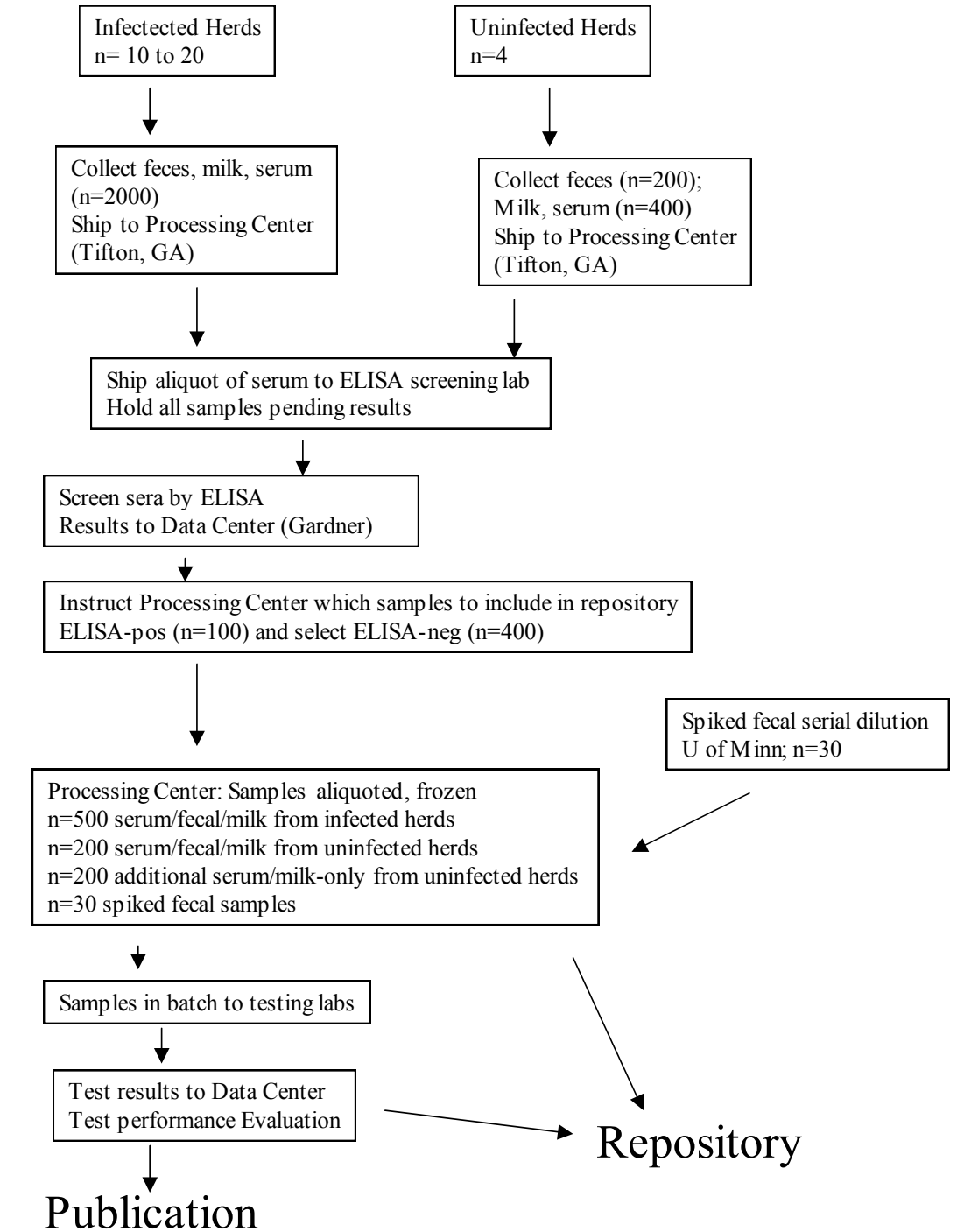
The goals of the project are to: 1) create a repository of well-characterized samples for use in the studies of Johne’s disease diagnostic test accuracy and 2) use samples collected to create the repository and compare performance of multiple diagnostic tests for paratuberculosis in dairy herds.

Holstein dairy herds participating in Dairy Herd Improvement Association (DHIA) scheme and not using paratuberculosis vaccine are eligible for inclusion in the study. Eligible animals in these herds will be those in lactation 2 and greater, and lactating at the time of sample (milk, feces and serum) collection. Infected and non-infected herds will be included in the study. Key animal data that will be collected include lactation number and days in milk. Herd data are also being collected to facilitate the reporting of herd data in peer-reviewed publication. Publications will follow suggestions for reporting as outlined in “Consensus-based reporting standards for diagnostic test accuracy studies for paratuberculosis in ruminants,” which was recently published in *Preventive Veterinary Medicine* in August (volume 101:18-34). The flow chart for the study is shown in the figure on page 7.

Once all of the samples have been banked in the repository, test sets will be sent to the four laboratories that are participating in the head-to-head comparison of tests: Antel BioSystems (serum and milk ELISA); Cornell Animal Health Diagnostic Center (liquid culture and qualitative PCR); Johne’s Research Laboratory, University of Pennsylvania (HEYM and Tetracore PCR); and Johne’s Testing Center, University of Wisconsin (liquid culture). Testing labs were selected based on a competitive process with key criteria being that the lab had passed the USDA-NVSL check test, experience and publication record related to the assay, and bid costs for testing. Once the repository of all samples is created, there will be an opportunity for other laboratories to bid for sample access.



Study Flow Chart



JDIP's Genomics & Antibodies Core Develops a New Antibody That Is Specific for MAP

By: Kenneth Olson, Ph.D.

Researchers don't like false positive results when looking for bacteria, especially ones that stem from cross-reactivity. Until recently, any antibody that was used to detect *Mycobacterium avium* subsp. *paratuberculosis* (MAP) would also react with its close relative, the *M. avium* subspecies members including *silvaticum*, *hominissuis* and *avium*. But that's now about to change.

After years of work, researchers at the USDA's National Animal Disease Center (NADC) have recently produced a monoclonal antibody that specifically binds to only MAP strains. It is the only antibody in the world that can make such a claim. However, that's just the beginning of this story.

"When the antibody was checked for specificity, the results were astounding," said John Bannantine, a research microbiologist at NADC. In fact, the data was impressive enough that the USDA was recently awarded a U.S. patent for this antibody. "But trying to find the protein that the antibody binds to led me on a wild goose chase."

It was initially thought that the antibody reacted with a protein encoded by a gene that was not originally identified in the MAP K-10 genome. This genome was sequenced by JDIP's Project Director, Vivek Kapur at The Pennsylvania State University, along with John Bannantine back in the early 2000s.

"I was surprised at finding this new putative gene because I thought we were pretty thorough when K-10 was annotated," said Bannantine.

But some pieces of data just didn't add up, so Bannantine kept digging, and he asked for help from JDIP's diagnostics project leader Srinand Sreevatsan at the University of Minnesota.

"He's been great to work with," Bannantine said. "This has been a real strength of the whole JDIP program ... being able to call on other researchers within the program for help."

It turns out that the gene "missed" by annotation in the K-10 genome was not a real gene after all, but had an epitope that mimicked a similar epitope in a real gene that is annotated in K-10. With this discovery, all the pieces of data now fit like a glove.

The only remaining question is: why is the antibody so exquisitely specific? To find the answer to that, you'll have to read the paper published late July 2011 in *Frontiers in Cellular and Infection Microbiology*. You may access it by going to the website below:

http://www.frontiersin.org/cellular_and_infection_microbiology



The 11th International Colloquium on Paratuberculosis 2012

February 5-10, 2012 in Sydney, Australia *at the Sydney University Campus*
By: 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.

To encourage participation by young scientists, JDIP is pleased to offer Travel Awards for the meeting to postdoctoral appointees and graduate students who submitted abstracts to the 11th ICP meeting. The travel awards will provide student registration fees for the meeting and \$1,000 USD toward travel expenses. Selection of travel award recipients will be based on potential for future contributions to the field and the scientific merit of a submitted abstract. Application details are available on the ICP and JDIP website.

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. JDIP will host a session providing JDIP members and other interested participants with an update on activities and future plans. 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.

Early registration is available until December 1, 2011, but don't delay. Make your plans and register now.

For further information please contact the ICP2012 Secretariat at:
PO Box 1179, Crows Nest NSW 1585, Australia
Phone: +612 9436 0232
Fax: +612 9436 4462
Email: icp2012@conceptevents.com.au
Website: www.icp2012.com.au

Upcoming Meetings and Events

September 22-24, 2011
2011 AABP Annual Conference
St. Louis, Missouri. USA

<http://www.aabp.org/meeting/default.asp>

September 29 – October 5, 2011
115th USAHA Annual Meeting
Buffalo, New York. USA

<http://www.usaha.org/meetings/>

October 4-8, 2011
World Dairy Expo at the Alliant Energy Center of Dane County in
Madison, Wisconsin. USA

<http://www.worlddairyexpo.com/gen.home.cfm>

November 14-16, 2011
NMPF, NDB, UDIA Joint Annual Meeting
San Diego, California. USA

<http://nmpf.org/nmpf-joint-annual-meeting>

February 1-4, 2012
The 114th Cattle Industry Convention (NCBA Annual Meeting)
Nashville, Tennessee. USA

<http://www.beefusa.org/2012cattleindustryconvention.aspx>

February 5-10, 2012
The 11th International Colloquium on Paratuberculosis 2012
Sydney, Australia

www.icp2012.com.au

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.adsa.org/meetings-future.asp>

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/>

JD In Print – Producer Press

- Controlling Johne's disease. 2011. High Plains/ Midwest Ag Journal. <http://www.hpi.com/archives/2011/jan11/jan31/0117JohnsDiseaseinCattlesr.cfm>
- **Durst, P.** 2011. Can Johne's Disease be eliminated from a herd? Dairy Herd Network. June 6, 2011. <http://www.dairyherd.com/dairy-news/Can-Johnes-Disease-be-eliminated-from-a-herd-123254658.html>
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- **Grooms, D.,** R. Kreft, R. West, A. Blumerich and P. Durst. 2011. Innovative calf warming boxes reduce disease transmission. Dairy Herd Network. August 22, 2011. <http://www.dairyherd.com/dairy-resources/calf-heifer/Innovative-calf-warming-boxes-reduce-disease-transmission-126087029.html>
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- Limited funds available for Johne's disease costs in Wisconsin. Dairy Herd Network. May 9, 2011. <http://www.dairyherd.com/dairy-news/Limited-funds-available-for-Johnes-disease-costs-in-Wisconsin-121501119.html>
- **Linderoth, S.** 2011. Johne's disease has a negative influence on reproduction. Dairy Herd Network. March 8, 2011. <http://www.dairyherd.com/dairy-resources/reproduction/Johnes-disease-has-a-negative-influence-on-reproduction-117609358.html?ref=358>
- **Quigley, J.** 2011. What's new in colostrum research? Progressive Dairyman. Vol. 25. No. 7. May 2. 2011. P 49.
- Should you test heifers for Johne's disease? Dairy Herd Network. July 1, 2011. <http://www.dairyherd.com/dairy-herd/research-track/Should-you-test-heifers-for-Johnes-disease-124710574.html>

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

- **Aboagye G,** Rowe MT. Occurrence of Mycobacterium avium subsp. paratuberculosis in raw water and water treatment operations for the production of potable water. Water Res. 2011 May;45(11):3271-8.
- **Alharbi KB,** Al-Swailem A, Al-Dubaib MA, Al-Yamani E, Al-Naeem A, Shehata M, Hashad ME, Albusadah KA, Mahmoud OM. Pathology and molecular diagnosis of paratuberculosis of camels. Trop Anim Health Prod. 2011 Jun 4.
- **Allen AJ,** Park KT, Barrington GM, Lahmers KK, Abdellrazeq GS, Rihan HM, Sreevatsan S, Davies C, Hamilton MJ, Davis WC. Experimental infection of a bovine model with human isolates of Mycobacterium avium subsp. paratuberculosis. Vet Immunol Immunopathol. 2011 Jun 15;141(3-4):258-66.
- **Borrmann E,** Möbius P, Diller R, Köhler H. Divergent cytokine responses of macrophages to Mycobacterium avium subsp. paratuberculosis strains of Types II and III in a standardized in vitro model. Vet Microbiol. 2011 Apr 12.
- **Boulais C,** Wacker R, Augustin JC, Hedi Ben Cheikh M, Peladan F. Modeling the Occurrence of Mycobacterium avium subsp. paratuberculosis in Bulk Raw Milk and the Impact of Management Options for Exposure Mitigation. J Food Prot. 2011 Jul;74(7):1126-36.
- **Chassaing B,** Darfeuille-Michaud A. The commensal microbiota and enteropathogens in the pathogenesis of inflammatory bowel diseases. Gastroenterology. 2011 May;140(6):1720-28.
- **Click RE.** A 60-day probiotic protocol with Dietzia subsp. C79793-74 prevents development of Johne's disease parameters after in utero and/or neonatal MAP infection. Virulence. 2011 Jul 1;2(4).
- **Cossu D,** Cocco E, Paccagnini D, Masala S, Ahmed N, Frau J, Marrosu MG, Sechi LA. Association of Mycobacterium avium subsp. paratuberculosis with multiple sclerosis in Sardinian patients. PLoS One. 2011 Apr 13;6(4):e18482.
- **Cossu A,** Rosu V, Paccagnini D, Cossu D, Pacifico A, Sechi LA. MAP3738c and MptD are specific tags of Mycobacterium avium subsp. paratuberculosis infection in type I diabetes mellitus. Clin Immunol. 2011 May 14.
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- **Di Sabatino A**, Paccagnini D, Vidali F, Rosu V, Biancheri P, Cossu A, Zanetti S, Corazza GR, Sechi LA. Detection of *Mycobacterium avium* subsp. *paratuberculosis* (MAP)-specific IS900 DNA and antibodies against MAP peptides and lysate in the blood of Crohn's disease patients. *Inflamm Bowel Dis*. 2011 May;17(5):1254-5. doi: 10.1002/ibd.21461.
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- **Fernández-Silva JA**, Abdulmawjood A, Akineden O, Bülte M. Serological and molecular detection of *Mycobacterium avium* subsp. *paratuberculosis* in cattle of dairy herds in Colombia. *Trop Anim Health Prod*. 2011 Apr 6.
- **Fitzgerald SD**, Bolin SR, Boland KG, Lim A, Kaneene JB. Overt *Mycobacterium avium* subsp. *paratuberculosis* Infection: An Infrequent Occurrence in Archived Tissue from False TB Reactor Cattle in Michigan, USA. *Vet Med Int*. 2011;2011:910738.
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- **Klanicova B**, Slana I, Vondruskova H, Kaevska M, Pavlik I. Real-time quantitative PCR detection of *Mycobacterium avium* subspecies in meat products. *J Food Prot*. 2011 Apr;74(4):636-40.
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