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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 contributions, suggestions and comments via email to:
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The JDIP 5th Annual Conference will be held in August 2009 in conjunction with the 10th ICP in Minnesota.



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JDIP 4th Annual Conference

The JDIP 4th Annual Conference was held on April 18-20, 2008 at The James B. Henry Center, Michigan State University and kicked off with a welcome presentation by Karen Plout, Chair of the Department of Animal Science, Michigan State University.



Feedback from the event was uniformly positive, with comments that included "this conference was the best JDIP conference, thus far".



Conference Highlights:

- Over 100 attendees
- Participants from the U.S., Canada, Netherlands, India, and Mexico
- Collaboration and networking amongst the JDIP conference and New Horizon's in Johne's Disease industry workshop attendees
- Six JDIP travel awardees (Jenn-wei Chen, Luis Espejo, Zhao Lu, Patrick Pithua, Meetu Seth, Shoorvir Singh)

Thank you to all attendees who traveled to the conference and contributed to it's success! Also a sincere thank you to our hosts at Michigan State University and those from the University who contributed to the success of the event including Paul Coussens, Chris Colvin, Ed Kabara, Michele Winchester, and Sue Sipkovsky.

www.JDIP.org is Adding New Features!

In an effort to make Johne's information more easily available, three new sections have been added to the JDIP website. Each includes information targeted to meet specific needs. The new sections are **Annual Conference**, **Producer Information** and **Veterinarian Information**.

The **Annual Conference** section provides direct access to presentations and supporting information from each of our Annual Conferences. For the 2008 conference you will find links that take you to the presentations given at both the JDIP conference and the "New Horizon's in Johne's Disease Control" workshop.

The **Producer Information** section is targeted for producers and includes articles that have recently appeared in producer publications that focus on Johne's research and the on-farm application of this work as well as access to the producer education units developed in conjunction with the UW-Madison School of Veterinary Medicine. It also includes the current draft of the new "Johne's Strategic Plan" that is available for comment as industry, state animal health officials and USDA work to craft a new plan that will help producers address Johne's disease more effectively in the future. The final item in the section is a summary from the NAHMS Dairy 2007 Study that examined producer knowledge of Johne's disease and management practices they are using to address the disease.

The **Veterinarian Information** section provides information especially for veterinarians. It currently includes the Dairy and Beef handbooks for veterinarians and producers, the "How to do Risk Assessments and Management Plan" manual and the most recent Uniform Program Standards for the national Johne's program. These are important tools in the current program. The "Best Test Report", highlighting suggested testing strategies for various types of herds, can also be accessed in this section, as well as the on-line Johne's Veterinary Certificate Program from the UW-Madison, School of Veterinary Medicine.

We hope that you find these new sections useful. As new information continues to be added, we welcome your suggestions on further enhancements and additional information you would like to see included. Please send your suggestions to Ken Olson at keolson@prodigy.net.



The National Dairy Producers Johne's Survey

By Ken Olson, Ph.D., PAS and Ernest Hovingh, Ph.D.

Johne's is a disease that has been known for more than a century, but it is one that we still are seeking effective ways to address. In 1998, the United States Animal Health Association approved the Voluntary Johne's Disease Herd Status Program for Cattle (VJDHSP). The VJDHSP provided testing guidelines for states to use to identify cattle herds as low risk for Johne's disease infection. States began to develop programs based on these guidelines. Recognizing the value of uniformity in programs between states, USDA-APHIS-VS incorporated portions of this program into its national program standards, "Uniform Program Standards for the Voluntary Bovine Johne's Disease Control Program (VBJDCP)" that were released in April of 2002.

Now, after six years of operation almost all producers indicate that they are somewhat knowledgeable of the disease, but only about 11% of the dairy farms in the nation "officially" participate in the program. Interestingly, in national surveys one-third of all producers indicate that they participate in a Johne's control or certification program.

A national survey of dairy producers, funded by JDIP and led by Dr. Ernest Hovingh of Penn State University, is underway. The survey was mailed to a random sample of approximately 15% of the dairy producers in each state in order to provide a statistically valid assessment of dairy producers' knowledge of Johne's Disease and Johne's control programs.

The survey also seeks to identify barriers to and incentives for participation in the Voluntary Bovine Johne's Disease Control Program. Information gained from the survey will be used to identify information needs of producers, and to find ways to improve the program so that it is more useful for producers and identify the future direction of Johne's disease control efforts. This will be important input for the updated Johne's Strategic plan that is now under development.

While surveys were mailed only to a subset of producers across the country, input is welcomed from all producers. This will allow us to increase the sample size and receive input from as many dairy producers as possible. Producers who did not receive a copy of the survey by mail are encouraged to go "on-line" to participate in the survey at <https://online.survey.psu.edu/johnesdisease/> from the JDIP website at www.jdip.org.

For further information about the survey, contact Dr. Ernest Hovingh at eph1@psu.edu or Dr. Ken Olson at keolson@prodigy.net. Industry professionals can also email them with comments and suggestions about Johne's Disease management programs.

Congratulations!

YR 4 Funded Projects

- Adaska, John
University of California-Davis
- Bermudez, Luiz
Oregon State University
- Coussens, Paul
Cornell University
- DeBuck, Jeroen
University of Calgary
- Eckstein, Torsten
Colorado State University
- Eda, Shigetoshi
University of Tennessee
- Friedman, Richard
The University of Arizona
- Gardner, Ian
University of California-Davis
- Godden, Sandra
University of Minnesota
- Grohn, Yrjo
Cornell University
- Khare, Sangeeta
Texas A&M Research Foundation
- McDonald, Jeannette
University of Wisconsin-Madison
- Paustian, Michael
National Animal Disease Center, USDA-ARS
- Schukken, Ynte
Cornell University

JDIP YR 4 Funding Update

JDIP received and reviewed 27 proposals in response to the year 4 Request for Applications (RFA) with a total funding request exceeding \$3.3 million. For the current funding cycle a total of \$1.2 million were available for support of JDIP programs and operations, not including the APHIS supported vaccine program.

All of the submitted proposals were reviewed externally, as well as by the JDIP Scientific Advisory Board (SAB) at an in-person meeting. Members of the EAB as well as USDA program staff were in attendance at the SAB meeting to help provide oversight and observe the review process. As before, anyone who may have been in conflict with any of the proposals being reviewed were excluded from the discussions and were not present in the room to avoid any potential conflict of interest. The JDIP Executive Committee (EC) compiled summary statements from the SAB meeting and, based on the reviews and taking into consideration program priorities, made funding recommendations for the full External Advisory Board (EAB) to consider. Based on a review of the proposals, summary statements, and recommendations by the EC, the EAB approved the following projects for support during year 4 (listed alphabetically by PI last name):

- Adaska, John (University of California-Davis) \$38,500
- Bermudez, Luiz (Oregon State University) \$90,893
- Coussens, Paul (Michigan State University) \$97,013
- DeBuck, Jeroen (University of Calgary) \$37,250
- Eckstein, Torsten (Colorado State University) \$12,095
- Eda, Shigetoshi (University of Tennessee) \$34,625
- Friedman, Richard (The University of Arizona) \$25,000
- Gardner, Ian (University of California-Davis) \$44,444
- Godden, Sandra (University of Minnesota) \$65,961
- Grohn, Yrjo (Cornell University) \$44,444
- Khare, Sangeeta (Texas A&M Research Foundation) \$34,131
- McDonald, Jeannette (University of Wisconsin-Madison) \$75,030
- Paustian, Michael (National Animal Disease Center, USDA-ARS) No funds requested for year 4
- Schukken, Ynte (Cornell University) \$75,000

***** Please note all sub-awards for the projects above are in process and have not been executed at this point. *****

Funding for proposals related to vaccine evaluation as sponsored by APHIS-VS was deferred in lieu of a coordinated vaccine development program that is currently being finalized. This is recognized as an exciting opportunity for implementing a well-coordinated program and pathway for the development and evaluation of vaccines against JD far beyond the current funding cycle. Additional funds from JDIP to supplement APHIS dollars will be made available for this program as needed. We will be providing updates on this exciting initiative as additional information becomes available.



New Horizon's in Johne's Disease Control

By Ken Olson, Ph.D., PAS



A new feature was added to the 4th Annual JDIP Conference, an industry workshop titled "New Horizon's in Johne's Disease Control". The workshop provided an opportunity to introduce veterinarians, producers and industry representatives to JDIP and highlight several major field applications of JDIP funded research. This was a way to demonstrate the JDIP commitment to shortening the time period between discovery research and field application of the work.

The concept of the workshop was well received as 12 companies/ organizations provided financial support for the program. Sponsors included: Michigan Milk Producers Association, Ambion, Inc., Trek Diagnostic Systems, Intervet Schering Plough, Tetracore and MSU Diagnostic Center for Population and Animal Health (DCPAH) at the "Gold" level and Dairy Farmers of America, Antel BioSystems Inc., Pfizer Animal Health, Land O'Lakes Purina Feed LLC, Michigan Farm Bureau and IDEXX at the "Silver" level.

Organizations and industry publications also helped to promote the workshop through check stuffers, meeting announcements and e-mail contact. As a result, there were approximately 90 individuals at the meeting, including 40 veterinarians and a good mix of producers, industry representatives and university personnel.

JDIP Core and Project leaders provided background information on JDIP and overviews of our primary research areas. Application topics included:

- An overview of the "Best Test" report;
- Results from a Minnesota demonstration herd study that assessed the effectiveness of recommended management practices;
- An introduction to the concept of "Super Shedders";
- An introduction to the veterinarian and producer on-line education modules; and
- An overview of the national dairy producer survey.

In addition to the JDIP topics the current status and funding for the National Johne's Control program was reviewed and participants were invited to provide feedback on the new Johne's Strategic plan that is currently under development. If you would like to learn more about the workshop, proceedings are available on the JDIP website www.jdip.org

Feedback from the meeting was very positive. Participants indicated increased understanding of all topics covered and rated the overall conference as very useful. It is anticipated that JDIP will build on this to offer similar events in future years.

Special thanks go to the "New Horizons" planning committee that included: Dan Grooms, Michigan State University, College of Veterinary Medicine, Joe Woltanski, USDA, APHIS, VS, Ted Ferris, Michigan State University, Department of Animal Science, Phil Durst, Michigan State University Extension, Natalie Novak, JDIP/Penn State University, Paul Coussens, Michigan State University, Department of Animal Science and Ken Olson, JDIP.



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Moving Toward a New Johne's Strategic Plan

By Ken Olson, Ph.D., PAS

A Johne's Disease Strategic Planning Subcommittee, appointed by the Johne's Disease Committee of United States Animal Health Association (USAHA) has been charged with developing a new strategic plan for the National Johne's Disease Control Program. The current strategic plan, that has provided guidance for the program, was developed in 2004 with plans to run until 2009. The program has evolved since the plan was developed, research has provided new tools and the industry has changed, so it is appropriate to look at ways to adapt the program to encourage greater participation and better meet producer needs.

The Strategic Plan anticipates that the program would evolve in several important ways:

- Moving from a primarily Federal/ State program to one that becomes more of a public/ private partnership. As the possible connection of Johne's disease to human health remains unresolved and Federal and State funding shrinks it is important that industry becomes a stronger partner.
- Simplification of the herd classification system and appropriate simplification of other program components.
- Focusing education on producers and professionals (like veterinarians and herd management consultants) who can help producers prevent and control Johne's disease.
- Focusing research on control and prevention of Johne's disease with the highest priorities given to work on diagnostics, effective control strategies, and vaccines.
- Marketing this new approach for controlling and preventing Johne's disease.
- Roles will be changing because of this new approach. See Appendix B of the "Draft Strategic Plan" for the redefined roles and responsibilities.

The current draft of the plan is available as a pdf file on the JDIP website in the new "Producer Information" section

http://www.jdip.org/index.php?option=com_content&task=view&id=94&Itemid=142/.

We are very interested in suggestions relative to the proposed plan and the direction it sets. Specific questions we would like to have addressed include:

- Are there actions missing from the draft Strategic Plan that need to be added?
- Does the draft Strategic Plan include actions that are not needed and should be removed?
- Are the new "Roles and Responsibilities" identified for the program partners in the draft Strategic Plan appropriate?

Any additional comments that you might wish to make are welcome as well. Please send your comments to Ken Olson at keolson@prodigy.net.

**JD in Producer Publications**

Daniels, A. Don't ignore Johne's disease. Dairy Herd Management. 2008. May 1. Health Column

Jackson, S. They tackled Johne's head-on. Hoard's Dairyman. 2008. April 25. p 289

Olson, K. Research focusing on practical Johne's measures. Hoard's Dairyman. 2008. April 10. p. 259

Mycobacterial genomic resources

By Mike Paustian, Ph.D., National Animal Disease Center, USDA-ARS, Ames, IA

Rapid advances in DNA sequencing technology have quickly lowered the hurdles that must be overcome in order to sequence microbial genomes. This has resulted in a rapid expansion of genome sequence data, including mycobacterial species (Table 1). Indeed, DNA sequencing has reached a level of economy that makes it feasible to sequence multiple isolates of the same microbial species rather than rely on a single representative isolate. This has in turn facilitated an expansion of the number and types of comparative genomic studies that can be performed.

Table 1. Mycobacterial genome projects.

Organism	Genome size (Mb)	%GC	RefSeq	Released
<i>M. abscessus</i>	5.12	64.1	NC_010397.1	3/1/2008
<i>M. avium</i> (subsp. <i>hominissuis</i>) 104	5.5	69	NC_008595.1	11/20/2006
<i>M. avium</i> subsp. <i>paratuberculosis</i> K-10	4.8	69.3	NC_002944.2	1/30/2004
<i>M. bovis</i> AF2122/97	4.35	65.6	NC_002945.3	6/6/2003
<i>M. bovis</i> BCG str. Pasteur 1173P2	4.4	65.6	NC_008769.1	1/8/2007
<i>M. gilvum</i> PYR-GCK	5.96	67.7	NC_009338.1	4/13/2007
<i>M. leprae</i> TN	3.27	57.8	NC_002677.1	3/10/2001
<i>M. marinum</i> M	6.62	65.7	NC_010612.1	4/15/2008
<i>M. smegmatis</i> str. MC2 155	7	67.4	NC_008596.1	11/20/2006
<i>M. sp.</i> JLS	6	68.4	NC_009077.1	2/27/2007
<i>M. sp.</i> KMS	6.22	68.2	NC_008705.1	12/20/2006
<i>M. sp.</i> MCS	5.92	68.4	NC_008146.1	6/9/2006
<i>M. tuberculosis</i> CDC1551	4.4	65.6	NC_002755.2	9/10/2002
<i>M. tuberculosis</i> F11	4.4	65.6	NC_009565.1	6/7/2007
<i>M. tuberculosis</i> H37Ra	4.4	65.6	NC_009525.1	5/31/2007
<i>M. tuberculosis</i> H37Rv	4.4	65.6	NC_000962.2	6/20/1998
<i>M. ulcerans</i> Agy99	5.6	65.5	NC_008611.1	12/1/2006
<i>M. vanbaalenii</i> PYR-1	6.5	67.8	NC_008726.1	12/27/2006
<i>In progress:</i>				
<i>M. avium</i> subsp. <i>paratuberculosis</i> (sheep)				
<i>M. avium</i> subsp. <i>paratuberculosis</i> (human)				
<i>M. avium</i> subsp. <i>avium</i>				
<i>M. avium</i> subsp. <i>silvaticum</i>				
<i>M. intracellulare</i>				
<i>M. tuberculosis</i> (multiple isolates)				

Genome sequencing has enabled a new approach to diagnostic and vaccine design in which specific proteins can be identified based on their lack of similarity to proteins found in other organisms. These proteins can then be evaluated for utility as diagnostics or vaccines. This approach is limited, however, by the amount of genome sequence data available in public databases. Potentially cross-reacting proteins will not be identified unless they have been sequenced as part of a microbial genome or metagenomic sequencing project. Recently completed mycobacterial genome projects have added to this pool of sequence information, but additional sequencing is warranted.

One of the easiest ways to access existing sequence information is through the Genbank website (<http://www.ncbi.nlm.nih.gov>). More specialized repositories also exist for some mycobacteria, including TubercuList (<http://genolist.pasteur.fr/TubercuList/>) and BoviList (<http://genolist.pasteur.fr/BoviList/>), while GenoList (<http://genolist.pasteur.fr/GenoList/>) can be used to view and compare multiple genomes, including *M. paratuberculosis*. The Comprehensive Microbial Resource provided by TIGR (<http://cmr.jcvi.org/tigr-scripts/CMR/CmrHomePage.cgi>) also allows researchers to browse, compare, analyze, and download genome sequence information for all of the sequenced mycobacterial genomes.

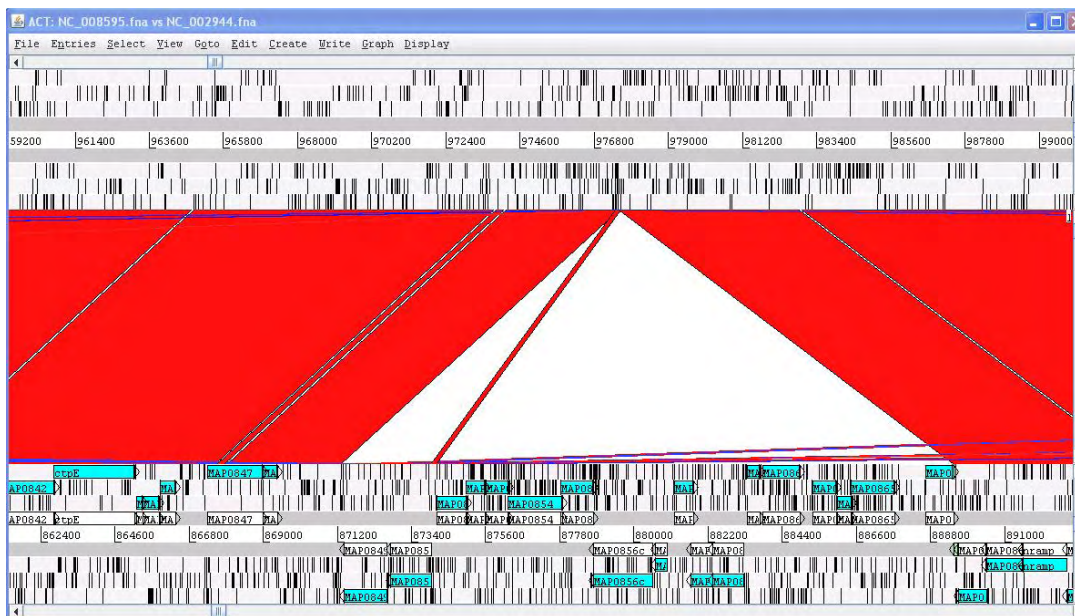
Entire microbial genomes can be downloaded, compared, and manipulated using software developed for this purpose. Individual or groups of microbial genomes can be searched using the genomic BLAST tool at NCBI (http://www.ncbi.nlm.nih.gov/sutils/genom_table.cgi). While this is useful for searching small numbers of sequences against the databases, for more flexibility with larger groups of sequences it may be worth setting up your own database locally. Those with access to bioinformatics support staff can easily get assistance, but even a novice can attempt to setup their own local database without much effort (Box 1). Many researchers have found it useful to have custom local databases available to quickly check data or investigate new ideas. For smaller or infrequent BLAST searches, any type of computer should be usable, even a laptop.

Box 1. Steps to set up a local BLAST database.

1. Download sequence data (DNA or protein fasta files containing genes, genome, etc)
2. Download BLAST executables from <ftp://ftp.ncbi.nlm.nih.gov/blast/executables/LATEST>
3. Select the package for the type of computer you will be using. The file will be something like blast-2.2.18-your-computer-type (i.e. "-ia32-linux.tar.gz" for a Linux computer or "-ia32-win32.exe" for Windows)
4. Uncompress and install the BLAST executables on your computer (instructions should be included in your installation files)
5. Use the program formatdb (included with the BLAST program) to convert your fasta file(s) into a BLAST-searchable database
6. You're now ready to BLAST using a command line interface (ex: "blastall -p blastn -d your_database -f your_input -o your_output"). Just type "blastall" at a command prompt to see all of the command line options.

A visual comparison of microbial genomes can be performed using software programs such as the Artemis Comparison Tool (ACT - <http://www.sanger.ac.uk/Software/ACT/>). The required input files are two (or more) genome sequences and a comparison file. The comparison file can be the output from the "megablast" program (part of the NCBI BLAST package). Alternatively, the online tool DoubleACT (http://www.hpa-bioinfotools.org.uk/pise/double_act.html) can be used to generate comparison files, or pre-computed files can be downloaded for some genomes at the WebACT website (<http://www.webact.org/>). A screenshot of a comparison of the *M. hominissuis* 104 and *M. paratuberculosis* K-10 genomes is presented in Figure 1 and demonstrates how users can quickly identify the MAP K-10 genes contained within a large sequence polymorphism that is not present in the MAH 104 genome.

Figure 1. Comparison of *M. hominissuis* 104 (top) and *M. paratuberculosis* K-10 (bottom) genomes with the Artemis Comparison Tool. Connecting red bars represent DNA sequence matches.



Genome sequence data is now routinely being used during the everyday planning and analysis of molecular biology experiments. Fortunately, there are a number of tools and resources available that can provide easy access to this information. Despite the exponential increase in microbial genome sequencing over the last decade, 30% or more of most genomes are annotated as encoding hypothetical proteins. Unraveling the function of these unexplored corners of the genome is the challenge facing functional genomics research in the future.



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- **Bannantine JP, Waters WR, Stabel JR, Palmer MV, Li L, Kapur V, Paustian ML.**, Development and use of a partial *Mycobacterium avium* subspecies *paratuberculosis* protein array. *Proteomics*. 2008 Feb;8(3):463-74. PMID: 18186021 [PubMed - in process]
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- **Donaghy JA, Rowe MT, Rademaker JL, Hammer P, Herman L, De Jonghe V, Blanchard B, Duhem K, Vindel E.**, An inter-laboratory ring trial for the detection and isolation of *Mycobacterium avium* subsp. *paratuberculosis* from raw milk artificially contaminated with naturally infected faeces. *Food Microbiol*. 2008 Feb;25(1):128-35. Epub 2007 Jul 14. PMID: 17993386 [PubMed - indexed for MEDLINE]
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- **Karcher EL, Beitz DC, Stabel JR.**, Modulation of cytokine gene expression and secretion during the periparturient period in dairy cows naturally infected with *Mycobacterium avium* subsp. *paratuberculosis*. *Vet Immunol Immunopathol*. 2008 Feb 16; [Epub ahead of print] PMID: 18374424 [PubMed - as supplied by publisher]
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JD In Print Crohn's Disease Related Publications

- **Abubakar I, Myhill D, Aliyu SH, Hunter PR.**, Detection of *Mycobacterium avium* subspecies *paratuberculosis* from patients with Crohn's disease using nucleic acid-based techniques: a systematic review and meta-analysis. *Inflamm Bowel Dis.* 2008 Mar;14(3):401-10. PMID: 17886288 [PubMed - in process]
- **Bentley RW, Keenan JI, Gearty RB, Kennedy MA, Barclay ML, Roberts RL.**, Incidence of *Mycobacterium avium* Subspecies *paratuberculosis* in a Population-Based Cohort of Patients With Crohn's Disease and Control Subjects. *Am J Gastroenterol.* 2008 Mar 26; [Epub ahead of print] PMID: 18371139 [PubMed - as supplied by publisher]
- **Ren Z, Turton J, Borody T, Pang G, Clancy R.**, Selective Th2 pattern of cytokine secretion in *Mycobacterium avium* subsp. *paratuberculosis* infected Crohn's disease. *J Gastroenterol Hepatol.* 2008 Feb;23(2):310-4. PMID: 18289359 [PubMed - indexed for MEDLINE]
- **Singh AV, Singh SV, Makharia GK, Singh PK, Sohal JS.**, Presence and characterization of *Mycobacterium avium* subspecies *paratuberculosis* from clinical and suspected cases of Crohn's disease and in the healthy human population in India. *Int J Infect Dis.* 2008 Mar;12(2):190-7. Epub 2007 Oct 2. PMID: 17913536 [PubMed - in process]

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Meetings & Conferences

- July 7 – 11, 2008
2008 Joint ADSA-ASAS Annual Meeting (The Indiana Convention Center & RCA Dome * Indianapolis, IN)
<http://adsa.asas.org/meetings/2008/>
- July 19 – 22, 2008
AVMA Annual Convention (New Orleans Morial Convention Center * New Orleans, LA)
http://avmaconvention.org/default.asp?alt=URL2&body=/_event1/default_content.asp&nav=/leftnav/navHome.asp
- September 3 – October 4, 2008
World Dairy Expo (Alliant Energy Center of Dane County * Madison, WI)
http://www.worlddairyexpo.com/gen_home.cfm
- September 25 – 27, 2008
41st Annual Convention of the American Association of Bovine Practitioners (Charlotte Convention Center * Charlotte, NC)
<http://www.aabp.org/meeting/default.asp>
- October 21 – 28, 2008
USAHA/AAVLD 112th Annual Meeting (Sheraton Greensboro Hotel * Greensboro, NC)
<http://www.usaha.org/meetings/>
- October 28 – 30, 2008
NMPF/NDB/UDIA Annual Meeting (Gaylord Opryland Resort and Convention Center * Nashville, TN)
<http://www.nmpf.org>
- August 2009
10th ICP and JDIP 5th Annual Meeting in Minnesota (More details at a later date)

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