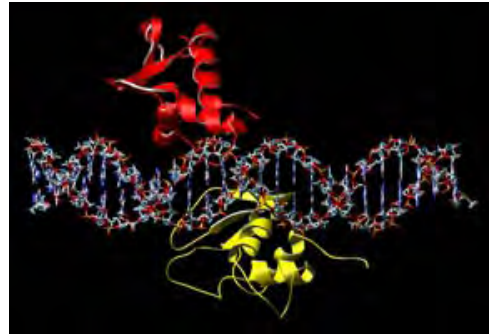


Fall 2011

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Dear VMD-PhD Alumni,

Greetings from Penn! A lot has been happening over the past six months. We've welcomed two new incoming VMD-PhD students into the program and information on them is included here. Program coordinator Yong No and I have been busy working on the MSTP grant competitive renewal. This is a major undertaking and has occupied a good deal of time. Some alumni data from the grant are included here for your amazement and amusement. We've celebrated the end of summer with a BBQ party and look forward to events this fall. We are particularly excited about the Presidential National Medal of Science awarded to the first VMD-PhD director, Dr. Ralph Brinster. We include information here on Ralph's award, the highest science award given out by the United States. We have quite a few updates on prizes and significant accomplishments by our VMD-PhD alumni. These profiles are included in this newsletter along with upcoming events and recent publications by current students. We hope to initiate a new seminar series in the coming year and will invite veterinarian-scientists to Penn to meet with our students and to give a seminar on their research. We hope this will enable our current students to learn more from successful veterinarian-scientist role models, and will enable them to seek out advice on science, medicine, and career.

We are now ramping up for our next admissions cycle, and thus far incoming application packages are ahead of pace with previous years. To continue to develop the program we will need to identify new sources of financial support. In particular, we need to identify matching funds for the \$500,000 pledged by overseer Mindy Heyer. If you know of any sources for this endowment, or for any other aspect of the Program, please contact me.

We are proud of the success of our alumni and thank so many of you who have shared your careers and lives with us.

Wishing you the best,
Michael Atchison, Ph.D.
Director, VMD-PhD Program



Alumni are Online!

Check out:

OHwww.vet.upenn.edu/Research/ResearchTrainingOpportunities/VMDPhDProgram/OurAlumn[i/](#)

Incoming VMD-PHD Students



In Fall 2011 we welcomed two new students to the VMD/PhD Program, bringing our total number of students to 25. Pictured here is the incoming class. Left Rebecca Rosenthal, right Elinor Willis.

Rebecca Rosenthal

Immunology

Rebecca graduated from the University of Chicago in June 2011. One of her earliest research experiences was at the Cornell University College of Veterinary Medicine as a summer intern in the gastroenterology lab of Dr. Kenneth Simpson studying the role of bacteria in equine gastric ulcers. She then worked with Dr. Anita Chong at the University of Chicago Hospital on general immunology research, which led to her honors research project aimed at determining the effect of IRF-4 expression levels on antigen affinity with both Dr. Anita Chong and Dr. Roger Sciammas. In her free time, she volunteered at “no kill” animal shelters. Rebecca looks forward to a career in clinical research and veterinary medicine where she can contribute to the improvement of animal health as well as human medicine.

Elinor Willis

CAMB-MVP

Elinor graduated from Princeton University in May 2011. She worked on her senior thesis with Drs. Paul Schedl and Girish Deshpande in the Department of Molecular Biology at Princeton. Her thesis research was on the role of bone morphogenetic protein (BMP) signaling in the development of primordial germ cells (PGCs) in the *Drosophila* embryo. Elinor also had multiple research experiences at the University of Giessen in Germany studying non-structural proteins of classical swine fever virus (CSFV), examining parrot sera for presence of anti-Borna virus antibodies, and subcellular localization of non-structural proteins of feline coronavirus. Elinor’s other interests include cooking and riding horses. Upon earning her VMD-PhD degree, Elinor would like to combine research with clinical work and teaching in an academic setting.

Dr. Ralph Brinster Awarded National Medal of Science

(photo: Scott H. Spitzer)



CONGRATULATIONS to Dr. Ralph Brinster as a recipient of the National Medal of Science. The award is the highest honor bestowed by the United States government on scientists and engineers. President Obama named Dr. Brinster as a recipient of the National Medal of Science in late September. Dr. Brinster is the first veterinary scientist ever to be awarded this medal in the 50-year history of the award. Dr. Brinster will receive his award at a White House ceremony later this year along with six other recipients. Dr. Brinster was the first director of the VMD/PhD Program beginning in 1969, and he served as director for 14 years.

President Obama commented, “Each of these extraordinary scientists, engineers, and inventors is guided by a passion for innovation, a fearlessness even as they explore the very frontiers of human knowledge, and a desire to make the world a better place, their ingenuity inspires us all to reach higher and try harder, no matter how difficult the challenges we face.”

The National Medal of Science was created by statute in 1959 and is administered by the National Science Foundation for the White House. It is awarded annually and the Medal recognizes individuals who have made outstanding contributions to science and engineering. Nominees are selected by a committee of Presidential appointees based on their extraordinary knowledge in and contributions to chemistry, engineering, computing, mathematics, and the biological, behavioral/social, and physical sciences.

Dr. Brinster is being awarded the National Medal of Science:

For his fundamental contributions to the development and use of transgenic mice. His research has provided experimental foundations and inspiration for progress in germline genetic modification in a range of species, which has generated a revolution in biology, medicine, and agriculture.

Ralph has served as a faculty member at the Penn School of Veterinary Medicine for the past 50 years and is currently the Richard King Mellon Professor of Reproductive Physiology. His accomplishments are exceptional. His work pioneered methods for inserting new genes into the germline of a developing organism to create transgenic animals. This work has revolutionized our ability to understand life processes and disease. He has over 400 publications to his credit, an amazing 18% of which are in the top tier journals Nature, Science and Cell. An astonishing 30% of his publications are in journals with an impact factor greater than 10.

“Ralph Brinster is a trailblazer in the field of reproductive biology and genetics whose work has had inestimable influence in science and medicine,” Penn President Amy Gutmann said. “His early findings helped usher in the era of transgenic research and represent foundational aspects of techniques used in genetic engineering, in vitro fertilization and cloning. We are extraordinarily proud that he has received the National Medal of Science in recognition of more than five decades of scientific achievement.”

A number of celebrations honoring Dr. Brinster will be held this year. Watch for announcements of these events. At least one will be a Symposium honoring Ralph in late spring. We hope our alumni can attend.

For the White House Announcement:

<http://www.whitehouse.gov/the-press-office/2011/09/27/president-obama-honors-nation-s-top-scientists-and-innovators>

For the full article on the UPenn website:

<http://www.upenn.edu/pennnews/news/penn-veterinarian-ralph-brinster-awarded-national-medal-science>

www.vet.upenn.edu/research/programs/vmstp

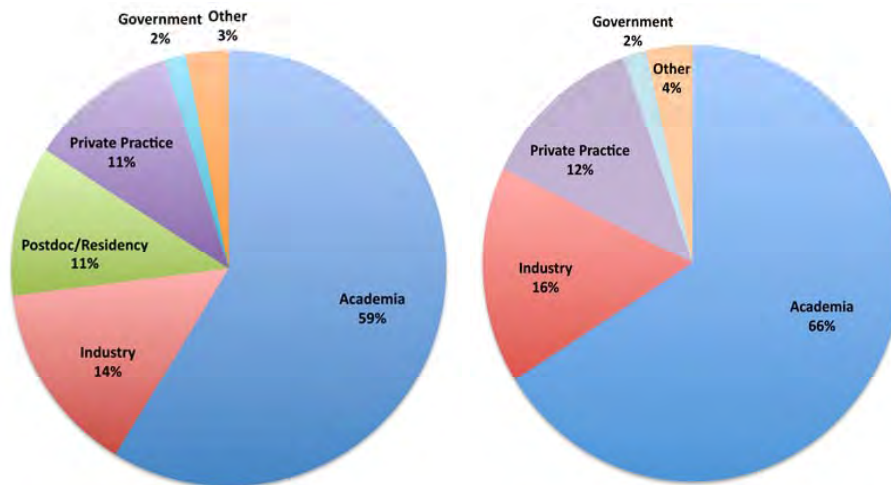
Recent Events

To welcome in our new students, and to just have fun, the VMD-PhD program and the NIH/Merial Summer Scholars Program held a BBQ picnic at the Biopond this past September. The day was perfect, and the food and drink were great!



Where Do Alumni Go?

As part of the MSTP grant competitive renewal, we've evaluated where our VMD-PhD alumni go post-graduation. There have been 63 graduates of the program, and the data are quite striking (see the pie charts below). The 37 alumni in academia (66% of alumni past post-graduate training) include one Dean, and 10 Department Chairs, Chiefs, or Heads. The 9 alumni with careers in Industry (14% of total, and 16% post-training phase) include positions in big pharma (Pfizer, for instance) as well as biotech firms. 67% hold positions of President, Vice President, CEO, or Director in their firms. One alumnus holds a high level position in the New York State Department of Health, and several work for scientific foundations. Strikingly, only 12% are in private practice clinical careers. Over 84% of our alumni are in career paths involving significant research efforts.



Career paths of graduates of the VMD-PhD program. The figure on the left shows current status of all 63 graduates. The figure on the right shows the data of the 56 graduates who have completed postgraduate training.

Basic research is a component of 67% of our alumni, 64% are involved in translational research, and 42% are involved in clinical research. Those in academia (37 alumni) show a very strong funding base with about 70% having NIH or NSF support. Total NIH support over the past decade amounted to over 104 million dollars. In addition, many alumni have support from a variety of foundations totaling over 25 million dollars. In total, over 89% of alumni funded their research by NIH, NSF, and foundation sources. Not too shabby. With numbers like these, and the success of our alumni, it is "easy" to justify continued support for the program.

Alumni Awards, Accomplishments, and Honors

We've received updates on awards and accomplishments from 12 of our alumni:



Steven Bensinger VMD/PhD (2003) Assistant Professor, University of California, Los Angeles

We congratulate Dr. Steven Bensinger for receiving the Sontag Foundation Distinguished Scientist Award to study the impact of lipid metabolism on brain cancer.

Jessica Bertout VMD/PhD (2010) Postdoc, Hutchinson Cancer Center

Congratulations to Dr. Jessica Bertout, a 2010 graduate of the combined degree program. She recently started a Postdoc position at the Hutchinson Cancer Center in Dr. Jason Bielas laboratory after taking some time off for the birth of her second child.





LaTasha Crawford VMD/PhD (2011)

Congratulations to Dr. Crawford, a recent graduate for her position as Pathology Post-Doctoral Fellow along with her position as Anatomic Pathology Resident at Johns Hopkins University, School of Medicine. LaTasha also has two recent publications:

LaTasha K. Crawford, Caryne P. Craige, and Sheryl G. Beck. Glutamatergic input is selectively increased in dorsal raphe subfield 5-HT neurons: role of morphology, topography and selective innervation. *European Journal of Neuroscience* (In Press)

Prem N Yadav, Atheir I Abbas, Martilias S Farrell, Vincent Setola, Noah Sciaky, Xi-Ping Huang, Wesley K Kroeze, Latasha K Crawford, David A Piel, Michael J Keiser, John J Irwin, Brian K Shoichet, Evan S Deneris, Jay Gingrich, Sheryl G Beck and Bryan L Roth. The Presynaptic Component of the Serotonergic System is Required for Clozapine's Efficacy. *Neuropsychopharmacology* 36(3):638-51 (2011)

Duncan Ferguson VMD/PhD (1982) Professor and Department Head, Veterinary Biosciences, University of Illinois at Urbana Champaign

Congratulations to Dr. Duncan Ferguson for being awarded the 2010 Lifetime Achievement Award by Morris Animal Foundation for service on the Scientific Advisory Committee. During his time on the Advisory Committee starting in 1992, Dr. Ferguson pushed for moving the process of review to be similar to NIH, and to use electronic means of communicating reviews.



Dara Kritchman VMD/PhD (1996) Associate Professor, Johns Hopkins University



Congratulations to Dr. Kritchman on promotion to Cardiovascular Interventional Section Head. She also received one of the nine investigator-initiated Maryland Stem Cell Research Fund Grants awarded in July 2011 entitled, "Single Cell Microencapsulation for Ischemic Heart Disease Therapy." Dr. Kritchman was awarded a patent: Stuber M, Gilson WD, Kraitchman DL: Method for magnetic resonance imaging using inversion recovery with on-resonant water suppression including MRI systems and software embodying same.

Finally, Dr. Kritchman has two recent publications in Nature-related journals:

Barnett BP, Arepally A, Stuber M, Arifin DR, Kraitchman DL, Bulte JWM: Synthesis of magnetic resonance-, X-ray-, and ultrasound-visible alginate microcapsules for immunoisolation and non-invasive imaging of cellular therapeutics. *Nature Protocols*, 2011; 6: 1142-1151.

Patil, RR, Yu J, Banerjee, SR, Ren Y, Leong D, Jiang X, Pomper M, Tsui B, Kraitchman DL, Mao HQ: Probing in vivo trafficking of polymer/DNA micellar nanoparticles using SPECT/CT imaging. *Molecular Therapy*, 2011 19(9), 1626-1635.



Mark Pykett (1994) President and CEO, Neoprobe Corporation

Congratulations on the new promotion to President and CEO of Neoprobe Corporation. Formerly Dr. Pykett was the Executive Vice President and Chief Development Officer. Dr. Pykett also served as a panelist on the Prix Galien life science industry awards.

Stephanie Murphy VMD/PhD (1996) Associate Professor, Oregon Health & Science University

Congratulations to Dr. Murphy as the recipient of the 2011 Nathan R. Brewer Scientific Achievement Award, by the American Association for Laboratory Animal Science. The Brewer Award was established in 1994 in honor of Nathan R. Brewer, DVM, PhD, first president and a founding father of AALAS. The award is open to all members of professional scientific societies. Candidates must have made major and repeated scientific
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contributions to laboratory animal science/medicine or comparative medicine. Dr. Murphy will be receiving the award on October 2, 2011 at the 62nd AALAS National meeting in San Diego. She will also be giving the Brewer lecture titled "Sex, Drugs, Alcohol and Stroke" at the meeting.



Sarah Ralston VMD/PhD (1982) Associate Professor, Rutgers University

Dr. Ralston was invited to give a keynote Plenary Paper "NMR-based metabonomic analyses of horse serum: detection of metabolic markers of disease" at the Recent Advances in Animal Nutrition Conference in Armidale, New South Wales, Australia July, 2011. It is published as a full peer reviewed paper: Ralston SL, Pappalardo L, Pelczer I, Spears PF. NMR-based Metabonomic Analyses of horse serum: Detection of metabolic markers of disease. *Recent Advances in Animal Nutrition* 21: 197-205, 2011

Dr. Ralston will be giving two invited papers at the Equine Nutrition and Training Conference in Paris, France in October, 2011, titled "Will Total Mixed Rations cubes be the future of horse feeding?" The other one is entitled "Practical news on advances in nutrition for performance horses and ponies published between 2009 and 2011." Finally, Dr. Ralston was also invited to give to talks at ACVIM in spring 2012.

Mary Robinson VMD/PhD (2010) Lecturer, Clinical Studies at New Bolton Center, University of Pennsylvania



Congratulations to Dr. Robinson for presenting a poster at the American Academy of Veterinary Pharmacology and Therapeutics 17th Biennial Symposium in May 2011 entitled "Pharmacokinetics and Pharmacodynamics of AICAR (5-amino-4-imidazolecarboximide riboside) in the Horse."

Dr. Robinson also submitted an invited review with Cindy Otto and Jim Baumgardner in July to *Free Radical Biology and Medicine* entitled "Oxygen-Dependent Regulation of Nitric Oxide Production by Inducible NOS"

Melissa Sanchez VMD/PhD (2006) Chief of the Small Animal Necropsy Service, University of Pennsylvania

Congratulations to Dr. Sanchez on her new position as the Chief of the Small Animal Necropsy Service at the School of Veterinary Medicine at University of Pennsylvania, and the new addition to her family, daughter Gabriela born in February.



Douglas Sheffield, Vice President of Clinical Research, NeuroVista Corporation

Congratulations to Dr. Sheffield who just received an award notice that NeuroVista and his collaborators received year one funding for a five year milestone driven translational research grant entitled "Neurophysiologically Based Responsive Pharmacotherapy for Epilepsy." Year one funding is around \$1.5 million and will be over \$7.5 million if they meet their milestones. Besides NeuroVista the other collaborators who will share in the funding include the University of Pennsylvania (Drs. Charles Vite and Brian Litt, Veterinary School and the School of Medicine, respectively), the Mayo Clinic Rochester, and the University of Minnesota (Veterinary School and School of Pharmacology).

Dr. Sheffield was also a co-author with Charles Vite and others from the University of Pennsylvania on a paper describing a canine epilepsy model.

Davis, K.A., Sturges, B.K., Vite, C.H., Ruedebusch, V., Worrell, G., Gardner, A.B., Leyde, K., Sheffield, W.D., and Litt, B. A novel implanted device to wirelessly record and analyze continuous intracranial canine EEG. *Epilepsy Res.* (2011, in press).



Alexander Travis VMD/PhD(1999) Associate Professor, Cornell University

Dr. Alexander Travis served as a co-guest editor for a Special Feature in PNAS. Dr. Travis and his colleague wrote an introductory, theoretical piece as well as a research paper. Their research paper was on the cover of that issue to highlight the special feature on Biodiversity Conservation and Poverty Traps.

Barrett, C.B., Travis, A.J., and Dasgupta, P. On biodiversity conservation and poverty traps. PNAS 108:13907-13912 (2011)

Lewis, D., Bell, S.D., Fay, J., Bothi, K.L. Gatere, L., Kabila, M., Mukamba, M., Matokwani, E., Mushimbalume, M., Moraru, C.I., Lehmann, J., Lassoie, J., Wolfe, D., Lee, D.R., Buck, L., Travis, A.J. Community markets for conservation (COMACO) links biodiversity conservation with sustainable improvements in livelihoods and food production. PNAS 108:13957-13962 (2011)

We want to know....

New position, promotion, patent, publication, etc.? Please share your news!
vmstp@vet.upenn.edu

Upcoming Events

- 1. Dinner meeting with Dr. Ed Marookian:** On November 8 at 5PM in Room 132 Hill, Dr. Ed Marookian (the Marookian of Hill 130), will be the guest speaker at a special dinner specifically for the VMD-PhD Program. Dr. Marookian will be describing his career path to Penn Vet and beyond. Dr. Marookian is an important benefactor of Penn Vet as well as the VMD-PhD program. The dinner will be hosted by the Development Office and is open to alumni and current students. Everyone is encourage to attend. Alumni should RSVP by emailing yongno@vet.upenn.edu.
- 2. December Dinner Party** in the Program Director's home: watch for announcements.
- 3. Halloween Gig at Alpha Psi** by vet school band, TRIAGE: October 28.



Left: VMD-PhD Back-up Singers Mary Robinson, LaTasha Crawford, Catrina King.

Student Publications

2010

Bender, S.J., Phillips, J.M., Scott, E.P., and Weiss, S.R. Murine coronavirus receptors are differentially expressed in the central nervous system and play virus strain-dependent roles in neuronal spread. *J. Virol.*, 82:9829-9838 (2010) PMID: 20739537

Bender, S.J. and Weiss, S.R. Pathogenesis of murine coronavirus in the central nervous system. *J. Neuroimmune Pharmacol.* 5:336-354 (2010). PMID: 20369302

Shah, P.P., Zheng, X., Epshtein, A., **Carey, J.N.**, Bishop, D.K., & Klein, H.L. Swi2/Snf2-Related Translocases Prevent Accumulation of Toxic Rad51 Complexes during Mitotic Growth. *Mol. Cell* 39, 862-872 (2010).

Cook Sangar, M., Anandatheerthavarada, H.K., Martin, M.V., Guengerich, F.P., and Avadhani, N.G. Identification of genetic variants of human cytochrome P450 2D6 with impaired mitochondrial targeting. *Mol. Genet. Metab.* 99:90-97 (2010).

Cook Sangar, M., Bansal, S., and Avadhani, N.G. Bimodal targeting of microsomal cytochrome P450s to mitochondria: implications in drug metabolism and toxicity. *Expert Opin. Drug Metab. Toxicol.* 6:1231-1251 (2010).

Crawford, L.K., Craige, C.P., and Beck, S.G. Increased intrinsic excitability of lateral wing serotonin neurons of the dorsal raphe: a mechanism for selective activation in stress circuits. *Journal of Neurophysiology* 103:2652-2663 (2010).

Phoenix, K.N., Vumbaca, F., Fox, M.M., **Evans, R.**, and Claffey, K.P. Dietary energy availability affects primary and metastatic breast cancer and metformin efficiency. *Breast Cancer Research and Treatment.* 123:333-344 (2010)

Robinson M.A., Tuttle, S.W., Otto, C.M. and Koch, C.J. pO(2)-dependent NO production determines OPPC activity in macrophages. *Free Radic Biol Med.* 48:189-195 (2010)

Sanborn, K.B., **Rak, G.D.**, Maru, S.Y., Demers, K., Difeo, A., Martignetti, J.A., Betts, M.R., Favier, R., Banerjee, P.P. and Orange, J.S. Myosin IIA associates with NK cell lytic granules to enable their interaction with F-actin and function at the immunological synapse. *J Immunol.* 182:6969-6984 (2010) PMCID: PMC2835774

Sanborn, K.B., **Rak, G.D.**, Mentlik, A.N., Banerjee, P.P. and Orange, J.S. Analysis of the NK cell immunological synapse. *Methods Mol. Biol.* 612:127-148 (2010) PMID: 20033638

Shearin, A.L. and Ostrander, E.A. Leading the way: canine models of genomics and disease. *Dis. Model Mech.* 3:27-34 (2010) PMID: 20075379 (Review)

Shearin, A.L. and Ostrandern E.A. Canine morphology: hunting for genes and tracking mutations. *PLoS Biol.* Mar 2;8(3):e1000310. (2010) PMCID: PMC2830451 (Review)

Parker, H.G., **Shearin, A.L.** and Ostrander, E.A. Man's best friend becomes biology's best in show: genome analyses in the domestic dog. *Ann. Rev. Genet.* 44:309-336 (2010) PMID:21047261 (Review)

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Basu, A., Hodawadekar, S., Andrews, O., Knox, A., **Pan, X.**, Wilkinson, F., Atchison, M.L. YY1 PcG function as a potential cancer therapeutic target. *Forum Immunopath. Dis. Ther.* 1: 31-50 (2010).

2011

King, C., Wang, L., Winograd, R., Madison, B., Mongroo, P., Johnstone, C. and Rustgi, A.K. LIN28B fosters colon cancer migration, invasion, and transformation through let-7 dependent and independent mechanisms. *Oncogene* May 30. [Epub ahead of print]. (2011) PMID: PMC3165068

King, C.E., Cuatrecasas, M., Castells, A., Sepulveda, A.R., Lee, J.S. and Rustgi, A.K. LIN28B promotes colon cancer progression and metastasis. *Cancer Res.* 71:4260-4268 (2011) PMID: 21512136

Mongroo, P.S., Noubissi, F.K., Cuatrecasas, M., Kalabis, J., **King, C.E.**, Johnstone, C.N., Bowser, M.J., Castells, A., Spiegelman, V.S. and Rustgi, A.K. IMP-1 Displays Cross-Talk with K-Ras and Modulates Colon Cancer Cell Survival through the Novel Proapoptotic Protein CYFIP2. *Cancer Res.* 71:2172-2182 (2011) PMID: 21252116

Orange, J.S., Roy-Ghanta, S., Mace, E.M., Maru, S., **Rak, G.D.**, Sanborn, K.B., Fath, A., Saltzman, R., Paisley, A., Monaco-Shawver, L., Banerjee, P.P. and Pandey, R. IL-2 induces a WAVE2-dependent pathway for actin reorganization that enables WASp-independent human NK cell function. *J. Clin. Invest.*, Mar 7. pii: 44862. doi: 10.1172/JCI44862. [Epub ahead of print] (2011) PMID: 21383498

Rak, G.D., Macem E.M., Banerjee, P.P., Svitkina, T., and Orange, J.S. Natural killer lytic granule secretion occurs through a pervasive actin network at the immune synapse *PLoS Biol.*, 9(9): e1001151 (2011)

Yadav, P.N., Abbas, A.I., Farrell, M.S., Setola, V., Sciaky, N., Huang, X.-P., Kroeze, W.K., **Crawford, L.K.**, Piel, D.A., Keiser, M.J., Irwin, J.J., Shoichet, B.K., Deneris, E.S., Gingrich, J., Beck, S.G., and Roth, B.L. The Presynaptic Component of the Serotonergic System is Required for Clozapine's Efficacy. *Neuropsychopharmacology* 36(3):638-51 (2011)

Brisson, D., **Brinkley, C.**, Humphrey, P., Kemp, B.D., and Ostfeld, R.S. It takes a community to raise the prevalence of a zoonotic pathogen. *Interdisc. Persp. Inf. Dis.* (2011, in press).

Brinkley, C. Sustainability unpacked: Food, energy and water for resilient environments and societies. *J. Plan. Ed. Res.* (2011, in press).

Crawford, L.K., Craige, C.P., and Beck, S.G. Glutamatergic input is selectively increased in dorsal raphe subfield 5-HT neurons: role of morphology, topography and selective innervation. *European Journal of Neuroscience* (2011, in press)

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