RICARDO ALEJANDRO VERDUGO SALGADO

Assistant Professor, Human Genetics Program
Institute of Biomedical Sciences, School of Medicine
Universidad de Chile

Independencia 1027, Santiago, RM 8389100, Chile

January 1st, 2013

EDUCATION

Ph.D. in Genetics. Dissertation title: "Genetic Dissection of Growth and Obesity Traits in a Mouse Congenic Strain Using Transcript Profiling and High Density Mapping". University of California, Davis, December 2008.

Título Profesional de Médico Veterinario (equivalent to the **DMV** degree).
Universidad de Chile, December 2002.

Licenciado en Medicina Veterinaria (four years of coursework and practical training required for candidacy to the DMV degree).
Universidad de Chile, December 1999.

RELEVANT COURSES

Bioinformatics (Genetics Graduate Group)
Statistical Bioinformatics (Department of Applied Sciences)
Modeling Gene Regulation (Department of Computer Science)
Genes and Gene Expression (Department of Biological Sciences)
Animal Genetics (Department of Animal Science)
General Linear Regressions (Department of Statistics)
Seminars in Animal Genomics (Genetics Graduate group)

RELEVANT SKILLS

Data analysis: experienced in analysis of large datasets and programming in Perl, SAS and R languages. Have worked on analysis of DNA microarray data using Affymetrix GeneChips since 2003 and Illumina BeadChips since 2006.

Computer: Programming in C, Perl, SAS, MySQL, and R languages.
Proficient on LINUX, Mac OSX and familiar with Windows Operative Systems.

Laboratory: gel electrophoresis, DNA extraction, PCR, RFLP genotyping, microarrays hybridization, quality control, and data analysis.

Language: fluent in English and Spanish. Intermediate level in French.

RESEARCH PROJECTS

Responsible investigator. FONDECYT 2012, project N°11121666. **Discovery of networks of gene expression in monocytes and lymphocytes mediating HDL anti-atherogenic effects in humans.** International Collaborators: Stefan Blankenberg (Germany) and Laurence Tiret (France). Project proposal received 2nd best score in its study group.

Principal investigator. FONDEF 2012, project D11I1029. [**Implementation of Next Generation Sequencing in healthcare of cancer patients**] *Original title:* Incorporación de la Secuenciación de Última Generación en el cuidado de los pacientes con cáncer. Responsible for the unit of data analysis. General director of the project: Dr. Ricardo Armisen.

Principal investigator. FONDEF 2011, project D10I1007. [**Genomics of the Chilean Population: genetic profiling needed for clinical research, public heal, and forensic medicine**]. *Original title:* Genómica de la población chilena: obtención de perfiles genéticos necesarios en investigación clínica, salud pública y medicina forense. Responsible for the unit of data analysis. General director of the project: Dr. Lucia Cifuentes.

RESEARCH EXPERIENCE

Assistant Professor, Human Genetics Program, Institute of Biomedical Sciences, University of Chile (April 2012 to present).

Postdoctoral Researcher, UMRS 937, Institut National de la Santé et de la Recherche Médicale (INSERM; September 2010 to March 2012). Responsible for the statistical analysis of gene expression and genotypic data from the Gutenberg Health Study. This is a prospective epidemiologic study to identify genetic risk factors for cardiovascular disease. About 3000 individuals have been recruited in the phase one of the study and of these, ~1500 have microarray gene expression data from monocytes. The postdoc's objective is to use multivariate analysis to identify key regulators in the gene networks that react to smoking and cause atherosclerotic plaques.

Postdoctoral Researcher, Center for Genome Dynamics, The Jackson Laboratory (May 2008 to August 2010). Responsible for the formulation and implementation of original research in the fields of mouse genomics and high-throughput phenotyping technologies such as DNA microarrays. Postdoctoral fellows are subject to continuous evaluation of their performance. During this time, he gave a lecture at the annual Short Course on Systems Genetics for 2 consecutive years. He also mentored high-school students in the JAX Summer Program, where the students must design an experiment, write a research proposal, analyze data, write a report, and give a final presentation.

Science Policy Internship, Global Affairs Division, National Academy of Sciences of the U.S (January to March 2008). Designed to engage graduate science, engineering, medical, veterinary, business, public policy, and law students in the analytical process that informs the creation of national policy-making with a science/technology element.

During the internship, I was involved in the organization of a seminar titled "Prescription intelligence: Policy and Ethics of Neurocognitive Enhancement". The invited speakers were Dr. Nora Volkow, director of the National Institute on Drug Abuse, and Dr. Richard Restak, Neuropsychiatrist and author of over 18 books on the human brain. I also lead a project to investigate the effects of ambiguous interpretations of the U.S. tax law by the IRS and universities on the sponsoring of research by the industry at universities. As a product, I authored a white paper titled: "Analysis of the IRS Revenue Procedure 2007-47: Effects on Industry-Sponsored Research in Universities in the U.S" that aims to inform on the advantages of modifying the IRS 2007-47 procedure to incentivize private sponsoring of research with a public benefit.

Participated in a Workshop in Statistical Genetics and Computational Molecular Biology, Department of Biostatistics, University of Washington (September 21-23, 2003). Funded by a University of Washington's grant.

Internship in the Animal Genomics Laboratory, Department of Animal Science, University of California, Davis (January 2001 to June 2001).
Experienced in current techniques in PCR, gel electrophoresis, and DNA extraction from blood and semen samples. Trained in laboratory safety.

Internship in the Molecular Biology Laboratory, Universidad de Chile, Fac. Ciencias Veterinarias y Pecuarias (March 1999 to July 1999).
Experienced in basic techniques of Molecular Biology, including gel electrophoresis, PCR, and samples management. Also studied laboratory organization and confectioning reports.

TEACHING EXPERIENCE

Bioinformatics II. Coordinator of an advanced graduate course on Bioinformatics applied to biomedical sciences. School of Medicine, U. of Chile. Students must have first completed Bioinformatics I at the School of Engineering. He also lectures in other graduate level course in the Medical School in the topics of population genetics, genomics, and regulation of gene expression.

Genetics, Lecturer. Undergraduate course for medical students at the School of Medicine in the University of Chile. Leads practice sessions and gives lectures. March-July 2012.

Taught a lecture titled **"Designing microarray experiments in genetics of complex traits"** at the International Course on "Genetics of Diseases and Human Populations", University of Chile, Santiago, Chile, October 24 – 28, 2011. Also prepared a workshop **"Tutorial for Testing Differential Expression in R".**

Taught a lecture titled **"Designing microarray experiments in genetics of complex traits"** and a workshop **"Tutorial for Testing Differential Expression in R"**, at Institute Pasteur, Paris, France. Received a 4.86 average evaluation from attendees (scale from 1=poor to 5=excellent).

Student Mentor: Summer Student Program, The Jackson Laboratory. June-August 2010. Guided and supervised two intern high-school students on a project titled "Prediction of complex disease phenotypes from genotype and microarray data in soybeans (*Glycine max*)".

Taught a lecture titled **"Genetical Genomics Workflows"** at the Short Course on Systems Genetics, at the Jackson Laboratory, Bar Harbor, Maine. October 24th, 2009. Received a 4.8 grade for the instruction by the attendees (scale from 1=poor to 5=excellent).

Taught a lecture titled **"Probe annotations and Genome Coverage in Microarrays"** at the Short Course on Systems Genetics, at the Jackson Laboratory, Bar Harbor, Maine. September 26th, 2008.

Student Mentor: Summer Student Program, The Jackson Laboratory. June-August 2009. Guided and supervised an intern high-school student on a project titled "A systems biology approach to the genetic dissection of obesity in a C57BL/6J x C3H/HeJ F2 mouse cross".

Teaching Assistant: Genetics and Animal Breeding, Department of Animal Science, University of California, Davis (October 2002 to 2007). Responsible for a simulation of dairy herds to be genetically improved by students. Contributed to the development of the program and web interfaces.

Teaching Assistant: Genes and Gene Expression, Department of Biological Sciences, University of California, Davis (2003). Led a discussion session, helping student to solve genetics problems.

Teaching Assistant: Introductory Animal Science, Department of Animal Science, University of California, Davis (2004). Led discussion group, demonstrated basic animal handling, anatomy and physiology practical sessions.

Teaching Assistant: Animal Growth and Development, Department of Animal Science (2006). Held office hours for students to answer questions.

Teaching Assistant: Animal Genetics, Universidad de Chile, Fac. Ciencias Veterinarias y Pecuarias (July 1998 to December 2000).
Responsible for a discussion section: developed problems and exercises in genetics and reinforced course theory and concepts.

AWARDS, GRANTS, AND HONORS

Best poster award from the Institute Fédératif Coeur, muscle, vaisseaux – IFR14, march 15 2012. This price consists of €500 given to the 2 best poster presentations. Obtained for the work titled "Graphical modeling reveals primary genes in the gene expression network linking smoking to atherosclerotic plaques in a prospective human study" presented at the annual meeting on March 15 2012, Paris, France.

Christine Mirzayan Science & Technology Policy Graduate Fellowship, January 2008. This fellowship is awarded to outstanding graduates from science or policy graduate schools with interest in policy making and with a record of involvement in social work. It consists of $5,300 granted by the Christine Mirzayan Memorial Fund of the National Academies.

Fulbright Grant, July 2002**.** This award pursues to finance partially doctorate studies of Chilean students with academic excellence. It consists of $15,000 per year for two years. Administered by the Institute of International Education (IIE), New York.

Academic Excellence Award, December 2000. This award is made to students with a grade higher than 5.5 (on a scale of 1-7) and without failed courses in the entire career. Obtained 5.6 and ranked second place in overall grade of the 2000 generation.

Education Abroad Grant, December 2000, for $4,300 (American dollars). This grant is made for student with academic merits for studying abroad, and is given by the Programa de Movilidad Estudiantil of the Universidad de Chile.

PUBLICATIONS

Graphical Modeling of Gene Expression in Monocytes Suggests Molecular Mechanisms Explaining Increased Atherosclerosis in Smokers. Verdugo RA, Zeller T, Rotival M, Wild PS, Münzel T, Lackner KJ, Weidmann H, Ninio E, Trégouët DA, Cambien F, Blankenberg S, Tiret L. 2013.
PlosOne Journal 8(1):e50888. doi:10.1371/journal.pone.0050888

Using bioinformatics and systems genetics to dissect HDL cholesterol levels in an MRL/MpJ x SM/J . Leduc M.S., Hageman Blair R.S., **Verdugo R.A.**, Tsaih S., Walsh K., Churchill G.A., Paigen B. 2012.
Journal of Lipid Research 53(6):1163-1175. doi:10.1194/jlr.M025833.

Integration of QTL and bioinformatic tools to identify candidate genes for triglycerides in mice. Leduc M.S., Hageman R.S., **Verdugo R.A.,** Tsaih S., Walsh K., Churchill G.A., and Paigen B. 2011.
Journal of Lipid Research 52(9):1672-1682. doi:10.1194/jlr.M011130.

Genetic analysis of complex traits in the emerging collaborative cross. Aylor DL, Valdar W, Foulds-Mathes W, Buus RJ, **Verdugo RA,** Baric RS, Ferris MT, et al. 2011.
Genome Research 21(8):1213-1222. doi:10.1101/gr.111310.110.

Identification of genetic determinants of IGF-1 levels and longevity among mouse inbred strains. Leduc M.S., Hageman R.S., Meng Q., **Verdugo R.A.**, Tsaih S., et al.
Aging Cell 2010, 9: 823-836. doi:10.1111/j.1474-9726.2010.00612.x.

Serious limitations of the QTL/Microarray approach for QTL gene discovery. Verdugo, R.A., Farber, C.R., Warden, C.H., and Medrano, J.F.
BMC Biology 2010, 8:96. doi: 10.1186/1741-7007-8-96.

A survey of airway responsiveness in 36 inbred mouse strains facilitates gene mapping studies and identification of quantitative trait loci. Leme A.S., Berndt A., Williams L.K., Tsaih S., Szatkiewicz J.P., Verdugo R.A., Paigen B., Shapiro S.
Molecular Genetics and Genomics 2010, 283(4):317-326. doi:10.1007/s00438-010-0515-x

Segregation Analysis of a Sex Ratio Distortion Locus in Congenic Mice, Casellas, J., Farber, C.R, **Verdugo, R.A.**, and Medrano, J.F.
Journal of Heredity 2009, 101(3):351-359. doi:10.1093/jhered/esp118.

Importance of Randomization in Microarray Experimental Designs with Illumina Platforms, Verdugo, R.A., Deschepper, C., Muñoz, G. Pomp D., and Churchill, C.A.
Nucleic Acids Research 2009, 37(17): 5610-5618.

Chromosome Y variants from different inbred mouse strains are linked to differences in the morphologic and molecular responses of cardiac cells to postpubertal testosterone. Llamas, B.[†], **Verdugo, R.A.**[†], Churchill, G.A., and Deschepper, C.F. [†]*Contributed equally*
BMC Genomics 2008, 10(1): 150, 10.1186/1471-2164-10-150.

Overexpression of scg5 increases enzymatic activity of pcsk2 and is inversely correlated with body weight in congenic mice. Farber, C.R., Chitwood, J., Lee, S., **Verdugo, R.A.,** Islas-Trejo, A., Rincon, G., Lindberg, I., and Medrano, J.F. (2008).
BMC Genetics 2008, 9: 34.

Comparison of Gene Coverage of Mouse Oligonucleotide Microarray Platforms. Verdugo, R. A. and J. F. Medrano.
BMC Genomics 2006, 7:58.

Selection response of US Holstein AI bulls for milk production in Chile and Argentina. Verdugo, R. A., A. A. Jara, R. W. Everett and N. R. Barría Perez.
Livestock Production Science 2004, 88(1-2): 9-16.

ORAL PRESENTATION

Graphical modeling reveals a gene expression network linking smoking to atherosclerotic plaques in a prospective human study. 20th Meeting of the International Genetic Epidemiology Society, Heidelberg, Germany, September 18-20, 2011. Finalist platform presentation for the Neel award.

Automation and self-documentation of analysis workflows for high-throughput data (live demo). Ricardo A. Verdugo and Gary A. Churchill. 9th Annual Meeting of the Complex Trait Community. Chicago, IL. May 7-10, 2010.

POSTER PRESENTATIONS

[ChileGenomico Project: Characterizing the genomic diversity of Chileans – a First Advance]. *Original title:* Proyecto ChileGenómico: Caracterización de la diversidad genómica de los Chilenos – Primer avance. **Verdugo RA**, Valenzuela CY, Moraga M, Llop E, Acuña M, Herrera L, Berríos S, Bustamante ML, Villalón MC, Alvarado S, Cáceres D, Barozet E, Maass A, Di Génova A, Loira N, Caba Burgos F, Naranjo AM, Suazo J and Cifuentes L. XV Congreso Latinoamericano de Genética ALAG 2012. October 28 – 31, 2012. Rosario, Argentina.

Graphical modeling reveals primary genes in the gene expression network linking smoking to atherosclerotic plaques in a prospective human study. Verdugo R.A., Rotival M., Zeller Z., Wild P., Münzel T., Weidmann H., Nino E., Trégouët D-A., Cambien F., Blankenberg S., and Tiret L. Annual meeting of the Institute Fédératif Coeur, muscle, vaisseaux – IFR14. March 15, 2012, Paris, France. **Recipient of best-poster award.**

Graphical modeling reveals primary genes in the gene expression network linking smoking to atherosclerotic plaques. Verdugo R. A., Rotival M., Zeller T., Wild P., Münzel T., Trégouët D., Cambien F., Blankenberg S., and Tiret L. 4th Paris Workshop on Genomic Epidemiology, Paris, France. May 30, 31 and June 1, 2011.

A survey of gene expression in 17 mouse tissues with biological replication. Ricardo A. Verdugo, Beverly Paigen, and Gary A. Churchill. 9th Annual Meeting of the Complex Trait Community. Chicago, IL. May 7-10, 2010.

Importance of Randomization in Microarray Experimental Designs with Illumina Platforms, Verdugo, R. A., Deschepper, C. F., and Churchill, G. A. 8th Annual Meeting of the Complex Trait Community. Manchester, UK. May 2-5, 2009.

Importance of Randomization in Microarray Experimental Designs with Illumina Platforms, Verdugo, R. A., Deschepper, C. F., and Churchill, G. A. Gordon Research Conferences: Quantitative Genetics and Genomics. Galveston, TX. February 22-27, 2009.

QTL/Microarray Approach for cis-eQTL discovery: Literature Review, Meta-analysis, and Experimental Results, Verdugo, R. A. and J. F. Medrano. Annual meeting of the national centers funded by the National Institute of General Medical Sciences (NIGMS) at The Lewis-Sigler Institute for Integrative Genomics, Princeton University. July 10-11, 2008.

QTL/Microarray Approach for cis-eQTL discovery: Literature Review, Meta-analysis, and Experimental Results, Verdugo, R. A. and J. F. Medrano. 7th Annual Meeting of the Complex Trait Consortium. Montreal, Canada. May 31 - June 3, 2008.

Power of Detection of Natural Transcriptome Variation in Mouse using Affymetrix and Illumina Microarrays. Verdugo, R. A. and J. F. Medrano. Gordon Conference. Quantitative Genetics and Genomics. Ventura, California. February 18-23, 2007.

Respuesta a la Selección por Producción Láctea de Toros IA Holstein de Estados Unidos en una Población de Vacas Holstein en Chile. Barría Pérez, Nelson Rodrigo; Jara Vallejos, Alejandro Antonio; Tuohy Bizjak, Tamara Jacqueline; Verdugo Salgado, Ricardo Alejandro. 27º Reunión Anual De La Sociedad Chilena De Producción Animal. Chillán, Chile. 10/02/2002-10/04/2002.

Selection Response Of U.S. Holstein Sires For Milk Production In Chile And Argentina. Barría Pérez, Nelson Rodrigo; Casanova, D; Jara Vallejos, Alejandro Antonio; Verdugo Salgado, Ricardo Alejandro. 7th World Congress on Genetics Applied to Livestock Production. Montpellier, France. 08/19/2002-08/23/2002.

LEADERSHIP

Fundraiser, ChileCAD (non-profit) 2007-2008. Sits at committee appointed to organize a fundraising campaign to support a small rural school in Bio-Bio (south), Chile. The objective is to provide its students with equal opportunities to quality education.

Representative, Genetics Graduate students of UC Davis, 2003-2005. Elected to represent genetics' students at the Graduates Student Association of UC Davis.

Founder president, Chilean Cultural Association of Davis, 2003-2004. Currently, an active member, coordinating the social work of the association in Chile. www.chilecad.org

Founder and board member, Festival Latinoamericano de Davis, a Non-Profit Organization for needy children in Latin America, 2004-2007. www.festivalendavis.org

Organizing Committee, First Congress of Conservation and Management of Wild Fauna, Santiago, Chile, November 11th-14th, 2000. Project sponsored by ENDESA S.A. for $3,300 and Universidad de Chile for $2,000 (American dollars).

President, Associated students of Veterinary Medicine School, 1999-2000.

MEMBERSHIP

American Association for the Advancement of Science (AAAS) since 2008.

Genetics Society of America (GSA) since 2008.

International Genetic Epidemiology Society (IGES) since 2011.

International Mammalian Genome Society since 2011.

REFERENCES

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