

Angela Cánovas



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Date of Birth: April-25-1982

EDUCATION

Ph.D., in Animal Genetics, University of Lleida, Lleida, Spain. **2011**
IRTA (Research & Technology food & Agriculture). Title: Genes associated with fat deposition and composition in swine: gene expression, protein and functional and structural genetic studies. Honors European Mention.

M.S., Animal Breeding and Biotechnology of Reproduction (Module: Quantitative Genetics), University Polytechnic of Valencia, Valencia, Spain. **2008**

B.S., Agriculture Engineering, University of Lleida, Lleida, Spain. **2006**
Honors Biotechnology

PROFESSIONAL EXPERIENCE

Fulbright Post-doctoral Researcher, University of California, Davis **2012-present**
Department of Animal Science. Davis, CA, USA

Post-doctoral Researcher, IRTA (Research & Technology food & Agriculture) **2011-2012**
Department of Genetics and Animal Breeding. Lleida, Spain

Graduate Student Researcher, University of Lleida / IRTA **2007-2011**
Department of Genetics and Animal Breeding. Lleida, Spain

*During PhD studies period, stages at:

- **University of California, Davis, CA, USA** **2010**

- **Iowa State University, IA, USA** **2009**
- **University of Bristol, UK** **2008**

Research Technician (during undergraduate studies), IRTA **2005-2007**
 Department of Genetics and Animal Breeding. Lleida, Spain

TEACHING EXPERIENCE

Identification of microarrays probes in porcine course. **2010**
 University of Zaragoza, Zaragoza, Spain. December 2010.

PEER REVIEWED PUBLICATIONS

- 1.- **Cánovas, A.**, Casellas, J., Varona, L., Díaz, I., Quintanilla, R., Pena, RN. Gene expression analysis of pig muscle associated to cholesterol and fat parameters. *Journal of Animal Science*. 90:14-15. **2007**.
- 2.- **Cánovas, A.**, Estany, J., Tor, M., Pena, R.N., Doran, O. Selection for decreased backfat thickness at restrained intramuscular fat content is related to reduction in acetyl-CoA carboxylase and stearoyl-CoA desaturase protein expression in pig subcutaneous adipose tissue. *Journal of Animal Science*. 87: 3905-3914. **2009**.
- 3.- Pena, R.N., **Cánovas, A.**, Varona, L., Díaz, I., Gallardo, D., Ramírez, O., Noguera, J.L., Quintanilla, R. Nucleotide sequence and association analysis of pig Apolipoprotein-B and LDL-receptor genes. *Animal Biotechnology*. 20(3):110-23. **2009**.
- 4.- **Cánovas, A.**, Quintanilla, R., Reecy, J.M., Marqués, M., Pena, R.N. Proximal promoter of the pig HMGCR gene: structural and functional study. *Journal of Animal Science*. 87: 358-359. **2009**.

- 5.- **Cánovas, A.**, Quintanilla, R., Gallardo, D., Díaz, I., Noguera, J.L., Ramírez, O., Pena, R.N. Functional and association studies on the pig HMGCR gene, a cholesterol-synthesis limiting enzyme. *Animal*. 4: 224-233. **2010**.
- 6.- Pena, R.N., **Cánovas, A.**, Estany, J. Technical Note: Efficient protocol for isolation of good-quality total RNA from lyophilised fat and muscle pig samples. *Journal of Animal Science*. 88: 442-445. **2010**.
- 7.- **Cánovas, A.**, Quintanilla, R., Amills, M., Pena, R.N. Gene expression patterns associated with lipid metabolism and meat quality in the gluteus medius of Duroc pigs. *BMC Genomics*. 11: 372-392. **2010**.
- 8.- **Cánovas, A.**, Rincón, G., Islas-Trejo, A., Wickramasinghe, S., Medrano, J.F. SNP Discovery in Bovine Milk Transcriptome using RNA-Seq Technology. *Mammalian Genome*. 21: 592-598. **2010**.
- 9.- Quintanilla, R., Pena, R.N, Gallardo, D., **Cánovas, A.**, Ramírez, O., Díaz, I., Noguera, J.L, Amills, M. Porcine intramuscular fat content and composition are regulated by quantitative trait loci with muscle-specific effects. *Journal of Animal Science*. 89:2963–2971. **2011**.
- 10.- **Cánovas, A.**, L. Varona, C. Burgos, A. Galve, J.A. Carrodegas, N. Ibáñez-Escriche, I. Martín- Burriel, P. López-Buesa. Early postmortem gene expression and its relationship to composition and quality traits in pig longissimus dorsi muscle. *Journal of Animal Science*. Accepted. **2012**.
- 11.- **Cánovas, A.**, Pena, R.N, Gallardo, D., Ramirez, O, Amills, M., Quintanilla, R. Segregation of Regulatory Polymorphisms with Effects on the Gluteus Medius Transcriptome in a Purebred Pig Population. *Plos One*. Accepted. DOI:10.1371/journal.pone.0035583. **2012**.

- 12.- Cheng, Y., Rachigani, S., **Cánovas, A.**, Mayes, M.S., Tait, R., Dekkers, J.C., Nettleton, D., Reecy, J. A QTL mapping study on muscle and adipose related traits in mice reveals imprinting and interaction effects. *PloS Genetics*. Submitted. **2012**.
- 13.- A. Galve, C. Burgos, L. Varona, J. A. Carrodeguas, **Cánovas, A.**, P. López-Buesa. Allelic frequencies of PRKAG3 in several pig breeds and its technological consequences on a Duroc x Landrace-Large White cross. *Journal of Animal Science*. Submitted. **2012**.
- 14.- Quintanilla, R, **Cánovas, A.**, Amills, M., Pena, R.N. Differential mRNA expression of structural and metabolic genes in the gluteus medius and longissimus thoracis et lumborum muscles of pigs. *Animal Genetics*. Submitted. **2012**.
- 15.- **Cánovas, A.**, Quintanilla, R., Reecy, J.M., Marqués, M., Pena, R.N. A polymorphism in the pig HMGCR promoter affects the transcriptional activation differently in liver and muscle cells. *Draft*. **2012**.
- 16.- **Cánovas, A.**, L. Varona, C. Burgos, A. Galve, J.A. Carrodeguas, P. López-Buesa. Effects of meat and carcass quality associated genes (IGF2, LEPR, MC4R and PRKAG3) on gene expression in Longissimus dorsi muscle. *Journal of Animal Science*. *Draft*. **2012**.
- 17.- **Cánovas, A.**, Rincon, G., Islas-Trejo, A., Jimenez-Flores, R., Laubscher, A., Medrano, J.F. RNA-Sequencing approach to define citrate gene expression variety and association study in a complex trait. *Draft*. **2012**.

SPECIALIZED PUBLICATIONS (Bulletins, magazines)

- 1.- Francés, F., Pena, R., Portolés, O., **Cánovas, A.**, Sorlí, J.V., Quintanilla, R., Corella, D., González, J.I. Efecto comparativo de variaciones en el gen de la apolipoproteína B sobre el metabolismo lipídico en humano y porcino. *Clínica e Investigación en Arteriosclerosis*. 18, 2:1-74. **2006**.

- 2.- RN Pena, **Cánovas, A.**, JL Noguera, I Díaz, L Varona & R Quintanilla. Estudio del gen del receptor de partículas LDL en porcino y su asociación con niveles de lipoproteínas plasmáticas. Asociación Interprofesional para el Desarrollo Agrario. 28, 411-413. **2007**.
- 3.- **Cánovas, A.**, J Casellas, L Varona, I Díaz, R Quintanilla & RN Pena. Estudio de expresión génica en el músculo porcino asociado a parámetros de colesterol y engrasamiento. Asociación Interprofesional para el Desarrollo Agrario. 28, 444-446. **2007**.
- 4.- **Cánovas, A.**, M Tor, RN Pena, O Doran & J Estany. Efecto de la selección contra grasa dorsal a grasa intramuscular constante en la expresión proteica de las enzimas ACC y SCD porcinas. Asociación Interprofesional para el Desarrollo Agrario. M. Joy, J. H. Calvo, C. Calvete, M. A. Latorre, I. Casasús, A. Bernués, B. Panea, A. Sanz, J. Balcells (Eds.). 1, 78-80. **2009**.
- 5.- **Cánovas, A.**, R Quintanilla, J Reecy, M Marqués & RN Pena. El gen HMGCR porcino: estudio estructural y funcional de su promotor. Asociación Interprofesional para el Desarrollo Agrario. M. Joy, J. H. Calvo, C. Calvete, M. A. Latorre, I. Casasús, A. Bernués, B. Panea, A. Sanz, J. Balcells (Eds.). 1, 75-77. **2009**.
- 6.- M. Solé, RN Pena, M Amills, **Cánovas, A.**, D Gallardo, J Reixach, I Díaz, JL Noguera y R Quintanilla. Estudio de los genes implicados en la cantidad y composición de la grasa intramuscular de los músculos longissimus dorsi y gluteus medius en una población Duroc. Asociación Interprofesional para el Desarrollo Agrario. M. Joy, J. H. Calvo, C. Calvete, M. A. Latorre, I. Casasús, A. Bernués, B. Panea, A. Sanz, J. Balcells (Eds.). 1, 6-8. **2009**.
- 7.- **Cánovas, A.**, RN. Pena, D Gallardo, M Amills, R Quintanilla. eQTL asociados con la deposición y composición de la grasa en el músculo gluteus medius porcino Asociación Interprofesional para el Desarrollo Agrario. M. Joy, J. H. Calvo, C. Calvete, M. A. Latorre, I. Casasús, A. Bernués, B. Panea, A. Sanz, J. Balcells (Eds.). 2, 566-568. **2011**.

RESEARCH GRANTS

1.- Guide to the substantiation of health claims on foods: immune function, cognitive and metabolic syndrome. PI: Joan Tibau, PhD.

CDTI Program Grant (INNPRONTA). **2011-2013**

2.- Study of traits related to lipid metabolism and pork quality through comprehensive analysis of massive data of genotypes and gene expression. PI: Raquel Quintanilla, PhD.

CICYT Program Grant (Ref: ALG2010-22208-C02-01). **2011-2013**

3.- Consolidated Group "Improvement and Management of Pigs" (University of Lleida - IRTA Foundation). PI: Joan Tibau, PhD.

SGR2009 Program Grant. **2009-2011**

4.- Mapping and identification of genes involved in lipid metabolism in pigs, meat and cured ham quality. PI: Raquel Quintanilla, PhD.

CICYT Program Grant (Ref: AGL2007-66707-C02-01/GAN). **2008-2011**

5.- Genomic analysis using microarray genetic architecture of complex phenotypes in pigs. PI: Armand Sanchez, PhD.

CICYT Program Grant (Ref: GEN2003-20658-C05). **2004-2008**

6.- Mapping eQTL that affect reproductive traits in pigs led to a genetic marker-assisted selection. PI: Jose Luis Noguera, PhD.

CDTI-EUREKA Program Grant (Ref: Σ!3131) **2004-2007**

7.- Genetic architecture of lipid components of pork-related quality and human health. PI: Raquel Quintanilla, PhD.

CICYT Program Grant (Ref: AGL2002-04271-C03). **2003-2006**

PRESENTATIONS IN CONFERENCES
(and abstracts/papers published in conference proceedings)

1.- **Angela Cánovas**, Ramona N. Pena, David Gallardo, Marcel Amills, Raquel Quintanilla. eQTL asociados con la deposición y composición de la grasa en el músculo gluteus medius porcino. Oral presentation. XIV Jornadas sobre Producción Animal AIDA. Proceedings Vol. II, pag. 566-568. Zaragoza (Spain). 17-18 May, **2011**.

2.- **Angela Cánovas**, Ramona N. Pena, David Gallardo, Gonzalo Rincón, James R. Reecy, Juan F. Medrano, Marcel Amills, Raquel Quintanilla. Expression quantitative trait loci (eQTL) analysis of gluteus medius muscle in commercial Duroc pigs. Poster presentation. 9th World Congress on Genetics Applied to Livestock Production. Proceedings pag. 316. Leipzig (Germany). 1-6 August **2010**.

3.- **Angela Cánovas**, Ramona N. Pena, David Gallardo, Gonzalo Rincón, James R. Reecy, Juan F. Medrano, Marcel Amills, Raquel Quintanilla. Expression quantitative trait loci study in gluteus medius muscle of Duroc pigs. Poster presentation. 32nd International Society for Animal Genetics (ISAG). Proceedings pag. 41. Edinburgh (UK). 26-30 July **2010**.

4.- Raquel Quintanilla, Ramona N. Pena, **Angela Cánovas**, Marcel Amills. Differential gene expression profile between two porcine skeletal muscles: longissimus dorsi and gluteus medius. Poster presentation. 32nd International Society for Animal Genetics (ISAG). Proceedings pag. 44. Edinburgh (UK). 26-30 July **2010**.

5.- **Angela Cánovas**, Ramona N. Pena, David Gallardo, Gonzalo Rincón, James R. Reecy, Juan F. Medrano, Marcel Amills, Raquel Quintanilla. Expression Quantitative Trait Loci analyses in the skeletal muscle of commercial Duroc pigs. Poster presentation. Adapting Animal Production to Changes for a Growing Human Population. Proceedings. Lleida (Spain). 19-21 May **2010**.

6.- Raquel Quintanilla, Ramona N. Pena, **Angela Cánovas**, Marcel Amills. Differential gene expression profile between two porcine skeletal muscles: longissimus dorsi and gluteus medius.

Poster presentation. Adapting Animal Production to Changes for a Growing Human Population. Proceedings. Lleida (Spain).19-21 May **2010**.

7.- Ramona N. Pena, **Angela Cánovas**, Josep Reixach, Dolors Guàrdia, Marcel Amills, Raquel Quintanilla. Changes in gene expression related to texture defects in cured hams from Duroc pigs. Poster presentation. Adapting Animal Production to Changes for a Growing Human Population. Proceedings. Lleida (Spain). 19-21 May **2010**.

8.- **Angela Cánovas**, Ramona N. Pena, David Gallardo, James R. Reecy, Marcel Amills, Raquel Quintanilla. Expression quantitative trait loci for meat quality traits in the gluteus medius muscle of commercial Duroc pigs. Poster presentation. European Network for Pig Genomics. Proceedings. Hinxton (UK). 2-4 November **2009**.

9.- **Angela Cánovas**, Raquel Quintanilla, Isabel Díaz, Ramona N.Pena. Global gene expression changes associated with meat quality traits in the gluteus medius of Duroc pigs. Poster presentation. European Association of Animal Production 2009. Proceedings. Barcelona (Spain). 24-28 August **2009**.

10.- **Angela Cánovas**, Raquel Quintanilla, James M. Reecy, Margarita Marqués, Ramona N.Pena. Structural and functional study of the coding region and the proximal promoter of the pig HMGCRC gene. Poster presentation. European Association of Animal Production 2009. Proceedings. Barcelona (Spain). 24-28 August **2009**.

11.- Marina Solé, Ramona N.Pena, Marcel Amills, **Angela Cánovas**, David Gallardo, Josep Reixach, Isabel Díaz, José L. Nogrera, Raquel Quintanilla. Genetic and transcriptomic analysis of intramuscular fat content and fatty acid composition in two pig muscles. Poster presentation. European Association of Animal Production 2009. Proceedings. Barcelona (Spain). 24-28 August **2009**.

12.- J.L Noguera, L. Varona, N. Ibañez, **A. Cánovas**, R. Quintanilla, N. Buys, R. N. Pena. TITLE: Detection of epistatic QTL for prolificacy in commercial pig population. Poster presentation. European Association of Animal Production 2009. Proceedings. Barcelona (Spain). 24-28 August **2009**.

13.- **A. Cánovas**, R. Quintanilla, J.M. Reecy, M. Marqués, R.N. Pena. Proximal promoter of the pig HMGCR gene: structural and functional study. Oral presentation. ADSA PSA AMPA ASAS JOINT MEETING. Proceedings. Montreal (Canada). 12-16 July **2009**.

14.- **Cánovas, A.**, Quintanilla, R., Reecy, J.M., Marqués, M., Pena, RN. El gen HMGCR porcino: estudio estructural y funcional de su promotor. Oral presentation. XIII Congreso ITEA. Jornadas sobre producción animal. Proceedings. Zaragoza (Spain). 12-13 May **2009**.

15.- **Cánovas, A.**, Tor, M., Pena, RN., Doran, O., Estany, J. Efecto de la selección contra grasa dorsal a grasa intramuscular constante en la expresión proteica de las enzimas ACC y SCD porcinas. Oral presentation. XIII Congreso ITEA. Jornadas sobre producción animal. Proceedings. Zaragoza (Spain). 12-13 May **2009**.

16.- M. Solé, RN Pena, M Amills, **A. Cánovas**, D Gallardo, J Reixach, I Díaz, JL Noguera y R Quintanilla. Estudio de los genes implicados en la cantidad y composición de la grasa intramuscular de los músculos longissimus dorsi y gluteus medius en una población Duroc. Oral presentation. XIII Congreso ITEA. Jornadas sobre producción animal. Proceedings. Zaragoza (Spain). 12-13 May **2009**.

17.- **Angela Cánovas**, Raquel Quintanilla, Marta F. Baro, Margarita Marqués, Ramona N. Pena. Functional study of the pig HMGCR gene and proximal promoter. Poster presentation. Gordon Conference on Quantitative Genetics and Genomics. Proceedings. Galveston, Texas (USA). 22-27 February **2009**.

18.- RN. Pena, **A. Cánovas**, L. Varona, R. Quintanilla. Ontological analysis of gene expression profiles in Duroc pigs differing in fat and cholesterol parameters. Oral and Poster presentation. 2nd European Congress of Pig Genomics (PG-II). Proceedings. Ljubljana (Slovenia). 4-6 June 2008.

19.- **Cánovas, A.**, Quintanilla, R., Varona, L., Díaz, I., Casellas, J., Pena, RN. Gene network analysis on muscle expression data from Duroc pigs with extreme values for cholesterol and fat

deposition traits. Poster presentation. 3rd International Symposium on Animal Functional Genomics (ISAFG). Proceedings. Edinburgh (UK). 7-9 April **2008**.

20.- **Cánovas, A.**, Quintanilla, R., Varona, L., Díaz, I., Casellas, J., Pena, RN. Análisis de microarrays en el músculo porcino asociado a parámetros de colesterol y engrasamiento. Poster presentation. XXXVI Congreso de la sociedad española de genética. Proceedings (2007): 310. León (Spain). 18-21 September **2007**.

21.- **Cánovas, A.**, Quintanilla, R., Díaz, I., Noguera, JL., Varona, L., Pena, RN. Estudio de expresión y asociación del gen HMGCR porcino. Poster presentation. XXXVI Congreso de la sociedad española de genética. Proceedings (2007): 205. León (Spain). 18-21 September **2007**.

22.- **Cánovas, A.**, Quintanilla, R., Varona, L., Díaz, I., Casellas, J., Pena, RN. Gene expression analysis of pig muscle associated to cholesterol and fat parameters. Poster presentation. European Association of Animal Production 2007. Proceedings N°13 (2007): 84. Dublín (UK). 26-29 August **2007**.

23.- **Cánovas, A.**, Casellas, J., Varona, L., Díaz, I., Quintanilla, R., Pena, RN. Gene expression analysis of pig muscle associated to cholesterol and fat parameters. Poster presentation. ADSA PSA AMPA ASAS JOINT MEETING. Proceedings. San Antonio, Texas (USA). 8-12 July **2007**.

24.- **Cánovas, A.**, Quintanilla, R., Varona, L., Díaz, I., Casellas, J., Pena, RN. Microarray analysis of pig muscle in divergent populations for cholesterol and lipid metabolism parameters. Poster presentation. Trans-COST ARRAY meeting: Advanced Research Results using Array Technology: ARRAY. FinalCost Action 853 and ARRAY meeting. Pag. 26. Sant Feliu de Guíxols (Spain). 22-24 May **2007**.

25.- **Cánovas, A.**, Casellas, J., Varona, L., Díaz, I., Quintanilla, R., Pena, RN. Estudio de expresión génica en el músculo porcino asociado a parámetros de colesterol y engrasamiento. Oral presentation. XIII Congreso ITEA. Jornadas sobre producción animal. Proceedings. Zaragoza (Spain). 16-17 May **2007**.

26.- Pena, RN., **Cánovas, A.**, Noguera, J.L., Díaz, I., Varona, L., Quintanilla, R. Estudio del gen del receptor de partículas LDL porcino y su asociación con niveles de lipoproteínas plasmáticas. Poster presentation. XIII Congreso ITEA. Jornadas sobre producción animal. Proceedings. Zaragoza (Spain). 16-17 May **2007**.

27.- Pena, R., **Cánovas, A.**, Varona, L., Soler, J., Tibau, J., Diaz, I., Reixach, J., Noguera, J.L., Quintanilla, R. Characterisation and analysis of five cholesterol metabolism-related genes in a Duroc pig population. Poster presentation. 30th International Society for Animal Genetics (ISAG). Proceedings. Porto Seguro (Brazil). 20-25 August **2006**.

28.- Francés, F., Pena, R., Portolés, O., **Cánovas, A.**, Sorlí, J.V., Quintanilla, R., Corella, D., González, J.I. Efecto comparativo de variaciones en el gen de la apolipoproteína B sobre el metabolismo lipídico en humano y porcino. Oral presentation. XIX Congreso Nacional de la sociedad española de Arteriosclerosis. Proceedings. Santander (Spain). 7-10 June **2006**.

ACADEMIC HONORS, SCHOLARSHIPS, FELLOWSHIPS

- **Fulbright excellence postdoctoral fellowship** for a two-year postdoc in USA (call 2011). First position in the area of Livestock and Fisheries with the highest score (60/60).
- **Postdoctoral fellowship Spanish Ministry of Education** for a two-year postdoc in foreign country (call 2011). First position in the area of Livestock and Fisheries with the highest score (60/60).
- **Juan de la Cierva Postdoctoral fellowship of Spanish Ministry of Science & Innovation** (call 2011). Third position in the area of Livestock and Fisheries with a score of 99/100.
- **Young Researcher Award** of 9th World Congress on Genetics of Applied to Livestock Production (WCGALP). Leipzig (Germany). 1-6 August 2010.
- **Young Researcher Award** of 32th International Society for Animal Genetics conference (ISAG). Edinburgh (UK). 26-30 July 2010.

- **Scholarship of National Institute of Agriculture Research (INIA)** to do a stage during PhD studies at University of California, Davis (CA, USA) (Call 2010).
- 2010 International Society for Animal Genetics (ISAG) **Travel Award**.
- 2010 World Congress on Genetics Applied to Livestock Production (WCGALP) **International Travel Award**.
- 2009 Gordon Conference on Quantitative Genetics and Genomics **International Travel Award**.
- **Scholarship of National Institute of Agriculture Research (INIA)** to do a stage during PhD studies at Iowa State University (IA, USA) (Call 2009).
- 2009 European Network for Pig Genomics **International Travel Award**.
- **Scholarship of National Institute of Agriculture Research (INIA)** to do a stage during PhD studies at University of Bristol (UK) (Call 2008).
- 2008 International Symposium on Animal Functional Genomics (ISAFG) **Travel Award**.
- Selected as **young researcher** to participate in **European Research School; Post-genomics in Animal Science Research and Career Prospects**. Les Loges En Josas, Paris (France). 25-28 March 2008.
- **Scholarship of Foundation of Valencia Agrifood Research (AGROALIMED)** to do the Master in Animal Breeding and Biotechnology of Reproduction (Module: Quantitative Genetics). Call 2007/2008.
- 2007 COST Action: Advanced Research Results using Array Technology **International Travel Award**.
- **Scholarship of National Institute of Agriculture Research (INIA)** to do a stage during PhD studies at University of Leon (Spain) (Call 2007).
- **National Institute of Agriculture Research (INIA) fellowship** to do a PhD in Research & Technology food & Agriculture Institute (IRTA) (Call 2006).

PROPOSAL REVIEWS

Journal: *Canadian Journal of Animal Science* Editor: Dr. Luis Varona Year: 2010, 2011

Journal: *Iranian Journal of Animal Science* Editor: Dr. Alireza Seidavi Year: 2010, 2011

Journal: *Functional & Integrative Genomics* Editor: Dr. Rudi Appels Year: 2011

PROFESSIONAL AFFILIATIONS

- American Society of Animal Science (ASAS).
- International Society for Animal Genetics (ISAG).
- Asociación Interprofesional para el Desarrollo Agrario (AIDA).