

Part A. PERSONAL INFORMATION

CV date	03/06/2024
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First and Family name	Emilio Arsenio Martínez García		
Gender (*)	Male	Birth date (dd/mm/yyyy)	14/12/1956
ID number	50286322L		
e-mail	emilio@um.es	URL Web: Emilio A. Martinez	
Open Researcher and Contributor ID (ORCID)(*)	https://orcid.org/0000-0003-1260-9721		

(*) Mandatory

A.1. Current position

Position	Full Professor		
Initial date	09/02/1994		
Institution	University of Murcia (UMU)		
Department/Center	Animal Medicine and Surgery/Faculty of Veterinary		
Country	Spain	Phone number	868884734
Key words	Reproduction, porcine, embryo, embryo cryopreservation and transfer		

A.2. Previous positions

Period	Position/Institution/Country
01/10/1983-30/11/1985	Assistant Professor/UMU/Spain
01/12/1985-08/02/1994	Associate Professor/UMU/Spain

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Degree in Veterinary	Complutense University of Madrid	1980
PhD	UMU/Spain	1984

Part B. CV SUMMARY (max. 5000 characters, including spaces)

He is Diplomat of two European Colleges (ECAR and ECPHM). He is honorary president of the Spanish Association of Animal Reproduction (AERA). He is elected member of the Royal Academy of Medicine and Surgery of Murcia and of the Academy of Veterinary Sciences of Murcia. **Scientific responsibilities, international collaborations, and leadership:** He is Principal Investigator (PI) of the Animal Reproduction Research Group of the University of Murcia (E0A1-03) from its constitution in 1987. The group has the certification of group of excellence in the Region of Murcia from 2007. He is PI of the group Reproductive Biology of the Instituto Murciano de Investigación Biosanitaria-Pascual Parrilla de la Región de Murcia. He has participated in 26 national and regional research projects (in 15 of them as PI). He has collaborated with distinguished Scientists from USA (B Day, R Prather, JC Izpisua, J Wu, PJ Ross, L Johnson), Australia (WMC Maxwell, SP de Graaf), UK (WV Holt, A Fazeli), Sweden (H Rodriguez-Martinez), Portugal (G Ferreira-Dias), France (F Martinat-Botte), and Germany (D Rath), among others. **Collaboration with industry and the private sector:** He has participated in 30 research competitive projects with private companies through CDTI (in 22 of them as PI) and in 41 direct contracts with national and international companies (in 22 of them as PI). He is the author of two patents licensed to American and European companies. One of them was awarded with the First Prize i-patents 2006 of the Region of Murcia. **Scientific contributions:** He presents a solid background in porcine reproductive technologies such as deep uterine insemination (DUI), cryopreservation of gametes and embryos, in vitro production of embryos, and in vivo embryo collection and nonsurgical embryo transfer (ET). His group produced the first piglets born worldwide by nonsurgical deep uterine ET, the first litters of pre-selected sex by minimally invasive procedures, the first litters born combining a low number of frozen sperm and DUI and the first pig-human chimeras. During the last two decades, one of his main challenges has been to develop practical protocols to be used commercially by the pig industry, because of its impact from a productive, sanitary, and economic point of view. Thus, he developed a unique procedure for the nonsurgical ET in the depth of a uterine horn and several procedures for increasing survival rates of vitrified embryos. In this context, it is worth highlighting his works on the efficiency of the one-step embryo warming procedure, the reduction of cryoprotectant concentration from vitrification media and the development of a defined medium for all steps of ET and embryo

preservation. Many other aspects of the ET technology were studied and improved, such as the vitrification ability of untreated embryos, or the cryosensitivity of very early embryos. In the last five years, he has developed several protocols for the efficient nonsurgical transfer of embryos both stored in a liquid state and vitrified, and he has focused his research on the impact of vitrification on embryo transcriptome, the beneficial effects of seminal plasma on the endometrial transcriptome and cytokine levels at day 6 of pregnancy, and the effectiveness of synchronization-superovulation combined treatments on embryo production and on the ovarian and endometrial transcriptome of donor sows. Currently, he is developing studies for the further development of ET technology using new procedures to simultaneously vitrify a large number of embryos. As a result of all these investigations, many questions affecting the ET and embryo preservation technologies have been answered and the advances achieved have made it possible to significantly increase the expansion of ET in pigs. Since the beginning of his research, he has 231 JCR publications and 356 contributions to international Congresses.

Training of young researchers: He has trained and supervised 27 Ph.D. Thesis. An important number of these researchers are now full professor (8) and associate professor (6) of university. Others are postdoctoral researchers Marie Curie and Juan de la Cierva (2) or associated to research contracts (1) and the rest are part of R&D&I departments of private companies or are public officials. **Editorial activities, evaluation of researchers, projects, and other research activities:** He is Associate-Editor of three JCR journals (Reproduction in Domestic Animals, Livestock Science and Frontiers in Veterinary Science) and reviewer of manuscripts submitted to numerous JCR journals. He is involved in the evaluation of regional, national (AEI) and international (ANPCyT) researchers and research projects.

As a result of his scientific career, he has an h-index of 47, based on 219 published articles, with a total of 6,901 citations (5,650 without self-citations) and an average number of citations per article and year of 31.8 and 518.9 (last 5 years), respectively.

Part C. RELEVANT MERITS

C.1. Publications

1. Martinez CA, Cuello C, Parrilla I, ..., Martinez EA. Exogenous melatonin in the culture medium does not affect the development of in vivo-derived pig embryos but substantially improves the quality of in vitro-produced embryos. **Antioxidants**; 2022 11(6) 1177. **Position of the author 10/10.**
2. Cuello C, Martinez CA, Cambra JM, Parrilla I, Rodriguez-Martinez H, Gil MA, Martinez EA. 2021. Effects of Vitrification on the Blastocyst Gene Expression Profile in a Porcine Model. **Int J Mol Sci**; 22:1222. **Position of the author 7/7.**
3. Martinez CA, Cambra JM, Gil MA, Parrilla I, Alvarez-Rodriguez M, Rodriguez-Martinez H, Cuello C, Martinez EA. 2020. Seminal Plasma Induces Overexpression of Genes Associated with Embryo Development and Implantation in Day-6 Porcine Blastocysts. **Int J Mol Sci**; 21(10):3662. **Position of the author 8/8.**
4. Wu J, Platero-Luengo A, Sakurai M, ..., Izpisua Belmonte JC. 2017. Interspecies chimerism with mammalian pluripotent stem cells. **Cell**; 168:473-486. Position of the author 35/37.
5. Cuello C, Martinez CA, Nohalez A, Parrilla I, Roca J, Gil MA, Martinez EA. 2016. Effective vitrification and warming of porcine embryos using a pH-stable chemically defined medium. **Sci Rep**; 6:33915. **Position of the author 7/7.**
6. Martinez EA, Martinez CA, Nohalez A, Sanchez-Osorio J, Vazquez JM, Roca J, Parrilla I, Gil MA. 2015. Nonsurgical deep uterine transfer of vitrified in vivo-derived porcine embryos is as effective as the default surgical approach. **Sci Rep**; 5:10587. **Position of the author 1/8.**
7. Martinez EA, Angel MA, Cuello C, ...; Gil MA. 2014. Successful non-surgical deep uterine transfer of porcine morulae after 24-hour culture in a chemically defined medium. **PLoS One**; 13;9(8):e104696. **Position of the author 1/14.**
8. Martínez EA, Caamaño JN, Gil MA, ..., Day DN. (2004). Successful nonsurgical deep uterine embryo transfer in pigs. **Theriogenology**; 61:137-146. **Position of the author 1/13.**
9. Martinez EA, Vazquez JM, Roca J, Lucas X, Gil MA, Parrilla I, Vazquez JL, Day BN. (2002). Minimum number of spermatozoa required for normal fertility after deep intrauterine insemination in non-sedated sows. **Reproduction**; 123:163-170. **Position of the author 1/8.**
10. Martinez EA, Vazquez JM, Roca J, Lucas X, Gil MA, Parrilla I, Vazquez JL, Day BN. (2001) Successful non-surgical deep intrauterine insemination with low number of spermatozoa in sows by a fiberoptic endoscope technique. **Reproduction**; 122:289-296. **Position of the author 1/8.**

C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

1. Martinez EA, Martinez CA, Cambra JM, Maside C, Lucas X, Vazquez JL, Vazquez JM, Roca J, Rodriguez-Martinez H, Gil MA, Parrilla I, Cuello C. (2019). Achievements and future perspectives of embryo transfer technology in pigs. *Reprod Domest Anim.* 54 (suppl. 4); 4-13. 2019. 15th International Congress of the Spanish Society for Animal Reproduction (AERA). 7-9 November 2019. Toledo. Spain. **Invited Plenary.**
2. Martinez EA, Martinez CA, Nohalez A, Parrilla I, Vazquez JL, Roca J, Gil MA, Cuello C. (2016). Workshop: "Production of porcine embryos in vitro and in vivo: applications and potential use". *Advances in embryo transfer with in vivo derived porcine embryos Reprod Domest Anim.* 51 (S2):48. 2016. 20th Conference of the European Society for Domestic Animal Reproduction. 27-29 October 2016. Lisbon Portugal. **Invited Workshop.**
3. Martinez EA, Cuello C, Parrilla I, Vazquez JL, Vazquez JM, Roca J, Gil MA. (2015). Non-surgical embryo transfer in pigs. *Midwest Meeting of the American Society of Animal Science (ASAS) and the American Dairy Science Association (ADSA).* 15-18 March 2015. Des Moines Iowa (USA). **Invited Plenary.**
4. Martinez EA, Gil MA, Cuello C, Sanchez-Osorio J, Gomis J, Parrilla I, Angel MA, Rodriguez-Martinez H, Lucas X, Vazquez JL, Vazquez JM, Roca J. (2013). Current progress in non-surgical embryo transfer with fresh and vitrified/warmed pig embryos. In: *Control of Pig Reproduction IX* pp. 101-112. Society of Reproduction and Fertility volumen 68. Context Products Ltd. UK. 9th International Conference on Pig Reproduction (ICPR). 9-12 June 2013. Olsztyn Poland. **Invited Plenary.**
5. Martinez EA, Vazquez JM, Roca J, Gil MA, Cuello C, Parrilla I, Vazquez JL. (2008). Workshop: "Basic and clinical aspects of the functions of the cervix". Relationship of site of insemination to the required number of spermatozoa in pigs. *Reprod Domest Anim.* 43(Suppl 5):106. 2008. 12th Conference of the European Society for Domestic Animal Reproduction. 20-23 November 2008. Utrecht. The Netherlands. **Invited Workshop.**
6. Martinez EA, Vazquez JM, Roca J, Gil MA, Cuello C, Parrilla I, Lucas X, Vazquez JL. (2008). An overview of the current status of technology for artificial insemination in the swine industry. *Midwest Meeting of the American Society of Animal Science (ASAS) and the American Dairy Science Association (ADSA).* 17-19 March 2008. Des Moines Iowa (USA). **Invited Plenary.**
7. Martinez EA, Vazquez JM, Roca J, Cuello C, Gil MA, Parrilla I, Vazquez JL. (2005). An update on reproductive technologies in pigs. *Reprod Domest Anim.* 40:300-309. 2005. 9th Conference of the European Society for Domestic Animal Reproduction. 1-3 September 2005. Murcia. Spain. **Invited Plenary.**
8. Martinez EA, Vazquez JM, Roca J. (2003). Workshop: "Embryo transfer in pigs". Deep intrauterine embryo transfer in non-sedated gilts and sows. *Reprod Domest Anim.* 38 (4): 320. 2003. 7th Conference of the European Society for Domestic Animal Reproduction. 4-6 September 2003. University College Dublin. Ireland. **Invited Workshop.**
9. Martinez EA. (2003). Semen sexing. 10th International Symposium on Pig Reproduction and Artificial Insemination. 5-7 May 2003. Rome, Italy. **Invited Plenary.**
10. Martinez EA, Vazquez JM, Roca J, Lucas X, Gil MA, Vazquez JL. (2001). Deep intrauterine insemination and embryo transfer in pigs. *Reproduction Supplement* 58: 301-311 (*Control of Pig Reproduction*). International Conference on Pig Reproduction (ICPR). 3-6 June 2001. Columbia Missouri (USA). **Invited Plenary.**

C.3. Research projects, indicating your personal contribution.

1. RTI2018-093525-B-I00: Increasing the efficiency of embryo transfer in pigs. Ministerio de Ciencia, Innovación y Universidades. PI: EA Martinez and C Cuello (University of Murcia). 01/01/2019-31/12/2022. 205.700,00€.
2. RTC-2016-5448-2: Improving the efficiency of porcine production through new procedures of embryo transfer. Ministerio de Economía y Competitividad (Retos Colaboración). 01/08/2016-31/12/2019. 246.050,00€.
3. 19892/GERM/15: Reproductive biotechnologies for livestock and human health. Fundación Séneca de la Región de Murcia (Groups of Excellence). PI: EA Martinez and J Roca (University of Murcia). 01/01/2016-31/12/2019. 200.000,00€.

4. AGL2015-69735-R: Implementation of a non-surgical transfer program with refrigerated- stored porcine embryos. Ministerio de Economía y Competitividad. PI: EA Martinez and MA Gil (University of Murcia). 01/01/2016-31/12/2018. 193.600,00€.
5. AGL2012-38621: Non-surgical deep intrauterine with vitrified-warmed embryos in pigs. Ministerio de Economía y Competitividad. PI: EA Martinez (University of Murcia).01/01/2013-31/12/2015. 146.250,00€.
6. AGL2009-12091 GAN: Evaluation of the limiting factors influencing pig embryo vitrification and non-surgical embryo-transfer technologies. Ministerio de Ciencia e Innovación. PI: EA Martinez (University of Murcia). 01/01/2010-31/12/2012. 114.959,01€.
7. 04543/GERM/07: Animal reproduction biotechnology. Fundación Séneca de la Región de Murcia (Groups of Excellence). PI: EA Martinez and J Roca (University of Murcia). 01/01/2008-31/12/2012. 300.000,00€.
8. 2I05SU0012: Optimization of embryo vitrification and nonsurgical embryo transfer in pigs. Consejería de Educación y Cultura de la Región de Murcia. PI: EA Martinez (University of Murcia). 20/12/2005-19/06/2007. 52,152.01€.
9. AGL2004-07546: Factors affecting the survival of vitrified porcine embryos. Ministerio de Ciencia y Tecnología. PI: EA Martinez (University of Murcia). 13/12/2004-12/12/2007.174.050€.
10. AGF95-1009: Improvement of homologous in vitro penetration assay to predict the fertilizing ability of boar semen. Dirección General de Enseñanza Superior e Investigación Científica (CICYT). PI: EA Martinez (University of Murcia). 01/07/1995-30/06/1998. 56.326,85€.

C.4. Contracts, technological or transfer merits, include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any

1. Contract: Embryo transfer for the introduction of a new genetic line in a pig farm. Topigs Norsvin España SLU. PI: EA Martinez and C Cuello (University of Murcia). 27/04/2018-26/04/2019. (45,173.32€).
2. Contract: Development of a procedure for non-surgical embryo collection in pigs. PI: EA Martinez and MA Gil (University of Murcia). CDTI-Agropor SL. 20/07/2017-25/07/2019. 102,850.00€.
3. Contract: Generation of Functional and Clinical Relevant Cornea and Cartilage Tissues from Human iPSCs using Interspecies Blastocyst Complementation. UCAM. PI: EA Martinez and MA Gil (University of Murcia). 28/01/2015-15/11/2017. 157,884,7€.
4. Contract: Implementation of reproductive technologies to swine industry for improving growth performance and competitiveness. CDTI-Agropor SL. PI: EA Martinez (University of Murcia). 23/07/2014-23/03/2016. 84,700.00€.
5. Contract: Development of sperm and embryo technologies for commercial application in pig industry. CDTI-Porcisan SA. PI: EA Martinez (University of Murcia). 03/07/2014-03/03/2016. 96,800.00€.
6. Contract: Non-surgical deep uterine embryo transfer in pigs: evaluation of several steps of the procedure. CDTI-Agropor SL. PI: EA Martinez (University of Murcia). 23/09/2009-29/03/2011. 75,400.00€.
7. Contract: Deep intrauterine insemination in sows with natural oestrous. CDTI-Bibiano y CIA SL. PI: EA Martinez (University of Murcia). 23/11/2006-22/11/2008. 139,958.06€.
8. Contract: Non-surgical transfer of vitrified pig embryos. CDTI-Castillo de Larache SL. PI: EA Martinez (University of Murcia). 01/01/2004.31/12/2006. 103,914.15€.
9. Contract: Non-surgical embryo transfer in pigs. CDTI- Dalland Hybrid España SA. PI: EA Martinez (University of Murcia). 24/10/2001-24/10/2004. 104,576.11€).
10. Patent P200000114: Device, a probe and a method for introducing and/or collecting fluids in the inside of an animal uterus. Inventors: EA Martinez, JM Vazquez, JL Vazquez and J Roca. The Patent was granted and exploited in 24 countries, including Spain, Australia, Canada and the United States. It was licensed to Monsanto Company (USA), Minitüb GMBH (Germany) and Magapor (Spain). It has generated benefits worth 1,093,618.59€. Awarded with the Silver Trophy (Zaragoza 2002) and the first prize i-patents (Murcia 2006).