

CURRICULUM VITAE

Personal Information:

Name: Juan Carlos Izpisua Belmonte
Address: The Salk Institute for Biological Studies
Gene Expression Laboratory
10010 North Torrey Pines Road
La Jolla, CA 92037-1099
USA
Telephone: (858) 453-4100, Extension 1130
Fax: (858) 453-2573
E-mail: belmonte@salk.edu
Date of Birth: December 16, 1960
Place of Birth: Hellín, Spain

Degrees:

1980-1985 University of Valencia, Spain. M. Sc. (Honors). Pharmacology
1985-1987 University of Bologna, Italy and University of Valencia, Spain
Ph.D. Graduate Student. Biochemistry and Pharmacology
Prof. José Cabo

Positions:

1987-1988 University of Marburg, Germany. Postdoctoral Fellow, Prof. Miguel Beato
1988-1991 European Molecular Biology Laboratories (EMBL). Heidelberg, Germany,
Postdoctoral Fellow, Prof. Denis Duboule
1988-1991 University College, London. London, England, Visiting Fellow, Prof. Lewis
Wolpert
1988-1991 Oxford University. Oxford, England, Visiting Fellow, Prof. Claudio Stern
1992-1993 University of California, Los Angeles, USA. Postdoctoral Fellow,
Prof. Eddy De Robertis
1993-1998 The Salk Institute, San Diego, USA. Assistant Professor
1993- University of California, San Diego, USA. Adjunct Professor
1998- 2000 The Salk Institute, San Diego, USA. Associate Professor
2000- The Salk Institute, San Diego, USA. Professor
2005-2013 Center of Regenerative Medicine, Barcelona, Director
2015- Professor of the Universidad Católica San Antonio de Murcia

Scientific Interests:

Dr. Izpisua Belmonte's area of research is focused on the understanding of stem cell biology, organ and tissue development and regeneration. His observations include uncovering the role of some homeobox genes in organ and specification, as well as the identification of the molecular mechanisms that determine how the different cell type precursors of internal organs are organized spatially along the embryonic body axes. He has made seminal discoveries in the field of tissue and organ regeneration, the differentiation of human stem cells into various tissues, and the molecular basis underlying aging and somatic cell reprogramming. These observations may help towards the discovery of new molecules as well as specific cell based treatments for a wide variety of diseases afflicting mankind.

Honors and Awards:

1980-1985	“Premio Extraordinario”. Distinction Medal to the top student of the 1980 class. University of Valencia. Spain
1987	“Giuseppe Plancher” Award Colegio de España, Italy
1996	Basil O’Connor Research Scholar Award
1996	Pew Scholar Award
1997	President William Clinton Career Award
1998	Catedra Banco Bilbao/Vizcaya. Spanish Visiting Professor Award
1999	Catedra Iberdrola. Spanish Visiting Professor Award
1999	National Science Foundation Creativity Award
2000	Research Professor. Spanish Research Council. CSIC
2000	American Heart Association Established Investigator Award
2001	Faculty of 1000
2004	Naming of “Izpisua Belmonte” High School Hellin, Albacete
2006	Gold Medal of Castilla-La Mancha
2006	Medal from the Spanish College of Pharmacy
2009	Honorary Doctorate from University of Granada
2009	Elected Member to the Catalanian Royal Academy of Doctors
2010	Ellison Medical Foundation Senior Scholar Award
2011	Roger Guillemin Nobel Chair
2011	Académico de Honor de la Academia de Farmacia Santa María de España de la Región de Murcia
2012	Doctor Benepres Honor Prize
2014	Honorary Member of the Spanish Society of Transplantation (SET)
2014	Honorary Doctorate from Universidad Catolica San Antonio de Murcia
2014	Premio La Tribuna of Albacete
2015	Medal of the Transplant Society of Catalonia
2015	Premio Nacional de Investigacion 2015 FCCR

Scientific Activities

Scientific Journal Editorial Board Member

Advances in Regenerative Biology
American Journal of Stem Cells
BMC Developmental Biology
Cell Discovery
Cell Research
Current Stem Cell Reports
Development
Developmental Biology
Development Genes & Evolution
Development Growth and Differentiation
Elsevier Journals
International Journal of Clinical Cardiology
International Journal of Developmental Biology
ISRN Developmental Biology

Journal of Cardiovascular Medicine and Cardiology
Journal of Medical Sciences
Medical Sciences
OA Biotechnology
Protein & Cell
Stem Cell Reports
Stem Cell Research and Therapy
World Research Journal of Developmental Biology
World Research Journal of Stem Cells
World Research Journal of Transactions on Database Systems

Scientific Grant Reviews

AAAS
AFM
AICR
AHA
ANEP
CDRF Global
ERC
European Commission
French National Research Agency
Human Frontier Science Program Organization
India Alliance
Israel Science Foundation
Medical Research Council
NIH
NSF
Telethon
Vidi Programme
Wellcome Trust Centre
And others

Journal Reviews

BioEssays
Biotechnology Journal
Blood
BMC Biology
BMC Cancer
BMC Cell Biology
BMC Developmental Biology
BMC Genomics
Cardiovascular Research
Cell
Cell Metabolism
Cell Proliferation
Cell Reports
Cell Research
Cell Stem Cell
Cellular and Molecular Life Sciences

Current Biology
Current Opinion in Genetics and Development
Cytotherapy
Development
Development, Genes and Evolution
Development, Growth and Differentiation
Developmental Biology
Developmental Cell
Developmental Dynamics
Differentiation
Disease Models & Mechanisms
EMBO
EMBO Journal
EMBO Reports
Encyclopedia of Molecular Cell Biology and Molecular Medicine
Epigenomics
FASEB Journal
Genes & Development
Genome Biology
Heart and Vessels
Human Molecular Genetics
Human Reproduction
International Journal of Biochemistry and Cell Biology
International Journal of Developmental Biology
ISRN Developmental Biology
IUBMB Life
Journal of Cell Biology
Journal of Cell Science
Journal of Clinical Investigation
Journal of Experimental Medicine
Journal of Molecular Medicine
Journal of Neurological Sciences
Journal of Neuroscience
Journal of Tissue Engineering and Regenerative Medicine
Journal of Vascular Research
Journal of Visualized Experiments
Liver International
Mechanisms of Development
Molecular Human Reproduction
Molecular Systems Biology
Molecular Therapy
Nature
Nature Biotechnology
Nature Cell Biology
Nature Communications
Nature Genetics
Nature Medicine
Nature Methods
Nature Protocols

Nature Reviews Cancer
Nature Reviews Genetics
Nature Reviews Molecular Cell Biology
Nature Structural and Molecular Biology
Neuroscience
Oncogene
PLoS Biology
PLoS Genetics
PLoS ONE
PNAS
Science
Science Translational Medicine
Stem Cells
Stem Cells and Development
Stem Cell Reports
Stem Cell Research
Stem Cell Research and Therapy
Tissue Engineering
Trends in Genetics
Trends in Molecular Medicine
Trends in Pharmacological Science
WIRES Developmental Biology
Wound Repair and Regeneration
Zebrafish
And others

Organizer and/or Invited Meeting Speaker (Last 5 Years)

2009

American Society of Gene Therapy (ASGT) 12th Annual Meeting. *Generation of disease-free hematopoietic progenitors from Fanconi anemia-specific induced pluripotent stem cells*. San Diego, California, USA

Sixth International Symposium on Stem Cell Therapy and Cardiovascular Innovations. *What's new on heart tissue reengineering?* Madrid, Spain

The Embryo In Europe. *Efficient and rapid generation of induced pluripotent stem cells from human keratinocytes*. Barcelona, Spain

Organizer. International Society for Stem Cell Research (ISSCR) 7th Annual Meeting. *The p53 pathway as a guardian against reprogramming*. Barcelona, Spain

Encuentros Celgene de Investigacion en Cancer. *Celulas Madre: Capacidad Regenerativa y Terapeutica*. Madrid, Spain

Colegio Oficial Farmaceuticos Alicante. *Practical Applications of Regenerative Medicine*. Alicante, Spain

NHLBI Symposium on Cardiovascular Regenerative Medicine. *Zebrafish heart regeneration occurs by limited dedifferentiation and proliferation of cardiomyocytes*. Bethesda, Maryland, USA

1st International Symposium on Translational Regenerative Medicine. *Translational Regenerative Medicine*. Vitoria-Gastiez, Spain

4th Annual Stem Cell Meeting on the Mesa. La Jolla, California, USA

2010

Seventh International Symposium on Stem Cell Therapy and Applied Cardiovascular Biotechnology. Madrid, Spain

8th Annual International Cord Blood Symposium. San Francisco, California, USA

Keystone Symposium on Stem Cell Differentiation and Dedifferentiation. Keystone, Colorado, USA

Molecular Medicine Tri-Conference iPS Cells: From Screening to Therapy. San Francisco, USA.

25th National Congress of Sociedad Española de Medicina y Estética (SEME). Barcelona, Spain

International University of Menendez Pelayo. *Embryo Left-Right Asymmetry, Stem Cells and Regenerative Medicine*. Santander, Spain.

IPSEN Life Science Program. *Insights into Regenerative Medicine*. Paris, France.

The EMBO Meeting 2010. Barcelona, Spain.

Keynote Speaker. European Society of Gene and Cell Therapy (ESGCT) XVIII Annual Congress. Milan, Italy.

2011

Translational Research and Clinical Practice. *Dedifferentiation, transdifferentiation and reprogramming: three routes to regeneration*. Milan, Italy.

AACR Stem Cells, Development and Cancer. *Human Aging and Stem Cells*. Vancouver, Canada.

Keystone Symposia on Stem Cells in Development, Tissue Homeostasis and Disease. *Recapitulation of premature ageing with iPSCs from Hutchinson–Gilford progeria syndrome*. Santa Fe, New Mexico, USA.

Keystone Symposia on Mechanisms of Cardiac Growth, Death and Regeneration. *Zebrafish heart regeneration occurs by cardiomyocyte dedifferentiation and proliferation*. Keystone, Colorado, USA

Therapeutic Approaches to Neurodegeneration-Age Modifiers, Proteostasis, and Stem Cells.

Recapitulation of premature ageing with iPSCs from Hutchinson–Gilford progeria syndrome. Nassau, Bahamas.

Wilhelm Johansen Symposium: the impact of deep sequencing on the gene, genotype and phenotype concepts. *Stem Cell Models*. Copenhagen, Denmark.

6th International Meeting of the Stem Cell Network NRW. *Recapitulation of premature ageing with iPSCs from Hutchinson–Gilford progeria syndrome*. Essen, Germany.

37th Annual Meeting of the European Group for Blood and Marrow Transplantation. *Hematopoiesis through iPS reprogramming and transdifferentiation*. Paris, France.

6th Annual Wisconsin Stem Cell Symposium. *Recapitulation of premature ageing with iPSCs from Hutchinson–Gilford progeria syndrome*. Madison, Wisconsin, USA.

21st Regional Congress of the ISBT. *Human cord blood reprogrammed into embryonic-like stem cells*. Lisbon, Portugal.

7th Annual Stem Cell Symposium at UCLA. *Transdetermination of human mesenchymal stem cells into hematopoietic stem cells*. Los Angeles, California, USA.

2011 BMT Tandem Meetings. *Reprogramming of Fanconi Anemia and Other Human Diseases*. Honolulu, Hawaii, USA.

Fourth Edition of the French-American Biotech Symposium (FABS) on New Therapeutic Approaches of Aging. *Recapitulation of premature ageing with iPSCs from Hutchinson–Gilford progeria syndrome*. San Francisco, California, USA.

3rd International Collaborative Symposium on Stem Cell Research. *Recapitulation of premature ageing with iPSCs from Hutchinson–Gilford progeria syndrome*. Seoul, Korea.

22nd Congress of the SETS (Spanish Society of Blood Transfusion and Cellular Therapy). Malaga, Spain.

CNIORcapturing Pluripotency: Links between Cellular Reprogramming and Cancer. Madrid, Spain.

2012

Advances in Stem Cell Science. *Stem Cells and Aging*. La Jolla, California, USA.
2012 Buck Symposium on Stem Cell Research and Aging. *Generation and Correction of Laminopathy-Associated LMNA Mutations in Patient Specific iPSCs*. Novato, California, USA.
Qatar International Conference on Stem Cell Science and Policy. *Opportunities and Challenges for Stem Cell Research*. Doha, Qatar.
Programmed Cells from Basic Neuroscience to Therapy. *ES and iPSC cells as tools for modeling human aging*. Paris, France.
Seminar at Osaka University. *Diseases in a dish: modeling human genetic disorders using induced pluripotent cells*. Osaka, Japan.
Seminar at Kyoto University. *Diseases in a dish: modeling human genetic disorders using induced pluripotent cells*. Kyoto, Japan.
The 49th Annual Meeting of Japanese society of Molecular Medicine. *Stem Cells and Aging*. Kyoto, Japan.
Biomedicum Helsinki Seminar. Helsinki, Finland.
ICGEB Conference “Frontiers in Cardiac and Vascular Regeneration.” Trieste, Italy.
II Congreso de la Sociedad Española de Trasplante. Madrid, Spain.
XVIII International Course Clinica Planas. *Advances in Regenerative Medicine*. Barcelona, Spain.
National Council for Scientific and Technological Development. *Insights into the mechanisms underlying vertebrate cardiovascular regeneration*. Sao Paulo, Brazil.
VII Brazilian Congress on Stem Cells and Cell Therapy. *iPS Cells and Aging*. Sao Paulo, Brazil.
Genetics and Genomics of Vascular Disease 2012 Meeting. *Direct generation of vascular progenitors for the treatment of disease*. Asilomar, USA.
2012 UNIST Symposium. *Diseases in a Dish: modeling human genetic disorders using induced pluripotent cells*. Busan, Korea.
2012 UCSD Institute of Genomic Medicine Symposium. *Stem cells as a promising vehicle for gene-therapy*. La Jolla, USA.
Keynote Speaker. 5th Annual USC Stem Cell and Developmental Biology Retreat. Irvine, USA.

2013

Wellcome Trust Rare Disease Workshop. London, UK.
2013 Arnold and Mabel Beckman Conference on Atrophic Macular Degeneration. Irvine, USA.
Keynote Speaker. Proyecto BioBizi de Investigación Sanitaria. *Advances in Stem Cells and Regenerative Medicine*. Bilbao, Spain.
Keynote Speaker. British Society for Gene and Cell Therapy (BSGCT) 2013. *Engineering human somatic and stem cells for cell therapy*. London, UK.
Keynote Speaker. New Frontiers in Molecular and Cellular Therapy. *Strategies for organ and tissue regeneration*. Genoa, Italy.
NIEHS Symposium on Unlocking the Promise of Stem Cells. *Stem Cells and Heart Regeneration*. Research Triangle Park, USA.
2012 Progeria Research Foundation Workshop. Bethesda, USA.
Keynote Speaker. 2013 Inaugural Annual Collaborative Conference, Frontiers in Cell Reprogramming. *Reprogramming and iPSC*. Brisbane, Australia.
Keynote Speaker. *Dedifferentiation, transdifferentiation and reprogramming: paths towards tissue and organ regeneration*. Beijing, China.
10th International Symposium on Stem Cell Therapy and Cardiovascular Innovations. *Cardiovascular applications of iPSCs*. Madrid, Spain.
Keynote Speaker. I Encuentro Hispano-Luso VIVE. Lisbon, Portugal.

18th Congress of the European Hematology Association. *Stem Cells - iPS generation to study hematopoietic malignancies*. Stockholm, Sweden.
 Keynote Speaker. Roche Cardiovascular and Metabolism Stem Cell Symposium. *Reprogramming injury and disease. The many faces of stem cells*. Boston, USA.
 2013 Gordon Conference on Tissue Repair and Regeneration. *Reprogramming towards Heart Regeneration: Stem Cells and Beyond*. New London, USA.
 CIRM Mini-Symposium on Hematopoietic Stem Cells. San Francisco, USA.
 X Congreso AECOM. *Celulas Madre y Medicina Regenerativa*. Barcelona, Spain.
 12th International Congress of Inborn Errors of Metabolism. *Update on Cellular Models*. Barcelona, Spain.
 The 5th International Stem Cell Meeting. *Driving heart repair by promoting a regeneration-competent state*. Jerusalem, Israel.
 7th Stem Cell Clonality and Genome Stability Retreat. *Fanconi Anemia and iPSCs*. Madrid, Spain.
 European Society of Gene and Cell Therapy 2013 Annual Meeting. *Human Gene Editing for Stem Cell Based Therapy*. Madrid, Spain.
 Development, Diseases and Evolution of Endocrine Organs. Mont Ste Odile, France.
 Advances in Geroscience Summit. *Can stem cell models provide new insights on the mechanisms of human aging?* Bethesda, USA.
 Keynote Speaker. 1st Annual Conference of the German Stem Cell Network. *Driving heart repair by promoting a regeneration-competent state*. Berlin, Germany.
 Cell Symposia: Using Stem Cells to Model and Treat Human Disease. *Driving heart repair by promoting a regeneration-competent state*. Los Angeles, USA.
 International Coordination for Large Scale iPSCs Initiatives retreat. Cambridge, United Kingdom
 Epigenetic Control and Cellular Plasticity. *Driving heart repair by promoting a regeneration-competent state*. Irvine, USA.

2014

The 7th Takeda Science Foundation Symposium on PharmaSciences, iPSC Cells in Drug Discovery and Development. *Reprogramming Technologies and Regenerative Medicine*. Osaka, Japan.
 29th Congress of the Spanish National Society of Medicine. *Stem Cells and the Future of Regenerative Medicine*. Malaga, Spain.
 2014 Annual Meeting of the Society for Inherited Metabolic Disorders. *Human iPSC: Promise for Diagnosis, Modeling, Drug Screening and Cell Based Therapies for IEMs*. Asilomar, USA.
 Glenn Laboratories for the Biology of Aging at Stanford Frontiers in Aging Seminar Series. *Modeling of human aging diseases using iPSC cell technology*. Stanford, USA.
 40th annual meeting of the European Society for Blood and Marrow Transplantation. *Reprogramming technologies for a better understanding and treatment of human diseases*. Milan, Italy.
 11th Symposium on Stem Cell Therapy and Cardiovascular Innovations. *The revolution of human organ manufacturing. Will we use pigs as factories of human organs?* Madrid, Spain.
 XXXIX AIEOP National Congress. *Induced Pluripotent Stem Cell in Fanconi Anemia*. Genoa, Italy.
 3rd Congress of the Spanish Society of Transplantation. *Regeneration, Pluripotent Cells and Organ Transplantation*. Valencia, Spain.
 Biology of Aging Colloquium. Woods Hole, USA.
 Atherosclerosis Update Forum 2014. *Regenerative Strategies in Cardiovascular Medicine*. Tokyo, Japan.
 25th European Organ Donation Congress. *Regenerative Medicine in solid organ transplantation: present and future*. Budapest, Hungary.
 Organizer. IX Stem Cell Meeting on the Mesa. La Jolla, USA.
 Organizer. Stem Cells and Immunity. Tenerife, Spain.
 ASN Kidney Week, Advances in Research Conference—Building a Kidney: From Stem Cells to Function. *iPS Cells toward Nephron Progenitors: What Is Next*. Philadelphia, USA.

ASN Kidney Week, Annual Meeting: Basic & Clinical Science Symposia. *Renewable Nephron Progenitors from iPS Cells*. Philadelphia, USA.
Functional Analysis & Screening Technologies Congress. Boston, USA.
Cell Symposia: Stem Cell Energetics. *Regenerative medicine and mitochondrial diseases: cure and prevention*. San Francisco, USA.
Lowe Syndrome Symposium. *In Vitro and In Vivo Strategies in Regenerative Medicine*. London, England.

2015

Molecular Medicine Tri-Con: New Frontiers in Gene Editing. *Preventing transmission of mitochondrial diseases by germline heteroplasmic shift using TALENs*. San Francisco, USA.
Stem Cells, Cancer, Immunology and Aging Congress. *In Vitro and In Vivo Strategies in Regenerative Medicine*. Genoa, Italy.
Kyoto University International Symposium. *In Vivo and In Vitro Regenerative Medicine Strategies*. Kyoto, Japan
Invited Seminar Speaker. Peking University. *In Vivo and In Vitro Regenerative Medicine Strategies*. Beijing, China
Invited Seminar Speaker. UCLA Broad Stem Cell Institute. *In Vivo and In Vitro Strategies in Regenerative Medicine*. Los Angeles, USA
2015 American Transplant Congress. *Blastocyst Complementation to Develop Chimeric Abdominal Organs*. Philadelphia, USA.
Invited Speaker. IGMM Seminar Series. *In vitro and in vivo strategies in regenerative medicine*. Edinburgh, UK.
12th International Symposium on Stem Cell Therapy and Cardiovascular Innovations. *Interspecies manipulation for organ manufacturing. What about the heart?* Madrid, Spain.
52nd ERA-EDTA Congress. *In vivo and in vitro regenerating organ and tissue strategies*. London, UK.

Patents

Induced Pluripotent Stem Cells and Methods of Use
Induced Pluripotent Stem Cell Generation Using Two Factors and p53 Inactivation
Generation of Genetically Corrected Disease-free Induced Pluripotent Stem Cells
Generation of Induced Pluripotent Stem Cells from Cord Blood
Direct Transgeneration of Hematopoietic Progenitor Cells from Mesenchymal Stem Cells
Induced Pluripotent Stem Cells and Methods of Use
Robust and Efficient Differentiation of Human Pluripotent Stem Cells to Multipotent Vascular Progenitors
Progressive Degeneration of Human Neural Stem Cells Caused By Pathogenic LRRK2
Cord Blood-derived Neurons by Expression of SOX2
Generation of Vascular Progenitor Cells
Methods for Reprogramming a Somatic Cell
Methods for Heart Regeneration
Activin/BMP-2 Chimeric Ligands Direct Adipose-Derived Stem Cells to Chondrogenic Differentiation

Research Papers:

1. Lipid composition, fluidity and enzymatic activities of rat liver plasma and mitochondrial membranes in dietary obese rats.
Izpisua JC, Barber T, Cabo J, Hrelia S, Rossi CA, Parenti Castelli G, Lercker G, Biagi PL, Bordoni A, Lenaz G.
Int. J. Obesity (1989) 13:531-542.
2. Effect of a hyperlipidic diet on lipid composition, fluidity, and $Na^+-K^+-ATPase$ activity of rat erythrocyte membranes.
Bordoni A, Biagi PL, Parenti Castelli G, Hrelia S, Rossi CA, Lercker G, Izpisua JC, Barber T, Cabo J, a Lenaz G.
Membrane Biochem. (1989) 8:11-18.
3. Coordinate expression of the murine Hox-5 complex homeobox-containing genes during limb pattern formation.
Dollé, P., Izpisua Belmonte, J. C., Falkenstein, H., Renucci, A. and Duboule, D.
Nature (1989) 342:767-772.
4. Primary structure and embryonic expression pattern of the mouse Hox-4.3 homeobox gene.
Izpisua-Belmonte, J.C., Dollé, P., Renucci, A., Zappavigna, V., Falkenstein, H. and Duboule, D.
Development (1990) 110:733-745.
5. Expression of the homeobox Hox-4 genes and the specification of position in chick wing development.
Izpisua Belmonte, J.C., Tickle, C., Dollé, P., Wolpert, L. and Duboule, D.
Nature (1991) 350:585-589.
6. Murine genes related to the *Drosophila AbdB* homeotic genes are sequentially expressed during development of the posterior part of the body.
Izpisua Belmonte, J.C., Falkenstein, H., Dollé, P., Renucci, A. and Duboule, D.
EMBO J. (1991) 10:2279-2289.
7. HOX4 genes encode transcription factors with potential auto- and cross-regulatory capacities.
Zappavigna, V., Renucci, A., Izpisua Belmonte, J. C., Urier, G., Peschle, C. and Duboule, D.
EMBO J. (1991) 10:4177-4187.
8. HOX-4 genes and the morphogenesis of mammalian genitalia.
Dollé, P., Izpisua Belmonte, J. C., Brown, J., Tickle, C. and Duboule, D.
Genes Dev. (1991) 5:1767-1776.
9. The Hox-4.8 gene is localized at the 5' extremity of the HOX-4 complex and is expressed at the posterior end of the body during development.
Dollé, P., Izpisua Belmonte, J. C., Boncinelli, E. and Duboule, D.
Mech. Dev. (1991) 36(1-2):3-13.
10. HOX-4 genes and the molecular basis of vertebrate limb pattern formation.
Izpisua Belmonte, J. C., Tickle, C., Dollé, P. and Duboule, D.
Seminars in Dev. Biol. (1991) 2:385-391.
11. The misexpression of posterior HOX-4 genes in *talpid (ta3)* mutant wings correlates with the absence of anteroposterior polarity.
Izpisua Belmonte, J. C., Ede, D., Tickle, C. and Duboule, D.
Development (1992) 114:959-963.
12. Expression of HOX-4 genes in the chick wing links pattern formation to the epithelial-mesenchymal interactions that mediate growth.
Izpisua Belmonte, J.C., Brown, J.M., Duboule, D. and Tickle, C.
EMBO J. (1992) 11:1451-1457.
13. Comparison of mouse and human HOX-4 complexes defines conserved sequences involved in the regulation of Hox-4.4.

- Renucci, A., Zappavigna, V., Zakany, J., Izpisua Belmonte, J. C., Bürki, K. and Duboule, D. **EMBO J.** (1992) 11:1459-1468.
14. HOX-4 gene expression in mouse/chicken heterospecific grafts of signaling regions to limb buds reveals similarities in patterning mechanisms.
Izpisua Belmonte, J. C., Brown, J. M., Crawley, D., Duboule, D. and Tickle, C. **Development** (1992) 115:553-560.
 15. The murine even-skipped-like gene *Evx-2* is closely linked to the Hox-4 complex, but is transcribed in the opposite direction.
Bastian, H., Gruss, P., Duboule, D. and Izpisua Belmonte, J.C. **Mammalian Genome** (1992) 3:241-243.
 16. Homeobox genes and pattern formation in the vertebrate limb.
Izpisua-Belmonte, J. C. and Duboule, D. **Dev. Biol.** (1992) 152:26-36.
 17. Targeted misexpression of Hox-4.6 in the avian limb bud causes apparent homeotic transformations.
Morgan, B., Izpisua Belmonte, J. C., Duboule, D. and Tabin C. **Nature** (1992) 358:236-239.
 18. The homeobox gene *gooseoid* and the origin of organizer cells in the early chick blastoderm.
Izpisua Belmonte, J. C., De Robertis, E., Storey, K. and Stern, C. **Cell** (1993) 74:645-659.
 19. Hox genes and the morphogenesis of the vertebrate limb.
Dollé, P., Izpisua Belmonte, J.C., Brown, J., Tickle, C. and Duboule, D. **Prog. Clin. Biol. Res.** (1993) 383A:11-20.
 20. Reconstruction from serial sections: a tool for developmental biology. Application to Hox genes expression in chicken wing buds.
Olivo, J., Izpisua Belmonte, J. C., Tickle, C., Boulin, C. and Duboule, D. **BioImaging** (1993) 1:115-158.
 21. Expression of the zebrafish gene *hlx-1* in the prechordal plate and during CNS development.
Fjose, A., Izpisua Belmonte, J. C., Fromental, C. and Duboule, D. **Development** (1994) 120:71-81.
 22. Expression of genes encoding bone morphogenetic proteins and sonic hedgehog in Talpid (*ta3*) limb buds: their relationships in the signaling cascade involved in limb patterning.
Francis-West, P. H., Robertson, K., Ede, D. A., Rodriguez, C., Izpisua Belmonte, J.C., Houston, B., Burt, D. W., Gribbin, C., Brickell, P. M. and Tickle, C. **Dev. Dynamics** (1995) 203:187-197.
 23. Fibroblast Growth Factors induce additional limb development from the flank of chick embryos.
Cohn, M., Izpisua Belmonte, J. C., Abud, H., Heath, J. K. and Tickle, C. **Cell** (1995)80:739-746.
 24. Mouse embryos lacking RXRa are resistant to retinoic-acid-induced limb defects.
Sucov, H., Izpisua Belmonte, J. C., Gañan, Y. and Evans R. **Development** (1995) 121:3997-4003.
 25. Gene expression, polarizing activity and skeletal patterning in reaggregated hind limb mesenchyme.
Hardy, A., Richardson, M. K., Philippa, H., Francis-West, P. H., Rodriguez, C., Izpisua Belmonte, J. C., Duprez, D. and Wolpert, L. **Development** (1995) 121:4329-4337.
 26. Dorsal cell fate specified by chick *Lmx1* during vertebrate limb development.
Vogel, A., Rodriguez, C., Warnken W. and Izpisua Belmonte, J. C. **Nature** (1995) 378:716-720.
 27. Evidence that *Shh* cooperates with a retinoic acid inducible co-factor to establish ZPA-like activity.
Ogura, T., Alvarez, S., Vogel, A., Rodriguez, C., Evans, R. and Izpisua Belmonte, J.C.

- Development** (1996) 122:537-542.
28. Teleost *HoxD* and *HoxA* genes: comparison with tetrapods and functional evolution of the *HOXD* complex.
Van der Hoeven, F., Sordino, P., Fraudeau, N., Izpisua Belmonte, J.C. and Duboule, D.
Mech. Dev. (1996) 54:9-21.
 29. Involvement of FGF-8 in initiation, outgrowth, and patterning of the vertebrate limb.
Vogel, A., Rodriguez, C. and Izpisua Belmonte, J. C.
Development (1996) 122:1737-1750.
 30. The limb field mesoderm determines initial limb bud anteroposterior asymmetry and budding independent of *sonic hedgehog* or apical ectodermal gene expressions.
Ros, M., Lopez Martinez, A., Simandl, B. K., Rodriguez, C., Izpisua Belmonte, J. C., Dahn, R. and Fallon, J.
Development (1996) 122:2319-2330.
 31. *Shh*, *HoxD*, *Bmp-2*, and *Fgf-4* gene expression during development of the polydactylous *talpid2*, *diplopodia1*, and *diplopodia4* mutant chick limb buds.
Rodriguez, C., Kos, R., Macias, D., Abbott, U. K. and Izpisua Belmonte, J. C.
Dev. Genetics (1996) 19:26-32.
 32. Radical *fringe* positions the apical ectodermal ridge at the dorsoventral boundary of the vertebrate limb.
Rodriguez-Esteban, C., Schwabe, J.W.R., De La Peña, J., Foys, B., Eshelman, B. and Izpisua Belmonte, J.C.
Nature (1997) 386:360-366.
 33. Segregating expression domains of two gooseoid genes during the transition from gastrulation to neurulation in chick embryos.
Lemaire, L., Röser, T., Izpisua Belmonte, J. C. and Kessel, M.
Development (1997) 124:1443-1452.
 34. *Crescent*, a novel chick gene encoding a Frizzled-like Cysteine-Rich Domain, is expressed in anterior regions during early embryogenesis.
Pfeffer, P., De Robertis, E. and Izpisua Belmonte, J. C.
Int. J. Dev. Biol. (1997) 41(3):449-458.
 35. Outgrowth and patterning of the vertebrate limb.
Schwabe, J.W.R., Rodriguez-Esteban, C., De La Peña, J., Tavares, A., Ng, J., Banayo, E.M., Foys, B., Eshelman, B., Magallon, J., Tam, R. and Izpisua Belmonte, J.C.
Cold Spring Harbor Symposia on Biology, (1997) Vol. LXII, pp. 431-435.
 36. *Gooseoid* misexpression alters the morphology and Hox gene expression of the developing chick limb bud.
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