

IRB BARCELONA 2011 ANNUAL REPORT

Research Programmes

MOLECULAR MEDICINE

Antonio Zorzano: Heterogenic and polygenic diseases



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Highlights

- The nuclear cofactor DOR participates in osteoblast differentiation through the activation of thyroid hormones.
- Endoplasmic Reticulum (ER) stress induces an early increase in mitochondrial metabolism that is critically dependent on mitochondria-ER coupling and Ca²⁺ transfer.
- The macrophage molecule CD14 modulates the inflammatory activity and insulin resistance of adipose tissue.

Publications

- Resmini E, Morte B, Soriano E, Gallardo E, de Luna N, Illa I, Zorzano A, Bernal J and Webb SM. **Identification of novel GH-regulated genes in C2C12 cells** Horm Metab Res, **43**, 919-30 (2011)
- Fernández-Real JM, Pérez del Pulgar S, Luche E, Moreno-Navarrete JM, Waget A, Serino M, Soriano E, Sánchez-Pla A, Pontaque FC, Vendrell J, Chacón MR, Ricart W, Burcelin R and Zorzano A. **14 modulates inflammation-driven insulin resistance** Diabetes, **60**, 2179-86 (2011)
- Muñoz JP and Zorzano A. **Endoplasmic reticulum stress enters a Nogo zone** Sci Transl Med, **3**, 88ps26 (2011)
- Bravo R, Vicencio JM, Parra V, Troncoso R, Muñoz JP, Bui M, Quiroga C, Rodríguez AE, Verdejo HE, Ferreira J, Iglewski M, Chiong M, Simmen T, Zorzano A, Hill JA, Rothermel BA, Szabadkai G and Lavandro S. **Increased ER-mitochondrial coupling promotes mitochondrial respiration and bioenergetics during early phases of ER stress** J Cell Sci, **124**, 2143-52 (2011)
- Linares GR, Xing W, Burghardt H, Baumgartner B, Chen ST, Ricart W, Fernández-Real JM, Zorzano A, Mohan S. **Role of diabetes- and obesity-related protein in the regulation of osteoblast differentiation** Am J Physiol Endocrinol Metab, **301**, E40-8 (2011)
- Kowalczyk L, Ratera M, Paladino A, Bartocioni P, Errasti-Murugarren E, Valencia E, Portella G, Bial S, Zorzano A, Fita I, Orozco M, Carpena X, Vázquez-Ibar JL and Palacín M. **Molecular basis of substrate-induced permeation by an amino acid antiporter** Proc Natl Acad Sci U S A, **108**, 3935-40 (2011)

PhD Theses

- Effects of protein mitofusin 2 on muscle metabolism. Jessica Segalés, University of Barcelona (2011). Thesis Director: Antonio Zorzano. Honors: Cum Laude
- Role Mitofusin 2 and mitochondrial metabolism in obesity and type 2 diabetes. Maria Isabel Hernández Álvarez, University of Barcelona (2011). Thesis Director: Antonio Zorzano. Honors: Cum Laude
- Rol of DOR in autophagy. Caroline Mauvezin, University of Barcelona (2011). Thesis Director: Antonio Zorzano. Honors: Cum Laude
- Unraveling the metabolic significance of the nuclear receptor co-activator RAP250. Sonia Pereira da Veiga, University of Barcelona (2011). Thesis Director Antonio Zorzano. Honors: Cum Laude.
- DOR and Tp53inp1 are dual regulators of autophagy and transcription. Ana Sancho, University of Barcelona (2011). Thesis Director: Antonio Zorzano. Honors: Cum Laude.

Research projects

- Determinantes genéticos de las alteraciones metabólicas de la obesidad y diabetes de tipo 2. Proyectos de investigación fundamental (SAF2008-03803). Spanish Ministry of Science and Innovation (MICINN). 2009-2013. Principal investigator: Antonio Zorzano
- Grup d'estudi de les bases moleculars de patologies associades a transportadors de membrana (Genexartis: patologia i terapia molecular en enfermetats heterogèniques y poligèniques). Grups de Recerca reconeguts per la Generalitat de Catalunya 2009-2013 (2009 SGR 915) Agency for Administration of University and Research Grants (AGAUR). Principal investigator: Antonio Zorzano
- Centro de Investigación Biomédica en Red de Diabetes y Enfermedades Metabólicas Asociadas (CIBERDEM), Heterogenic and polygenic disease- Genexartis. Carlos III Health Institute (ISCIII). 2007-open. Principal investigator: Antonio Zorzano
- Integration of the system models of insulin signalling and of mitochondrial function and its application in the study of complex diseases (MITIN). FP7- Cooperation-Health-2007. European Commission (223450). 2008-2011. Principal investigator and consortium coordinator: Antonio Zorzano
- Rol potencial dels components de la dieta mediterrània en els tractaments de l'obesitat, la diabetis i les hiperlipidèmies. Accions de cooperació en el marc de la Comunitat de Treball dels Pirineus-CTP-DGR (2009 CTP 00003). Agency for Administration of University and Research Grants (AGAUR). 2010-2011. Principal investigator: Antonio Zorzano
- Transnational cooperation for technological innovation in the development of molecules for the treatment of diabetes and obesity. Research Project Interreg IV-SUDOE (SOE/P1/E178). SUDOE-FEDER. 2009-2011. Principal investigator and consortium coordinator: Antonio Zorzano

Collaborations

- *Expression of genes in human adipose tissue*, Joan Vendrell, Hospital Joan XXIII (Tarragona, Spain)
- *Functional analysis of adipose cell proteins*, José Manuel Fernández-Real, Hospital Trueta (Girona, Spain)
- *Generation of a screening platform*, Fernando Albericio, IRB Barcelona (Barcelona, Spain); Mabel Loza, Univesidad Santiago de Compostela (Santiago de Compostela, Spain)
- *Molecular and physiological effects of lifestyle factors on diabetes/obesity*, John Nolan, Steno Diabetes Center (Gentofte, Denmark)
- *Structural analysis of DOR protein*, Sandra Macedo Ribeiro, Institute for Molecular and Cell Biology (Porto, Portugal)



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