Marta Gonzalez-Freire PhD

BIOMEDICAL SCIENTIST

Miguel Servet Investigator. Health Research Institute of the Balearic Islands (IdISBa). Principal Investigator Translational Research in Aging and Longevity group (TRIAL group).

A. PERSONAL STATEMENT

Over the last decade, the major focus of my research has been focused on the molecular and cellular processes behind human aging. During my PhD, I obtained a M.S. in Physical Activity and Health (2007), and after that, in 2013 a M.S. in Genetics and Cellular Biology to improve my knowledge in molecular biology. During the latter part of my doctoral work (October 2012, PhD in Exercise Physiology), I became increasingly interested in identifying the molecular and cellular processes that account for the changes in the skeletal muscle and blood cells that occur during aging. To further my goal of investigating the biology of aging processes, I began a postdoctoral position in Biology of Aging with Dr. Luigi Ferrucci and Rafael de Cabo, at the National Institutes of Health (NIH) in the National Institute on Aging (NIA) in October 2013, in Baltimore, Maryland, USA. Being at the NIH for almost 6 years was an excellent training to study the mechanisms behind aging. During 2018-2019 I had the opportunity to work as a visiting professor at the Institute on Aging, College of Medicine, at the University of Florida.

Currently, since 2020, I am a principal Investigator, and director of the Translational Research in Aging and Longevity Group (TRIAL group), at the Health Research Institute of the Balearic Islands (IdISBa)- National Health Research Institute Carlos III (Palma de Mallorca, Spain) where we are conducting the Balearic Longitudinal Study of Aging, and several projects focused on developing interventions (pharmacological and non-pharmacological), that target the main hallmarks of aging, both in animal models and humans.

B. POSITIONS AND HONORS

Positions and Employment

01/2020-to date: Miguel Servet Investigator. Instituto de Salud Carlos III (ISCIII). Principal Investigator TRIAL group. Health Research Institute of the Balearic Islands.

10/2020- to date: Associate Professor. Illes Balears University (UIB, Palma de Mallorca, Spain).

02/2019- 01/2020: Professor Exercise Physiology. Isabel I de Burgos University. Spain.

10/2019-12/2019: Visiting Fellow. Center on Aging. University of Florida. College of Medicine. Gainesville, Florida. United States.

10/2013 – 05/2019: Postdoctoral Fellowship. National Institute on Aging (NIA). NIH. Baltimore (Maryland)

9/2017-12/2017: Visiting Fellow. Center on Muscle Biology. University of Kentucky College of Health Sciences. Kentucky, United States.

01/2013 - 09/2013: M.S Fellow. Biological Research Center (Centro de Investigaciones Biológicas –CIB, CSIC). Madrid, Spain.

06/2010 - 06/2011: Lecturer High Paralympic Performance. MSc Specific Educational Needs. Vigo University. Galicia. Spain

09/2010 - 09/2013: Assistant Professor Physical Activity and Cancer. MSc Physical Activity and Health. A Coruña University. Galicia. Spain

09/2010 - 12/2011: Sports Training Consultant. Spanish Sports Committee for the Development of Official Sports Training Courses for the Spanish Government. Spanish Surfing Federation. Spanish Sports Council. Madrid. Spain.

09/2009 - 09/2012: Exercise Physiologist. London Paralympic Games 2012. Spanish Paralympic Committee. Spanish Sports Council. Madrid. Spain.

09/2009 - 06/2010: Lecturer Genetics and Exercise. MSc Physical Activity and Health. European University of Madrid. Faculty of Health Sciences. Madrid. Spain

09/2008 - 09/2009: Associate Professor Exercise Physiology. BSc Physiotherapy, European University of Madrid. Faculty of Health Sciences. Madrid. Spain

02/2009 - 08/2009: Visiting Fellow. Human Performance Laboratory. Las Palmas de Gran Canaria University. Gran Canaria. Spain.

01/2008 - 01/2010: Ph.D. Fellowship Instituto de Salud Carlos III. (ISCIII). Madrid. Spain

03/2007 - 12/2007: Ph.D. Fellowship Spanish Sports Council (Consejo Superior de Deportes, CSD). Madrid. Spain

01/2006 - 07/2006: Full time research trainee. Faculty of Physical Activity and Sport. A Coruña University, Galicia, Spain.

C. CONTRIBUTIONS TO SCIENCE (Peer reviewed publications: 69; Citations: 4471 *h*-index=41)

1. **Genetics and Sport Performance.** My early publications directly addressed the fact that sport performance could be determined by genetic factors and if this could explain individual variations in human endurance phenotypic traits and determine the muscle power and endurance phenotypes not only in elite athletes (word-class and Olympic) but also in health non-athletic population. We found that many elite athletes had a favorable genetic endowment together with exceptional environmental factors (i.e. years of altitude living and training) that help to achieve the highest possible level of sport performance. We did not observe an association between having a preferable polygenic profile and medals won in World and National Championships. But in general, we observed that elite athletes tend to have a more "favorable" polygenic profile than the general population. These findings could also argue against the idea that genetic endowment differentiates athletic champions from elite, yet less accomplished athletes. In contrast, we cannot discard the fact that, overall, elite athletes are endowed with a more "favorable" polygenic profile than the general population.

   - **Gonzalez-Freire, M**., Santiago, C., Verde, Z., Lao, J. I., Oiivan, J., Gómez-Gallego, F., & Lucia, A. (2009). Unique among unique. Is it genetically determined? British Journal of Sports Medicine, 43(4), 307–309. doi:10.1136/bjsm.2008.049809.

- Gómez-Gallego, F., Santiago, C., **Gonzalez-Freire, M**., Muniesa, C. A., Fernández Del Valle, M., Pérez, M., et al. (2009). Endurance performance: genes or gene combinations? International Journal of Sports Medicine, 30(1), 66–72. doi:10.1055/s-2008-1038677.

- Ruiz, J. R., Gómez-Gallego, F., Santiago, C., **Gonzalez-Freire, M.,** Verde, Z., Foster, C., & Lucia, A. (2009). Is there an optimum endurance polygenic profile? The Journal of Physiology, 587(Pt 7), 1527–1534. doi:10.1113/jphysiol.2008.166645.

- Lucia, A., Oliván, J., Bravo, J., **Gonzalez-Freire, M.,** & Foster, C. (2008). The key to top-level endurance running performance: a unique example. British Journal of Sports Medicine, 42(3), 172–4–174. doi:10.1136/bjsm.2007.040725.

- Dopico X, Iglesias-Soler E, Carballeira E, Mayo X, Arda A and **Gonzalez-Freire M** (2014). The relationship between motoric dominance and functional dominance while executing judo techniques: a study on laterality. Archives of Budo 2014.

2. **Genetics and disease and aging.** In addition to the contributions described above, we also hypothesized if some of that genetic variations (particularly mutations in the myostatin gene, MSTN or GDF8 a negative regular of muscle mass) could affect the clinical manifestation of patients with McArdle disease (a metabolic disorder, also known as muscle phosphorylase deficiency and therefore these patients cannot break down glycogen in the muscles) and also the age-related sarcopenia. We found that carriers of the variant K153R in the GDF8 gene had a lower peak cardiorespiratory capacity in woman with McArdle disease and the clinical severity was higher. We also found that this mutation in homozygosis was associated with a lower muscle capacity and muscle quality in women nonagerians. Finally we also showed that in McArdle disease exercise could be a good therapy to improve the clinical manifestation of this disease.

   - **Gonzalez-Freire, M**., Rodríguez-Romo, G., Santiago, C., Bustamante-Ara, N., Yvert, T., Gómez-Gallego, F., et al. (2010). The K153R variant in the myostatin gene and sarcopenia at the end of the human lifespan. Age (Dordrecht, Netherlands), 32(3), 405–409. Doi:10.1007/s11357-010-9139-7.

   - **Gonzalez-Freire, M**., Santiago, C., Gómez-Gallego, F., Pérez, M., Foster, C., Arenas, J., & Lucia, A. (2009). Does the K153R variant of the myostatin gene influence the clinical presentation of women with McArdle disease? Neuromuscular Disorders: NMD, 19(3), 220–222. doi:10.1016/j.nmd.2009.01.001.

   - Pérez, M., Foster, C., **Gonzalez-Freire, M.,** Arenas, J., & Lucia, A. (2008). One-year follow-up in a child with McArdle disease: exercise is medicine. Pediatric Neurology, 38(2), 133–136. doi:10.1016/j.pediatrneurol.2007.10.005.

3. **Biology of Aging. Age-related sarcopenia. Aging and multimorbidity.** Aging is associated with a progressive loss of muscle mass and strength and a decline in neurophysiological functions. Circulating factors may provide clues on the mechanisms for decline in muscle quality with aging. Characterizing the metabolic profile associated with reduced muscle quality in older persons could have important translational implications for the early identification of subjects at high risk of developing sarcopenia and the identification of targets for new preventive strategies and treatments. Aging is characterized by rising susceptibility to development of multiple chronic diseases and, therefore, representing the major risk factor for multimorbidity. For example, it has been shown that excessively elevated resting metabolic rate (RMR) for persons of a certain age, sex, and body composition is a mortality risk factor. In fact we have demonstrated using data from the BLSA, that RMR could predict future higher multimorbidity in older adults and may be used as early biomarker of health deterioration. Finally, mitochondrial dysfunction has long been considered a major contributor to aging and age-related diseases playing a key role in the pathophysiology of aging or in the earlier stages of some events that lead to the aging phenotype

- Torrens-Mas, M.; Navas-Enamorado, C.; Wahl, D.; Sanchez-Polo, A.; Picca, A.; Oliver, J.; Roca, P.; **Gonzalez-Freire, M.** Sex Specific Differences in Response to Calorie Restriction in Skeletal Muscle of Young Rats. Nutrients 2022, 14, 4535. https://doi.org/10.3390/nu14214535

- Saini SK, Singh A, Saini M, **Gonzalez-Freire M,** Leeuwenburgh C, Anton SD. Time-Restricted Eating Regimen Differentially Affects Circulatory miRNA Expression in Older Overweight Adults. Nutrients. 2022 Apr 28;14(9):1843. doi: 10.3390/nu14091843. PMID: 35565812; PMCID: PMC9100641.

- Torrens-Mas M, Perelló-Reus C, Navas-Enamorado C, Ibargüen-González L, Sanchez-Polo A, Segura-Sampedro JJ, Masmiquel L, Barcelo C, **Gonzalez-Freire M.** Organoids: An Emerging Tool to Study Aging Signature across Human Tissues. Modeling Aging with Patient-Derived Organoids. Int J Mol Sci. 2021 Sep 29;22(19):10547. doi: 10.3390/ijms221910547. PMID: 34638891; PMCID: PMC8508868.

- Torrens-Mas, M.; Perello-Reus, C.; Navas-Enamorado, C.; Ibargüen, L.; Sanchez -Polo, A.; Segura-Sampedro, J.J.; Masmiquel, L.; Barcelo, C.; **Gonzalez-Freire, M**. Organoids: An Emerging Tool To Study Aging Signature Across Human Tissues. Modeling Aging With Patient-derived Organoids.

- **Gonzalez-Freire, M**., Moore, A. Z., Peterson, C. A., Kosmac, K., McDermott, M. M., Sufit, R. L., Guralnik, J. M., Polonsky, T., Tian, L., Kibbe, M. R., Criqui, M. H., Li, L., Leeuwenburgh, C., & Ferrucci, L. (2020). Associations of Peripheral Artery Disease With Calf Skeletal Muscle Mitochondrial DNA Heteroplasmy. Journal of the American Heart Association, 9(7), e015197. https://doi.org/10.1161/JAHA.119.015197

- **Gonzalez-Freire, M.,** Diaz-Ruiz, A., Hauser, D., Martinez-Romero, J., Ferrucci, L., Bernier, M., & de Cabo, R. (2020). The road ahead for health and lifespan interventions. Ageing research reviews, 59, 101037. https://doi.org/10.1016/j.arr.2020.101037

- Ferrucci L, **Gonzalez-Freire M**, Fabbri E, et al. Measuring biological aging in humans: A quest. Aging Cell. 2019;00:e13080. https ://doi.org/10.1111/acel.13080

- Ubaida-Mohien, C., **Gonzalez-Freire, M.,** Lyashkov, A., Moaddel, R., Chia, C., Simonsick, E., ... & Ferrucci, L. (2019). Physical Activity Associated Proteomics of Skeletal Muscle: Being Physically Active in Daily Life May Protect Skeletal Muscle From Aging. *Frontiers in Physiology*, *10*, 312.

- Ubaida-Mohien, C., Lyashkov, A., **Gonzalez-Freire, M**., Tharakan, R., Shardell, M., Moaddel, R., ... & Ferrucci, L. (2019). Discovery proteomics in aging human skeletal muscle finds change in spliceosome, immunity, proteostasis and mitochondria. *eLife*, *8*.

- Tanaka T, Biancotto A, Moaddel R, Moore AZ, **Gonzalez-Freire M**, Aon MA, Candia J, Zhang P, Cheung F, Fantoni G; CHI consortium, Semba RD, Ferrucci L. Plasma proteomic signature of age in healthy humans. Aging Cell. 2018 Jul 11:e12799. doi: 10.1111/acel.12799.

- Semba RD, **Gonzalez-Freire M,** Moaddel R, Sun K, Fabbri E, Zhang P, Carlson OD, Khadeer M, Chia CW, Salem N Jr, Ferrucci L. Altered Plasma Amino Acids and Lipids Associated with Abnormal Glucose Metabolism and Insulin Resistance in Older Adults. J Clin Endocrinol Metab. 2018 Jun 26. doi: 10.1210/jc.2018-00480.

- **Gonzalez-Freire M**, Adelnia F, Moaddel R, Ferrucci L. Searching for a mitochondrial root to the decline in muscle function with ageing. J Cachexia Sarcopenia Muscle. 2018 Jun;9(3):435-440. doi: 10.1002/jcsm.12313. Epub 2018 May 18.

- **Gonzalez-Freire M,** Scalzo P, D'Agostino J, et al. (2018) Skeletal muscle ex vivo mitochondrial respiration parallels decline in vivo oxidative capacity, cardiorespiratory fitness, and muscle strength: The Baltimore Longitudinal Study of Aging. Aging Cell. 2018;e12725.

- **Gonzalez-Freire M,** Moaddel R, Sun K, Fabbri E, Zhang P, Khadeer M, Salem N, Ferrucci L and Semba RD. Targeted Metabolomics Shows Low Plasma Lysophosphatidylcholine 18:2 Predicts Greater Decline of Gait Speed in Older Adults: the Baltimore Longitudinal Study of Aging. J Gerontol Biol Med Sci, 2018

- **Gonzalez-Freire M**, Semba RD, Ubaida-Mohien C, Fabbri E, Scalzo P, Højlund K, Dufresne C, Lyashkov A and Ferrucci L. (2017) The Human Skeletal Muscle Proteome Project: a reappraisal of the current literature. *J Cachexia Sarcopenia Muscle* 2017.

- Fabbri E, Chiles Shaffer N, **González-Freire M**, Shardell MD, Zoli M, Studenski SA, et al. Early body composition, but not body mass, is associated with future accelerated decline in muscle quality. J Cachexia Sarcopenia Muscle. 2017.

- Semba RD, Zhang P, Zhu M, **Gonzalez-Freire M,** Moaddle R, Geng-Spyropoulos M and Ferrucci L (2017). A targeted proteomic assay for the measurement of plasma proteoforms related to human aging phenotypes. *Proteomics* 2017.

- Mercken EM, CapriM, Carboneau BA, Conte M, Heidler J, Santoro A, Martin- Montalvo A, **Gonzalez-Freire M**, Khraiwesh H, Gonzalez Reyes JA, Moaddel R, Zhang Y, Becker KG, Mattison JA, Wittig I, Francesch and de Cabo R. Conserved and species-specific molecular denominators in mammalian skeletal muscle aging. Aging and Mechanism of disease **2017**.

- Moaddel R, Fabbri E, Khadeer MA, Carlson OD, **González-Freire M**, Zhang P, et al. (2016) Plasma Biomarkers of Poor Muscle Quality in Older Men and Women from the Baltimore Longitudinal Study of Aging. *J Gerontol A Biol Sci Med Sci*. 2016.

- White SH, McDermott MM, Sufit RL, Kosmac K, Bugg AW, **Gonzalez-Freire M,** et al. (2016) Walking performance is positively correlated to calf muscle fiber size in peripheral artery disease subjects, but fibers show aberrant mitophagy: an observational study. J Transl Med. **2016.**

- Fabbri E, Chia CW, Spencer RG, Fishbein KW, Reiter DA, Cameron D, **Gonzalez-Freire M** et al (2016) Insulin Resistance is Associated with Reduced Mitochondrial Oxidative Capacity Measured by 31P Magnetic Resonance Spectroscopy in Non-Diabetic Participants from the Baltimore Longitudinal Study of Aging. Diabetes. 2016.

- Fabbri E, An Y, **González-Freire M**, Zoli M, Maggio M, Studenski SA, et al. Bioavailable Testosterone Linearly Declines Over A Wide Age Spectrum in Men and Women From The Baltimore Longitudinal Study of Aging. *J Gerontol A Biol Sci Med Sci.* 2016.

- **Gonzalez-Freire, M**., de Cabo, R., Bernier, M., Sollott, S. J., Fabbri, E., Navas, P., & Ferrucci, L. (2015). Reconsidering the Role of Mitochondria in Aging. *The Journals of Gerontology. Series a, Biological Sciences and Medical Sciences*. doi:10.1093/gerona/glv070.

- **Gonzalez-Freire, M**., de Cabo, R., Studenski, S. A., & Ferrucci, L. (2014). The Neuromuscular Junction: Aging at the Crossroad between Nerves and Muscle. *Frontiers in Aging Neuroscience*, *6*, 208. doi:10.3389/fnagi.2014.00208.

- Fabbri, E., An, Y., Schrack, J. A., **Gonzalez-Freire, M**., Zoli, M., Simonsick, E. M., et al. (2014). Energy Metabolism and the Burden of Multimorbidity in Older Adults: Results From the Baltimore Longitudinal Study of Aging. *The Journals of Gerontology. Series a, Biological Sciences and Medical Sciences*. doi:10.1093/gerona/glu209

4. **Essential amino acids, choline, and child stunting**. We examined the relationship between circulating amino acids, biogenic amines, glycerophospholipids, and sphingolipids with both linear growth failure and environmental enteric dysfunction in over 300 children from rural Malawi using proteomic and metabolomic platforms. Our studies showed that child stunting was associated with low serum concentrations of all nine essential amino acids (a) and with low

serum choline (b). In addition, environmental enteric dysfunction was associated with low serum tryptophan, an essential amino acid, low citrulline, a marker for small bowl enterocyte mass, and low glycerophospholipids and sphingolipids

- Semba RD, **González-Freire M**, Moaddel R, Trehan I, Maleta KM, Khadeer M, et al. (2016) Environmental Enteric Dysfunction is Associated with Altered Bile Acid Metabolism. *J Pediatr Gastroenterol Nutr.* 2016

- Semba RD, Zhang P, **Gonzalez-Freire M**, Moaddel R, Trehan I, Maleta KM, Ordiz MI, Ferrucci L, Manary MJ. (2016) The association of serum choline with linear growth failure in young children from rural Malawi. Am J Clin Nutr 2016 Jun 8. pii: ajcn129684

- **Richard Semba & Marta Gonzalez-Freire** (2017). Metabolomics and proteomics: Methodological advances to increase our knowledge of the biology during the first 1,000 days. The Biology Behind the First 1,000 Days of Life. CRC press 2017. Taylor and Francis Group (Book Chapter)

5. **COVID-19**. COVID-19 has a rather heterogenous presentation. While many patients remain asymptomatic carriers, others can show a wide array of symptoms, from mild flu-like manifestations such as dry cough, phlegm, myalgia or diarrhea, to severe pneumonia or even acute respiratory distress syndrome. The exact pathobiology responsible for severe and critically ill cases is still not clear. It has been proposed that a hyperinflammatory syndrome may play a central role in the progression from mild to severe or critical COVID-19. Inflammatory factors are likely involved in this process and could become biomarkers of disease progression in the near future. We aimed to describe the clinical characteristics and epidemiological features of severe (non-ICU) and critically patients (ICU) with COVID-19 at triage, prior to hospitalization. We found that critically ill patients with COVID-19 present lymphopenia, hypoalbuminemia and high levels of inflammation.

   - Torrens-Mas M, Perelló-Reus CM., Trias-Ferrer N, Ibargüen-González L, Crespí C, Galmes-Panades AM, Navas-Enamorado C, Sanchez-Polo A, Piérola-Lopetegui J, Masmiquel L, Socias L, Barcelo C, **Gonzalez-Freire M**. GDF15 and ACE2 stratify COVID-19 patients according to severity while ACE2 mutations increase infection susceptibility . Front in Cell and Infect Microbiol. 2022. 10.3389/fcimb.2022.942951

   - de la Rica, R., Borges, M., Aranda, M., Del Castillo, A., Socias, A., Payeras, A., Rialp, G., Socias, L., Masmiquel, L., & **Gonzalez-Freire, M.** (2020). Low Albumin Levels Are Associated with Poorer Outcomes in a Case Series of COVID-19 Patients in Spain: A Retrospective Cohort Study. Microorganisms, 8(8), E1106. https://doi.org/10.3390/microorganisms8081106

   - Russell, S. M., Alba-Patiño, A., Barón, E., Borges, M., **Gonzalez-Freire, M**., & de la Rica, R. (2020). Biosensors for Managing the COVID-19 Cytokine Storm: Challenges Ahead. ACS sensors, 5(6), 1506–1513. https://doi.org/10.1021/acssensors.0c00979

   - de la Rica R, Borges M and **Gonzalez-Freire M** (2020) COVID-19: In the Eye of the Cytokine Storm. Front. Immunol. 11:558898. doi: 10.3389/fimmu.2020.558898

   - Vaquer A, Alba-Patiño A, Adrover-Jaume C, Russell SM, Aranda M, Borges M, Mena J, Del Castillo A, Socias A, Martín L, Arellano MM, Agudo M, **Gonzalez-Freire M**, Besalduch M, Clemente A, Barón E, de la Rica R. Nanoparticle transfer biosensors for the non-invasive detection of SARS-CoV-2 antigens trapped in surgical face masks. Sens Actuators B Chem. 2021 Oct 15;345:130347. doi: 10.1016/j.snb.2021.130347.

Complete List of Published Work in MyBibliography (67)

https://www.ncbi.nlm.nih.gov/myncbi/marta.gonzalez%20freire.2/bibliography/public/

https://pubmed.ncbi.nlm.nih.gov/?term=Gonzalez-Freire+M&sort=date

*link to my Researchgate account: https://www.researchgate.net/profile/Gonzalez-Freire_Marta

6. International Collaborations

***National Institutes of Health (NIH), National Institute on Aging (NIA), Baltimore, MD, USA** Dr. Luigi Ferrucci and Dr. Rafael de Cabo, Translational Gerontology Branch.

***John Hopkins University** (JHU) with Dr. Peter Abadir and Dr. Jeremy Walston, where I performed mitochondrial function studies in cardiac muscle in mice treated with Losartan, an antihypertensive drug; with Dr. Richard D Semba at JHU, doing bioinformatics analysis with metabolomics and proteomic data;

***University of Kentucky** (UK), Center on Muscle Biology, with Dr. Charlotte Peterson, where I spent 2 months during October to December 2017, working on the analysis of skeletal muscle samples from patients with peripheral arterial disease (PAD). This is also a collaboration with Dr. Mary McDermott, from **Northwestern University** in Chicago.

***University of Florida (UF),** College of Medicine with Dr. Christiaan Leeuwenburgh, where I spent 3 months, October 2019 to December 2019, studying the role of miRNAs in PAD, and aging. Currently we have on going several collaborations.

D. CURRENT COMPETITIVE FUNDING

- **Intermittent normobaric hypoxia/hyperoxia as a co-adjuvant therapeutic intervention to improve health span and metabolic function in age and age-related diseases. The INTERHYPOXIC study (2022- 2025). FIS. ISCIII**
    - Center: IdISBA, Palma de Mallorca
    - Funding Agency: Instituto de Salud Carlos III, 2021. 125000 eur
    - PI Marta Gonzalez-Freire

- **Relationship between serum GDF-15 and inflammatory markers in older people with type 2 diabetes before and after treatment with phytate (2021).**
    - Center: IdISBA, Palma de Mallorca
    - Funding Agency: Caixa Colonia Pollenca. 3000 eur
    - PI: Marta Gonzalez-Freire

- **Relationship between serum GDF-15 and inflammatory markers in older people with type 2 diabetes before and after treatment with phytate (2021).**
    - Center: IdISBA, Palma de Mallorca
    - Funding Agency: Caixa Colonia Pollenca. 3000 eur
    - PI: Marta Gonzalez-Freire

- **Identifying the molecular mechanisms in the pathogenesis of age-related sarcopenia using proteomics and metabolomics (2020-2025). Miguel Servet.**
    - Center: IdISBA, Palma de Mallorca

- Funding Agency: Instituto de Salud Carlos III, 255000 eur
- PI: Marta Gonzalez-Freire

- **<u>Identifying mechanisms underlying impaired mitochondrial quality in peripheral artery disease (PAD) (2017-to date)</u>**
  - Center: National Institutes of Health (NIH), University of Kentucky (UK)
  - Funding agency: Oklahoma Nathan Shock Center of excellence in the biology of aging. 30000 $
  - PI: Marta Gonzalez-Freire

- **Efecto de la activación de HIF1 alpha en el envejecimiento celular con un protocolo agudo y crónica de hipoxia en modelo Animal. Creación de sinergias entre grupos interdisciplinares de distintas comunidades autónomas, para el desarrollo de estrategias enfocadas a retrasar el envejecimiento y mejorar la calidad de vida. "Ajudes per Accions Puntuals de Recerca i Desenvolupament" (2022)**
  - Center: IdISBa
  - Funding agency: Govern Balear. 25000 $
  - PI: Marta Gonzalez-Freire

****Academic Background**

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
A Coruña University, Galicia, Spain	B.Sc.	2006	Exercise Physiology/Sport Sciences
European University of Madrid, Madrid, Spain	M.S.	2007	Physical Activity/Health
Francisco de Vitoria University, Madrid, Spain	B. Sc.	2009	Biotechnology (1st course)
European University of Madrid, Madrid, Spain	Ph.D.	2012	Exercise Physiology
Autonoma University of Madrid, Madrid, Spain	M.S.	2013	Genetics and Cellular biology
Antonio de Nebrija University, Madrid, Spain	M.S.	On going	Applied Data Science and Programming
IESE Business School	M.S.	On going	PDD. Business and Management Program

CERTIFICATES

** ANECA Certification: Contratado Doctor, Ayudante Doctor, Universidad Privada.

**Research Certification: i3 researcher.