

## CURRICULUM VITAE

Dr. INIGO SAN MILLAN, DSc.

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### **Personal Statement.**

Over the past twenty-seven years I have been working as an applied exercise physiologist and sports medicine advisor to many professional teams and athletes worldwide from sports including cycling, soccer, football, basketball, hockey, rowing, swimming, triathlon, University athletics, track and field, running, gymnastics and organizations like the US Olympic Committee, the International Cycling Union, US Cycling, US Rowing, US Swimming and US Triathlon.

I have been a pioneer in developing new methodologies in different fields of athletic performance like physiological and metabolic assessment and protocols to assess mitochondrial function, nutrition, glycogen measurement, recovery, overtraining, blood analysis, metabolomics, or muscle damage monitoring and prevention. I have spent twenty-seven years studying the metabolic and physiological response to exercise in the elite athlete as well as the adaptations at the cellular and mitochondrial level.

World-class athletes possess the most perfect physiology and metabolism known in humans. Hence, they are perfection. As I always say, we cannot understand imperfection without understanding perfection in the first place. Working with world-class athletes has allowed me to understand what perfection is at the physiological and metabolic level.

My main passion also is the application of the knowledge I have acquired with elite athletes to populations with different chronic diseases like cardiometabolic diseases, insulin resistance, metabolic syndrome, type 2 diabetes as well as cancer and ICU patients. Like in the case of elite athletes, I have developed novel methodologies to assess metabolic function to work with populations with chronic diseases, a term that I have coined “Metabolic Rehabilitation”.

Furthermore, in the last years I have devoted a significant amount of time to study cellular metabolism with the deployment of novel methodologies and approaches, especially in cancer metabolism and mitochondrial function. I have been able to master the integration of multidisciplinary groups related to the field of cellular biology and metabolism with state-of-the-art methodologies in the area of mitochondrial respiration and function, metabolomics, fluxomics, proteomics, mass spectrometry, genetic engineering, genetic expression, western blotting and exosomes. These new approach and methodologies have allowed me to open novel doors in the field of cellular metabolism related to diseases like cancer and type 2 diabetes.

### **Present Position**

-Assistant Professor  
Department of Medicine  
Division of Endocrinology, Metabolism and Diabetes  
Division of Medical Oncology  
University of Colorado School of Medicine  
-Associate Professor  
Department of Human Physiology and Nutrition.  
University of Colorado, Colorado Springs  
-Director of Performance, Team UAE-Emirates cycling team

### **Education**

- **Bachelor's Degree.** Health and Exercise Science, Sports Medicine Concentration. Colorado State University. Fort Collins, Colorado, USA.
- **Doctorate.** Physiology. School of Medicine, University of the Basque Country, Leioa, Spain.
- **Post-Doctoral:** High-Impact Cancer Research Program, Harvard Medical School, Boston, Massachusetts, USA.

### **Fields of Expertise**

- Sports Performance
- Metabolism
- Metabolic Health
- Mitochondrial function
- Physiology
- Physiological and metabolic testing
- Scientific monitoring of the competitive athlete
- Metabolomics and Biomarkers
- Sports Nutrition
- Overtraining
- Diabetes
- Cancer metabolism
- Medical physiology

### **Memberships/Associations**

- Member of American College of Sports Medicine (ACSM-Applying to become a Fellow)
- Member of University of Colorado Diabetes Research Center
- Member of Medicine of Cycling association
- JDRF International Panel of Experts on Type 1 Diabetes and Exercise

## **Academic Appointments and Teaching Experience**

- Assistant Professor of Medicine, Division of Endocrinology, Metabolism and Diabetes, Sports Medicine and Medical Oncology. University of Colorado School of Medicine (current).
- Associate Professor, Department of Human Physiology and Nutrition. University of Colorado, Colorado Springs (Current).
- Assistant Professor of Physical Medicine & Rehabilitation, University of Colorado School of Medicine. May 2015-June 2019
- Assistant Professor of Family Medicine, University of Colorado School of Medicine. July 2012-May 2015.
- Instructor of Family Medicine, University of Colorado School of Medicine. April 2011-June 2012.
- Lecturer in Health and Wellness. School of Pharmacy, University of the Basque Country, Vitoria-Gasteiz, Spain 2006
- Lecturer in Exercise Physiology and Sports Medicine, Union Cycliste International-International Cycling Union (UCI). 2006
- Lecturer in Physiology, Exercise Physiology and Sports Medicine to Licensed Coaches at the Spanish Cycling Federation. 2006-2007
- Many conferences, seminars and clinics worldwide in the field of Exercise Physiology and Sports Medicine.

## **Clinical and Research Contributions**

### **Sports Performance , Sports Medicine and Exercise Physiology**

- Over the past twenty-seven years I have been working as an applied exercise physiologist and sports medicine advisor to many professional teams and athletes worldwide from sports including cycling, soccer, football, basketball, hockey, rowing, swimming, triathlon, University athletics, track and field, running, gymnastics and organizations like the US Olympic Committee, the International Cycling Union, US Cycling, US Rowing, US Swimming and US Triathlon.
- I have mentored many coaches, physiologists, physicians and sports scientists around the world in the area of sports medicine and sports science. Have directed sports performance programs for 27 years.
- Started from scratch, 15 years ago, the first Sports Performance Program for both the University of Colorado Hospital and the University of Colorado System (including CU Athletics). My program has been considered to be a national and international reference in the field, receiving visitors on a regular basis from around the state, the country and the world seeking my expertise.
- Being innovative is imperative in order to survive and thrive in this field and I have been an innovator and pioneer in different areas of sports performance:
- Co-developed the first method to assess skeletal muscle glycogen content in athletes through non-invasive way with high-frequency ultrasound. This new technique was validated by my colleague Dr. John Hill and me (*Hill and San-Millan, 2014*). Although the

technology has to improve it is already being used by athletes and teams around the world including NBA, NFL, NHL, MLS, European soccer and cycling. I use it personally to monitor recovery and nutrition with 2020 and 2021 Tour de France winner, Tadej Pogacar, who I also personally coach as well as his team, UAE team Emirates, for which I am the Director of Performance.

- Developed a first methodology to indirectly assess mitochondrial function and metabolic flexibility in athletes (*San-Millan, 2015; San-Millan and Brooks, 2018*).
- Co-developed the 1<sup>st</sup> platform for metabolomics assessment in professional athletes (*San-Millan et al, 2020*). We have already used this platform with professional athletes at the Tour de France including the 2020 and 2021 winner.
- I was the first in the world to apply the metabolic measurement of substrate utilization (fat and carbohydrates oxidation) during exercise to elite and recreational athletes for monitoring and training purposes.
- Started the first integrative sports performance program in professional cycling in 2009 (Garmin Team).
- Pioneer in the utilization and development of blood biomarkers to monitor and diagnose overtraining, fatigue and muscle damage in athletes for performance and injury prevention purposes.
- Pioneer in the application and development of new protocols for physiological and metabolic testing to different sports including endurance and team sports.
- Pioneer in sports nutrition guidelines in the area of carbohydrates. First to apply, in 2009 with Garmin Team, the current and recent guidelines (2016) of carbohydrate consumption (80-100g/h) in elite athletes for events over 3h.

### **Cancer:**

- Along with Professor George A. Brooks from UC Berkeley, I developed a hypothesis that we believe explains for the first time in almost a century purpose and role of the Warburg Effect in carcinogenesis. According to our “lactagenesis hypotysis” dysregulated lactate is a master regulator in cancer. We believe our hypothesis opens new doors for diagnostics and therapeutics targeting lactate exchange among and within cancer cells (*San Millan and Brooks, 2017*).
- We have recently demonstrated that lactate acts as a transcription factor in cancer by increasing the transcriptional activity of all key oncogenes, transcription factors, tumor suppressors and cell proliferation genes in breast cancer cells. This finding strengthens our hypothesis that posits dysregulated lactate as a master regulator in cancer (*San Millan et al, 2019*) which can open new doors in cancer research and therapeutics. Currently, I have expended my studies to triple negative cancer cells as well as non-small cell lung cancer and small-cell lung cancer cells with similar results. Beyond the role of latter as a regulator of genetic expression in cancer we have also discovered that lactate is a regulator of the expression of multiple immune checkpoint inhibitors in the aforementioned types of cancer cells. Further, we have shown that lactate is a regulator of the epithelial to mesenchymal transition (EMT) as well as regulates the EGFR and the mTOR pathway (*manuscript accepted*).

We have been able to show also that inhibiting lactate production through genetic engineering by silencing LDHA/B as well as PDHK, stops cancer growth leading to cell apoptosis.

We have also demonstrated that HIF-1 alpha is regulated by lactate in cancer and we have been able to block its expression and halting cancer cells growth and proliferation (*manuscript accepted*).

- We have discovered that PD-L1 expression is regulated by lactate in both breast and lung cancer cells. Furthermore, we have discovered that other different immunize checkpoints are overexpressed by lactate in both breast and lung cancer cells. Our findings open new doors in the development of novel therapeutics to target immune system in cancer (*manuscript in preparation*).
- I started a novel program within Cancer Rehab field which I call “Metabolic Rehabilitation”. The aim of this program is to target cancer metabolism through personalized exercise in cancer patients in order to reprogram human metabolism from the glycolytic phenotype of cancer towards an oxidative metabolism. This program is part of the “Exercise as Medicine” program that I started at both the University of Colorado School of Medicine and University of Colorado Hospital. Currently I am starting a collaboration with MD Anderson Cancer Center in Houston to implement a Cancer Rehabilitation program targeting metabolism through individualized exercise.
- We have also demonstrated for the first time that cancer patients with cachexia possess significantly lower amounts of glycogen which could explain cachexia and opens new doors from nutritional intervention and monitoring. Studying in conjunction with MD Anderson (*manuscript submitted*)

### **Metabolism and Mitochondrial Function:**

- I have developed a novel methodology to assess mitochondrial function and metabolic flexibility during exercise. (*San Millan, 2015 and San Millan and Brooks, 2018*). The first aim of this method is to use it as an assessment tool for a wide range of populations, from patients with cardiometabolic disease like type 2 diabetes to world-class athletes. The second aim is to use this method for exercise prescription with all kinds of populations. As part of the “exercise as medicine program” that I started at the University of Colorado, I am already applying this methodology clinically with patients from cardiometabolic disease to cancer.
- We have recently discovered in my research group a mechanism that dysregulates mitochondrial fatty acids transport and oxidation as well as mitochondrial respiration and increased in reactive oxygen species (ROS) via dysregulation of CPT-1/2 transporter as well dysregulation of mitochondrial respiration and increased in reactive oxygen species. (*San Millan et al, 2021*)
- We have recently finalized a research study with muscle biopsies to try to understand some mechanisms behind the pathogenesis of type 2 diabetes where mitochondrial dysfunction is at the epicenter. We have performed genomics, metabolomics, proteomics, mitochondrial function and respiration in different groups: elite athletes, moderately active individuals, master athletes, pre- and type 2 diabetes patients. We have discovered that a key transporter of pyruvate in mitochondria is highly dysregulated

even before insulin resistance and diabetes diagnosis, probably 10-15 years before which opens new doors for diagnostics and therapeutics. Manuscript in preparation.

- We have recently discovered that mitochondrial pyruvate carrier (MPC) is significantly dysregulated in healthy sedentary individuals compared to moderately active individuals. Hence, we believe that disruptions of glucose metabolism, insulin resistance and type 2 diabetes are preceded by a dysregulation of MPC which could be already dysregulated 10-15 years before clinical symptoms which opens new doors in diagnosis, life changing interventions and development of novel targeted therapeutics (*Manuscript in preparation*)

### **Type 1 Diabetes**

- I was one of twenty international faculty panel chosen by Juvenile Diabetes Research Foundation (JDRF) to create new guidelines for type 1 diabetes (T1D) and exercise. These guidelines are currently being taught by us to clinicians and patients around the US, Europe and Australia. We have recently published these guidelines in *Lancet Diabetes and Endocrinology* (*Riddell et al, 2017*).
- I have developed a novel protocol to prevent post-exercise hyperglycemia in patients with T1D, which is very common in these patients leading to overcorrection with excessive insulin and dangerous hypoglycemia, especially nocturnal. This results in a big burden for exercise adherence in patients with T1D. The protocol I have developed is based on the physiological mechanisms of muscle contraction-derived translocation of glucose transporters, GLUT4. This finding is part of the new JDRF guidelines for exercise and diabetes and being used clinically with an important positive impact on patients with T1D. I am preparing the manuscript with the data I have collected for publication.
- I have also identified that individuals with T1D can store ~20-25% more glycogen than individuals without T1D. Historically it was thought that low glycogen storage was a key player in hypoglycemia in individuals with T1D. However, through the methodology I developed to measure muscle glycogen, I have been able to show that individuals with T1D actually store ~20-25% more muscle glycogen in comparison with individuals without T1D both before and after exercise. This finding opens new doors for nutrition and therapeutics in these patients as excessive insulin, and not decreased glycogen, is the main responsible for hypoglycemia. (*Manuscript under review*).
- I am collaborating with the Barbara Davis Center, a pioneer program in the US for exercise prescription for individuals with type 1 diabetes.

### **Exercise Prescription/"Exercise is Medicine"**

- I have been highly active in "Exercise is Medicine" movement within my university and community. I started the first "Exercise as Medicine" program for both the University of Colorado and the University of Colorado Hospital (UCH). I have developed new protocols for metabolic testing and exercise prescription for patients with chronic diseases like cardiometabolic disease or cancer based on the same methodologies I have used with elite athletes for the past twenty-five years.
- I have created a "Metabolic Rehabilitation" program for on of the largest University Hospital in Europe (University of Toledo Hospital) where for the first time this program

will apply the metabolic rehabilitation concept to populations with multiple diseases. This is the first program in the world of this nature.

#### **Type 2 Diabetes and Cardiometabolic Disease:**

- I have been working with Type 2 diabetes patients and cardiometabolic disease patients as part of the exercise as medicine program that I started at the University of Colorado and through my novel methodology to assess mitochondrial function and metabolic flexibility. By targeting directly metabolic reprogramming in patients with pre- and type 2 diabetes I have been able to reverse this metabolic condition. This program is still very young but holds great future in Cardiometabolic health prevention.

#### **Co-Founder of CU Sports Medicine and Performance Center (CUSMPC)**

- I was one of the founders of CUSMP in Boulder which is a top sports medicine and performance center in the USA and proposed the initial idea to CU Athletics Director, Rick George. Upon his request, I develop the first draft with the mission and the vision of the project for the entire center that was presented to CU Regents and was approved unanimously. I wrote the first draft of the project. Then I was part of the leadership team and we were able to build and open to the public one of the most comprehensive sports medicine and performance centers in the US. The \$120 million, 420,000 sq ft facility serves both CU Athletes as well as general public with about 40,000 visits/year.
- The Sports Performance Program that I directed until September 2018 received visits from athletes from around the country and the world seeking guidance, which makes my program a reference of national and international level in the sports performance field.
- Currently, I have been involved in the leadership team of the new Hybl Sports Medicine and Performance Center at the University of Colorado on our Colorado Springs Campus. This new center just opened doors in April 2020 and beyond the clinical activities of CUSMPC, it will integrate for the first time in the US clinical, research and academic activities under the same roof.

#### **Critically ill Patients:**

- I showed for the first time that critically ill patients have little or no glycogen, which poses important energetic challenges for recovery and survival. Furthermore, we believe we could explain cachexia due to increased proteolysis for gluconeogenesis as a result of glycogen depletion, which further decreases chances for survival. This finding should contribute to the development of new protocols for nutrition and therapeutics at the ICU (*San Millan, Hill and Wischmeyer, 2015*).

#### **Covid-19 Patients**

- Along with some colleagues from National Jewish Hospital in Denver, Colorado, we have found that Covid-19 patients suffering long-lasting effects (“long haulers”) suffer from important mitochondrial dysfunction (*De Boer et al, 2021*). We are the first group to find this in Covid-19 patients and my methodology to assess mitochondrial function was instrumental to find this.

### **Metabolomics**

- As a co-founder of Altis Bioscience, I have Co-developed the 1<sup>st</sup> platform for metabolomics assessment in professional athletes (*San-Millan et al, 2020, Nemkov et al, 2023*). We have already used this platform with professional athletes at the Tour de France including the 2020 and 2021 winner.
- We can already identify signatures regarding cellular bioenergetics including populations with metabolic dysfunctions. We are pioneers in the world in this field.

### **Advisor to Industry**

I have been advising different companies and organizations in the area of sports performance, sports medicine, metabolism and nutrition. Among the different companies and organizations that I have advised are: The US Olympic Committee, The International Cycling Union, Nike, Dexcom, JDRF, Danonne-Nutritia, The Feed, FootBeat, Cercacor, Ascent Nutrition, G42, Leprino Foods, Leomo.

### **Media/Conferences/Talks**

- I am featured on a regular basis by regional and national media including 9News, The Denver Post, Bicycling, Outside Magazine, Runners World, Velonews, Triathlete, Men's Health, Shape, etc. The estimated potential annual outreach I have is ~25-30 million potential readers.
- I was chosen by CU President's Office as one of the faces/talents of the University of Colorado for the University of Colorado TV commercial "CU: Four Campus" (aired on TV since the fall of 2017 until June-2019).
- In 2013 I was chosen by The Denver Post "Thinker of the Year" in the area of health.
- I am regularly invited to give conferences and talks locally, nationally and internationally including a TED talk in 2014.

### **Entrepreneurship**

- Co-founder of MuscleSound (2011). A company dedicated to assessing skeletal muscle glycogen in a rapid and non-invasive way through high-frequency ultrasound. Our current clients include, the US Olympic Committee, professional sports in NFL, NBA, NHL, MLB and MLS, Health Systems like MD Anderson Cancer Center and UCH Hospital
- Co-Founder of Altis Bioscience (2018). A company in the metabolomics field dedicated to developing diagnostic panels for sports performance, health and wellness as well as chronic diseases like type 2 diabetes (Start-up phase).
- Founder of Lactatelogic. I developed a software that can assess indirectly mitochondrial function, fat and carbohydrate oxidation based on lactate sampling.

### **Funding Support**

Between research, clinical services, donations and contracts, I have been able to bring about **\$ 6,000,000** to my program since I started in 2009. My program at CU has been always completely self-funded, also funding about 20 people's salaries over the years.



**Date of Birth:** January, 11<sup>th</sup>, 1971. Vitoria-Gasteiz, Basque Country, Spain.

**Languages Spoken (fluent)**

English, Spanish, French and Italian.

**Nationality**

United States and Spain



| Relative Citation Ratio (RCR) |      |      | Citations Per Pub |       |
|-------------------------------|------|------|-------------------|-------|
| MAX                           | MEAN | SEM  | MEAN              | SEM   |
| 27.96                         | 5.13 | 1.66 | 49.00             | 21.67 |

Mean for NIH-funded paper = 1

**Scientific References**

**Peer-Reviewed Publications**

- **San-Millan, I.**, Martinez, J. L., Pickard, S. L., Yu, H., Hirsch, F. R., Brooks, G. A., & Rivard, C. J. (2023). Role of Lactate in the Regulation of Transcriptional Activity of Breast Cancer-Related Genes and Epithelial-to-Mesenchymal Transition Proteins: A Comparison of MCF7 and MDA-MB-231 Cancer Cell Lines. *Frontiers Endocrinology (accepted/in press)*.
- **San-Millán I.** The Key Role of Mitochondrial Function in Health and Disease.(2023) *Antioxidants*; 12(4):782. <https://doi.org/10.3390/antiox12040782>
- Nemkov, T., Cendali, F., Stefanoni, D., Martinez, J. L., Hansen, K. C., **San-Millán, I.**, & D’Alessandro, A. (2023). Metabolic Signatures of Performance in Elite World Tour Professional Male Cyclists. *Sports Medicine*, 1-15.
- **San-Millán, I.**, Sparagna, G., Chapman, H., Warkins, V., Chatfield. K., Shuff, S., Martinez, J., Brooks, GA. (2022). Chronic Lactate Exposure Decreases Mitochondrial Function by Inhibition of Fatty Acid Uptake and Cardiolipin Alterations in Neonatal Rat Cardiomyocytes. *Frontiers in Nutrition*, 197.
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- Schostak, T., **San Millan, I.**, Jani, A., & Johnson, R. J. (2022). Thiamine deficiency: a commonly unrecognized but easily treatable condition. *Postgraduate Medical Journal*.
- **San-Millán, I.**, Martinez, JL., Pickard, SL., Sparagna, G., Hui, Y., Brooks, GA., Hirsch, FR. Rivard, C., (2022). Role of Lactate in the Regulation of Transcriptional Activity of Breast Cancer-Related Genes and Epithelial to Mesenchymal Transition: Comparison of MCF7 and MDA-MB-231 Cancer Cell Lines (*manuscript submitted*)
- **San-Millán, I.**, Martinez, JL. (2022). From Tour de France to Recreational Cyclists: A Comprehensive Representation of the Metabolic Responses to Cycling of Different Levels (*manuscript submitted*)
- de Boer, E., Petrache, I., Goldstein, N.M., Olin, J.T., Keith, R.C., Modena, B., Mohning, M.P., Yunt, Z.X., **San-Millán, I.** and Swigris, J.J. (2021). Decreased Fatty Oxidation and Altered Lactate Production During Exercise in Post-Acute COVID-19 Patients. *American Journal of Respiratory and Critical Care Medicine*, Oct 19 (ja).
- Whittle, J., & **San-Millán, I.** (2021). Objective assessment of metabolism and guidance of ICU rehabilitation with cardiopulmonary exercise testing. *Current Opinion in Critical Care*, 27(4), 390-398.
- **San-Millán, I.**; Davide Stefanoni., Janel Martinez., Alessandro, A., Travis Nemkov (2020). Metabolomics of endurance capacity in World Tour professional cyclists. *Frontiers in Physiology*.
- **San-Millán I.**, Hill JC, Calleja-González J. (2020). Reply to Comment on: "Changes in Skeletal Muscle Glycogen Content in Professional Soccer Players before and after a Match by a Non-Invasive MuscleSound® Technology. A Cross Sectional Pilot Study. *Nutrients*. 12(4), 971
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- **San-Millán, I.**, Julian, C. G., Matarazzo, C., Martinez, J., & Brooks, G. A. (2019). Is Lactate an Oncometabolite? Evidence Supporting a Role for Lactate in the Regulation of Transcriptional Activity of Cancer-related Genes in MCF7 Breast Cancer Cells. *Frontiers in Oncology*, 9, 1536.
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- **San-Millán, I** and Brooks, G.A. (2018). Assessment of metabolic flexibility by means of measuring blood lactate, fat and carbohydrate oxidation responses to exercise in professional endurance athletes and less fit individuals. *Sports Medicine*, 48(2), 467-479.
- **San-Millán, I.** and Brooks, G. A. (2017). Reexamining cancer metabolism: lactate production for carcinogenesis could be the purpose and explanation of the Warburg Effect. *Carcinogenesis*, 38(2), 119-133.
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### Peer-Reviewed Published Abstracts

- **San-Millán, I.**, Pietro-Bellver, G. (2022). The Bioenergetics of the Tour de France. *Med & Sci in Sports & Exerc*: Vol:54, issue 95, p496.
- **San-Millan, I.**, Stefanoni, D., Martinez, J. L., D'Alessandro, A., & Nemkov, T. (2020). Assessment Of Metabolic Responses To Exercise In Elite Professional Cyclists Using High-throughput Metabolomics: *Med Sci Sports Exerc*, 52(7S), 1076.

- **San Millán I.**, The Use of Individualized Exercise Prescription to Target Oxidative Metabolism in a Stage IV Colorectal, Metastatic Cancer Patient. World Congress of Exercise as Medicine (2019). *Med Sci Sports Exerc*, 51
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- **San Millán, I.**, Poddar, S., Rueda, M., Hill, J.C. (2016). Evolution of creatine kinase in division one American football players during the season. A method to monitor and evaluate skeletal muscle damage. *Med Sci Sports Exerc*, 48 (5), 266.
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- Hill, J.C., Gonzalez-Haro, C., & **San Millan, I.** (2012). Gender Differences in Maximal Fat and Carbohydrate Oxidation Rates. *J Gen Intern Med*, 27, 600.
- **San Millán I.**, González-Haro C. (2010). A new blood lactate concentration approach to assess the aerobic adaptation of UCI-23 elite road cyclists. *Med Sci Sports Exerc*, 42(5), 391.
- **San Millán, I.**, Gonzalez-Haro, C., Sagasti, M. 2009. Physiological Differences Between Road Cyclists of Different Categories. A New Approach. *Med Sci Sports Exerc*, 41(5), 48.
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- **San Millán, I.**, Irazusta, J., Gil, J., Gil, S., Gotshall, R.W. (2014). Differences in Cycling Performance at the Same Blood Lactate Concentration: Elite vs. Recreational Cyclists. *Med Sci Sports Exerc*, 36(5), 112.
- Ruiz, F., **San Millán, I.**, Gil, J., Irazusta, A., Gil, S., Irazusta, J. (2003). Variation of antioxidant capacity and creatine kinase activity during different periods of a cycling season. 6<sup>th</sup> Portuguese Congress on Free Radicals in Chemistry, Biology and Medicine.
- Ruiz, F., **San Millán, I.**, Garai, A., Celaya, P., Irazusta, J., Gil, J. (2003). Antioxidant capacity and the activity of creatine kinase in professional cyclists during a stage race. 6<sup>th</sup> Portuguese Congress on Free Radicals in Chemistry, Biology and Medicine.

### **Book Chapters**

- **San Millán I.** (2022). Control de las respuestas metabólicas al entrenamiento. *Metabolómica. Fisiología del Ejercicio*, 4th Edition. Editorial Panamericana.
- **San Millán I.** (2021). Assessing Metabolic Flexibility and Mitochondrial Bioenergetics. In: *Clinical Bioenergetics: from Pathophysiology to Clinical Translation*. Ch 10, 245-268 Elsevier Health Sciences.
- Hill, J.C; **San Millan, I.** (2021). Aerobic Training, 124-133. In: *Netter's Sports Medicine, 3rd Edition*. Elsevier Health Sciences.
- **San Millán I.** (2019). Blood Biomarkers in Sports Medicine and Performance and the Future of Metabolomics. In: *Methods in Molecular Biology*, Springer Nature.
- Hill, J.C; **San Millan, I.** (2017). Aerobic Training, 124-133. In: *Netter's Sports Medicine, 2nd Edition*. Elsevier Health Sciences, 2017.
- **San Millán I.** (2013). Physiology of the Athlete: Bioenergetics, Performance, Physiological Testing, and Monitoring. In: *Lifestyle Medicine, Second Edition*. CRC Press

### **Individual Invitations to Speak National and International (only author)**

- The scientific monitoring of the competitive cyclist. Medicine of Cycling Annual Conference. Colorado Springs, CO. 2009
- Physiological Differences Between Road Cyclists of Different Categories. American College of Sports Medicine annual meeting. Seattle, WA, 2009

- The Scientific monitoring and preparation of soccer player. National Conference of Medicine of Soccer, Bogota, Colombia. February, 2010
- Cycling Nutrition. Medicine of Cycling annual meeting. Colorado Springs, CO, August, 2011
- Cycling Medicine and Scientific Monitoring of the Cyclist. NYU, NYC. (**Keynote Speaker**) April 2012
- Exercise Metabolic Dysfunction and Recovery in a Severe Burn Patient. American College of Sports Medicine annual meeting. San Francisco, CA. May, 2012
- Exercise physiology and sports performance. Living at Your Peak. Vail, Co. September, 2012
- The scientific monitoring of the competitive cyclist. Medicine of Cycling Annual Conference. Colorado Springs, CO. 2013
- Women's Wellness Conference. Exercise Physiology and performance lecture. Colorado Springs, CO. April 2013
- Overtraining in Cycling. Medicine of Cycling annual meeting. Colorado Springs, Colorado, August, 2013
- The Scientific Monitoring of the Elite Athlete. Regis University. October, 2013
- Exercise Metabolism in Health and Disease. XIV International Meeting of Medical Sciences. Universidad de Guanajuato, Leon, Mexico, April, 2014 (**Keynote Speaker**)
- The Science Behind Diabetes: Understanding New Research and Clinical Applications. American College of Sports Medicine annual meeting. Orlando, FL. May, 2014
- Nutrition and preparation in extreme sports. 1st Annual International Extreme Sports Medicine Congress. Boulder, Colorado June 13-14, 2014
- The Scientific Monitoring in Cycling. Medicine of Cycling annual meeting. Colorado Springs, Colorado, August, 2014
- The Use of Ultrasound to Measure Glycogen. Rocky Mountain Chapter of the American College of Sports Medicine annual meeting. Denver, CO, November, 2015
- The Scientific Monitoring and Preparation of the Competitive Runner. US Track & Field and Cross Country Coaches Association annual meeting. Phoenix, AZ, December, 2014
- Improving Metabolic Health. Implications for Health and Performance. Pittsburg Create Festival. Pittsburg, June, 2015
- The Scientific Monitoring of the Endurance Athlete. Endurance Coaching Summit. Boulder, CO., July, 2015
- The Use of Ultrasound to Measure Skeletal Muscle Glycogen. Medicine of Cycling annual meeting. Colorado Springs, Colorado, August, 2015
- A novel Methodology to Measure Mitochondrial Function During Exercise. World Congress on Targeting Mitochondria Berlin, October 2015
- Breakout Session: Nutrition on the Endurance Athlete. Endurance Coaching Summit. Boulder, CO., July, 2016
- Cycling Nutrition. Medicine of Cycling annual meeting. Colorado Springs, Colorado, August, 2016
- The Scientific Monitoring of the Athlete. CU Sports Medicine Fall Symposium. September, 2015
- Nutrition of the Competitive Athlete. Vail, CO, September, 2015

- Exercise and Type 1 Diabetes. Juvenile Diabetes Research Foundation (JDRF) PEAK. Birmingham, UK, November 2015
- The Use of Ultrasound to Assess Muscle Glycogen. 2<sup>nd</sup> International Symposium in Rehabilitative Ultrasound Imaging. Madrid, Spain, June, 2016
- Exercise and Type 1 Diabetes. Type One Nation. JDRF. Denver, Colorado, February, 2017
- Reexamining Cancer Metabolism: Lactate as the Explanation and Purpose of the Warburg Effect. Cell Death, Cell Stress and Metabolism Conference. Cancun, Mexico, March, 2017
- Exercise and Type 1 Diabetes. Juvenile Diabetes Research Foundation (JDRF) PEAK. Baltimore, MD. April, 2017
- Exercise and Type 1 Diabetes. Juvenile Diabetes Research Foundation (JDRF) PEAK. Seattle, WA. April, 2017
- Exercise and Type 1 Diabetes. American Diabetes Association Annual Conference.. San Diego, California. June, 2017.
- Breakout Session: Physiological Testing. Endurance Coaching Summit. Boulder, CO., July, 2017
- The Overtraining Syndrome in Athletes. Medicine of Cycling annual meeting. Colorado Springs, Colorado, August, 2017
- Cancer Rehabilitation and Cancer Metabolism: Can We Use Exercise Prescription to Alter Cancer Metabolism?. American Association of Physical Medicine and Rehabilitation annual Assembly. Denver, Colorado, October, 2017 (Session Director)
- Scientific Monitoring of the Competitive Rower. US Rowing National Meeting Sarasota, FL., Nov, 2017
- Utilization of ultrasound in Physical Therapy. Spanish Association of Physical Therapy and Sports Physical Therapies annual meeting. Logrono, Spain, November, 2017
- Exercise and Type 1 Diabetes. Juvenile Diabetes Research Foundation (JDRF) PEAK. King of Prussia, PA. December, 2017
- The Use of Ultrasound to Monitor for Muscle Damage During Electrostimulation Therapy. VI International Symposium of Whole Body Electrostimulation. Florence, Italy, May, 2018.
- Relationships between  $VO_{2max}$  and blood lactate during exercise across different populations. American College of Sports Medicine annual meeting. Minneapolis, MN, May, 2018.
- Ultrasound Analysis of Glycogen in Football Players. 2<sup>nd</sup> Multidisciplinary Symposium. Health, Exercise and Sports. Leon, Spain, June, 2018.
- Metabolic Targeting of Cancer Rehabilitation. American Assembly of Physical Medicine & Rehabilitation Annual Conference. Orlando, FL., October 2018
- Exercise and Type 1 Diabetes. Juvenile Diabetes Research Foundation (JDRF) PEAK. **Keynote Speaker**. Madrid, Spain, 2018
- Cancer Metabolism and Lessons learned from Exercise Metabolism (2019). Grand Rounds. MD Anderson Cancer Center, Houston, TX.
- Cancer Metabolism and Lessons learned from Exercise Metabolism (2019). Grand Rounds. Kingsbrook Jewish Medical Center, Brooklyn, NY.
- Lessons Learnd from Exeercise Physiology that can be Used with Populations with Type 2 Diabetes. Cuban Diabetes National Meeting. La Habana, Cuba, May, 2019

- The Use of Individualized Exercise Prescription to Target Oxidative Metabolism in a Stage IV Colorectal, Metastatic Cancer Patient. World Congress of Exercise as Medicine, Orlando, FL., May 2019.
- Metabolic Reprogramming in Health and Disease. Grand Rounds. **Keynote Speaker**. Litch Lecture, University of Minnesota, November, 2019.
- Exercise as Medicine. Rocky Mountain Chapter of American College of Sports Medicine. **Keynote speaker**. April, 2020 (Cancelled due to Covid-19).
- Assessment Of Metabolic Responses To Exercise In Elite Professional Cyclists Using High-throughput Metabolomics. American College of Sports Medicine annual meeting, May 2020 (cancelled due to Covid-19)
- Diabetes and Exercise. 42<sup>nd</sup> Congress of Spanish Society of Pediatric Endocrinology. Zaragoza Spain, October 2020 (Virtual due to Covid-19).
- Mitochondrial function and low-grade inflammation. International low-grade inflammation conference, Dubai, UAE, October 2020 (Virtual due to Covid-19).
- Working with the Tour de France winner in Covid-19. Medicine of Cycling annual meeting, Colorado Springs, USA, October 2020 (Virtual due to Covid-19).
- Lessons learned from exercise metabolism to understand cancer. Iran, October, 2021.
- The scientific monitoring of the elite athlete. Madrid, Spain, November, 2021.
- In Pursue of Metabolic Health: Lessons learned from Elite Athletes. Rocky Mountain Surgery Association. Aspen, CO. February 2022.
- Metabolism and Mitochondrial Physiology: **Keynote Speaker** A Journey from High Performance to Therapeutic Exercise. University Hospital of Toledo, Spain. September, 2022.
- Lactate in health & Disease: lessons Learned from elite athletes to apply to populations with chronic diseases. University of Cape Town, South Africa, May-2023
- Lactate in health & Disease: lessons Learned from elite athletes to apply to populations with chronic diseases. American College of Sports Medicine annual meeting (highlighted conference). June 2023
- The preparation to win the Tour de France. International Conference of Science and Cycling. Spain, June, 2023
- The role of mitochondrial pyruvate carrier in the pathogenesis of Type 2 diabetes. International Cuban endocrinology Society meeting. October, 2023
- The integration of metabolism in health and disease. **Keynote Speaker**. Centre of Integration of sports, health and human development. Portugal, October, 2023

### Media Contributions

I am also contacted regularly by general national and international-level media to write or give my opinion and expertise about different areas like sports medicine, sports performance, diabetes, cancer, metabolism which are a great opportunity to disseminate further my didactic activities to the general population from lessons learned from exercise physiology. Based on the number of readers and podcast listeners in national and international media, my outreach is estimated to be 15-20 million people annually.