

## 2020 – CV- Dra Pilar Martín Escudero.

NAME <b>Martín Escudero; Pilar</b>	CURRENT APPOINTMENT(S) AND INSTITUTION(S) Contract Doctor Professor, (University Complutense of Madrid)		
ACADEMIC AND PROFESSIONAL QUALIFICATIONS			
INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
University Complutense of Madrid, Spain	MSc	1985	Medicine; Doctor
University Complutense of Madrid, Spain	MSc Grad Cert	1985	Medicine; Doctor
University Complutense of Madrid, Spain	Medical Specialist	1991	Sport Medicine
University Complutense of Madrid, Spain	PhD	1997	Doctor Sport Medicine
University Complutense of Madrid, Spain	Magister	2001	University Master in Management and Sports business

### 1. Positions and Honours

#### ***Positions and employment***

<i>Year</i>	<i>Position</i>
2007-	Contract Doctor Professor, Professional Medical School of physical education and sport (University Complutense of Madrid)
2004-2007	Assistant Doctor Professor, Professional Medical School of physical education and sport (University Complutense of Madrid)
1993-2004	Associate Professor, Professional Medical School of physical education and sport (University Complutense of Madrid)
1991-2004	Sport Medicine; National Center of Sports medicine in C.A.R (Center of high performance and sports science) Superior Council of Sports. Ministry of education and science.

#### ***Teaching Experience:***

<i>Year</i>	<i>Position</i>
2007-	Contract Doctor Professor, Professional Medical School of physical education and sport (University Complutense of Madrid).
2004-2007	Assistant Doctor Professor, Professional Medical School of physical education and sport (University Complutense of Madrid)
1993-2004	Associate Professor, Professional Medical School of physical education and sport (University Complutense of Madrid)

Courses I teach to Physicians who study sports medicine specialty:

- 1.- Training systems where learning training for athletes, exercise prescription in children, the elderly and women and exercise prescription in chronic diseases. Exercise for health.
- 2.- Human physiology applied to exercise
- 3.- Biochemistry modifications in sport. In blood, biochemistry adaptation in sport.
- 4.- Sports Pharmacology: The anti-doping code, Prohibited List in sport, nutritional Supplements, ergogenic aids.

I have a website where I have updated information from these areas.

<http://pilarmartinescudero.es/assignaturas.htm>  
[www.pilarmartinescudero.com](http://www.pilarmartinescudero.com)

Six Supervision of doctoral thesis

Researcher numbers	Researcher ID	V-2078-2017.
	Author ID	6506812909
	ORCID code	0000-0003-1431-8493

## ***Other experience and professional memberships***

<i>Year</i>	<i>Position</i>
2017	Spanish Deaflympics team Doctor. Samsun Turkey 2017
2013	Spanish Deaflympics team Doctor. Bulgaria 2013
2012	Spanish Olympic team doctor. London 2012
1990-2019	Medical doping control in Football, UCI, Basketball, Kickboxing, Fishing & Casting; Athletics, Shooting, Almeria 2005 Mediterranean Games <ul style="list-style-type: none"><li>• Team Doctor Olympic Shooting</li><li>• Team Doctor canoeing junior team.</li><li>• Team Doctor XII Gymnasiada CAEN 2002</li><li>• Team Doctor World School Cross Country Championship Marrakech Maroc 2000.</li><li>• Referee Physiological Measurement. Sport Medicine, Annals of Sports Medicine and Research; Journal of Sport Sciences.</li><li>• Referee "REVISTA INTERNACIONAL DE MEDICINA Y CIENCIAS DE LA ACTIVIDAD FISICA Y DEL DEPORTE</li></ul>

## ***Honors***

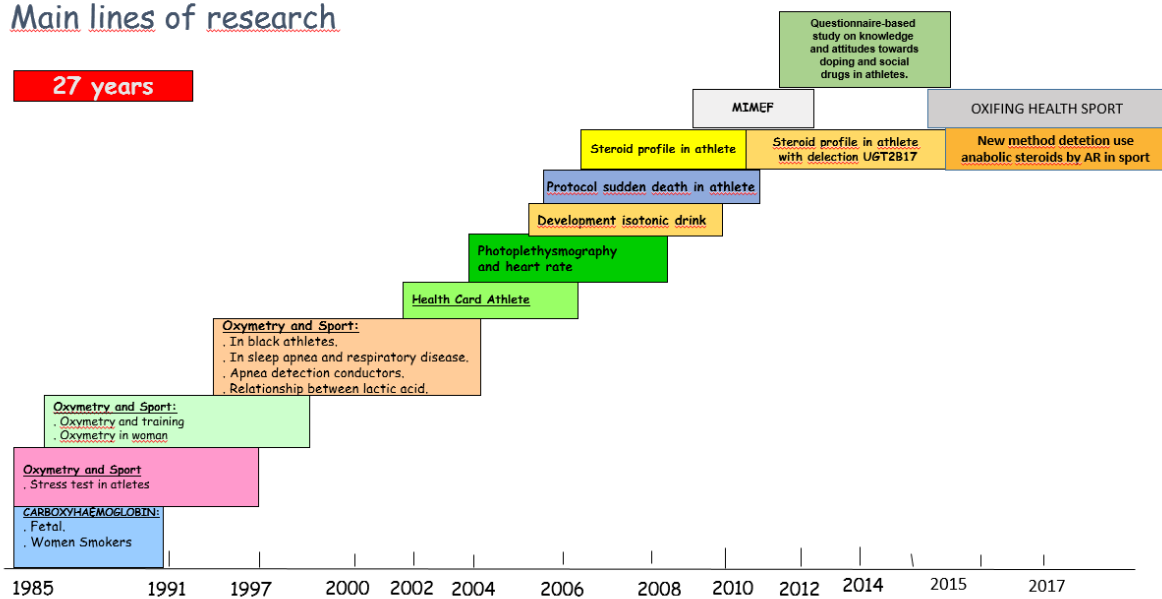
<i>Year</i>	<i>Honor or Award</i>
2019	Certificate I3.- identifier number I3 / 2019/377. Ministry of Science, Innovation and Universities of the Incentive Program for the Incorporation and Intensification of Research Activity. 10/01/2019.
2019	Diploma of Teaching Excellence awarded by the Complutense University of Madrid, according to the results of the Docentia Program of the Vice-rectorship of Quality for the teaching work developed during the academic year 2017-2018.
2017	"UCM-Santander: Research and Business" Award Award, first Prize for Technology-Based Projects. OXIFING HEALTH SPORT. July 2017
2014-2015	UNESCO expert appointed ASSIGNMENT / ANTI-DOPING POLICY ASSESSMENT in coordination with the AEPSAD for the evaluation of policies to combat doping and legislation in Spain.
2011-2019	Member of the Committee of inquiry from Hospital Clínico San Carlos Madrid; Research Institute.
2012	Second Prize. National Award for research in sports medicine in Spain.
2009-	Doctor of the Medical Commission of the Spanish Olympic Committee
2008-2017	Expert for the evaluation of projects of the call of the National Plan of Research of Spain; Ministry of Research.
2005-2015	Doctor of the Medical Commission of Therapeutic Authorizations. Superior council of Sports. Ministry of education and science.
2000-	Medical doping control

## ***Languages:***

- 1.- French: Bilingual education.
- 2.- English: professional competence.
- 3.- Spanish: native language.

## 2. Career Summary in Sport medicine:

### Main lines of research



## 3. Anti-Doping Science Contributions

Dr. Martín Escudero is and has been a team member on various Anti-doping research projects in last five years. These projects include:

- Profile steroid in athletes and its relation with physiological and genetic parameters. Development of mathematical models for the determination of levels thresholds of steroids in doping control. This project was integrated with Laboratory Doping Control in Madrid (Spanish State anti-doping agency), Hospital Clínico San Carlos Madrid, and Professional Medical School of physical education and sport (University Complutense of Madrid). The results of this study say the athletes have genetic variation UGT2B17 the levels thresholds of steroids are low.
- In this moment have another competitive research project "Clinical trial crossed on sports population according to polymorphism UGT2B17. Profile impact steroid". This project was integrated with Laboratory Doping Control in Madrid (Spanish State anti-doping agency), Hospital Clínico San Carlos Madrid, and Professional Medical School of physical education and sport (University Complutense of Madrid). The interest is to develop a mathematical formula based on the race of the athletes and the polymorphism UGT2B17, to change the threshold of detection of steroids which at the present time is T/E:4.
- Three Years ago we have been working with Terry Engelberg and Stephen Moston ( Department of Tourism, Sport and Hotel Management, Griffith Business School, Griffith University, Gold Coast, Australia. and Stephen Moston (Centre for Applied Psychology, Faculty of Health, University of Canberra, Bruce, Canberra, Australia; on the project: The Future of Doping: An International Survey of Performance and Image Enhancing Drug Use in Community Sport.
- My last Project: METHODOLOGICAL DEVELOPMENT FOR SCREENING STEROID CONSUMPTION IN THE FIELD OF SPORT PRACTICE BASED IN AR (androgen receptor );This study was carried out jointly with the Unit for Research Support of the Hospital San Carlos de Madrid, Anti-Doping Agency and the Professional School of Medicine Physical Education and Sport of the UCM, Previous studies by other research groups have shown that performing studies on androgen receptors obtained from yeast with bioluminescence assays, that androgen activity in urine increased 4.5 times and was closely associated with the unconjugated or free testosterone independent of the UGT2B17 genotype. This data supports the idea that trials with androgen receptors (AR) can serve as a complement to the urine values of testosterone/epitestosterone (T/E) as evidence of doping, because the ranges of determination significantly influenced by the UGT2B17 gene deletion polymorphism.

Additional contributions to Anti-doping Science:

- Doctor of the Medical Commission of Therapeutic Authorizations. Superior council of Sports. Ministry of education and science. I have developed therapeutic authorizations guidelines for athletes, until Dec2015.
- I have a website [www.pilarmartinescudero.com](http://www.pilarmartinescudero.com) where I have update information from Spanish law and foreign anti-doping law for athletes and sports medicine physicians.

#### **4. Other research contributions in Sport Medicine and Biomedical Engineering:**

1.- Project Title: "Oxygen saturation monitoring during maximal stress test performance". CSD (06/EPU10/00) From October 2000 to September 2001. This study was performed between the Instituto de Microelectrónica de Madrid (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Medicine Center Sports Council. The objective is to develop oximeters for athletes.

2.- Project title: "Analysis of continuous monitoring of oxygen saturation by pulse oximetry during maximal stress tests on professional athletes". CSD (04/EPB10/02). 2003. This study was performed between the Instituto de Microelectrónica de Madrid (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Medicine Center Sports Council. The objective is to develop oximeters for athletes.

3.- PROJECT TITLE: "Multiple wavelength pulse oximetry in high performance female athletes who practice aerobic sports. CSD (02/EPB10/03) 2003-2004. This study was performed between the Instituto de Microelectrónica de Madrid (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Medicine Center Sports Council. The objective is to develop oximeters for female athletes.

4.- PROJECT TITLE: "Application and improvements in oxygen saturation continuous measurement by pulse oximetry in young athletes during treadmill stress tests. Their usefulness as a training parameter. CSD (02/EPB10/04) 2005. This study was performed between the Instituto de Microelectrónica de Madrid (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Medicine Center Sports Council. The objective is to improve pulse oximeters for athletes in order to improve physical performance.

5.- PROJECT TITLE: "Continuous determination of oxygen saturation by pulse oximetry and its relationship with lactic acid metabolism. CSD (02/EPB10/05) 2005-2006. This study was performed between the Instituto de Microelectrónica de Madrid (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Medicine Center Sports Council. The objective is to improve pulse oximeters for athletes in order to improve physical performance.

6.- PROJECT TITLE: "Continuous monitoring of oxygen saturation during maximal stress tests on black athletes. CSD (03/UPB10/06). 2006-2007. Postgraduate fellowship. This study was performed by Instituto de Microelectrónica (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Professional Medical School of Physical Education and Sport of the UCM and the Pontifical University of Comillas (ICAI). The purpose of this study is the development of an improved pulse oximeter for sports use, including black athletes, aimed at improving physical performance.

7.- PROJECT TITLE: "Study of correlation between peripheral and lactic ventilatory thresholds between male athletes versus healthy male smokers" (PR1/07-14910). 2006-2007. This study was performed by the Pneumology Service of San Carlos Clinical Hospital, Medical Professional School of Physical Education and Sport of the UCM and (Centro de Medicina del Consejo Superior de Deportes) Medicine Center Sports Council, in order to study the correlation between ventilatory thresholds, peripheral and lactic acid ones, between non-smoker male athletes and smoker male athletes.

8.- PROJECT TITLE: "DEVELOPMENT OF ATHLETES HEALTH CARD" Advisory collaboration. 2007. Advisors to the development of athlete's health card within the Comisión de Salud y Control de Dopaje del CSD

9.-PROJECT TITLE: "Oxygen saturation study in female black athletes during maximal stress tests. 01/UPB10/07. 2007-2008. This study was performed by the Instituto de Microelectrónica (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Centro de Medicina del Consejo Superior de Deportes. The objective was the development of improved pulse oximeters for sports use, including black female athletes, focused on physical performance improvement.

10.- PROJECT TITLE: "Analysis and modeling of the relationship between the ECG, laser photoplethysmography and ventilatory parameters during maximal exercise testing in female and male athletes. 01/UPB10/08. 2008. This study was performed by the Instituto de Microelectrónica (IMM) attached to the Centro Nacional de Microelectrónica under the CSIC, the Medical Professional School of Physical Education and Sport of the UCM and Centro de Medicina del Consejo Superior de Deportes. The objective was the development of improved pulse oximeters for sports use, including male and female, black and Caucasian athletes, focused on physical performance improvement.

11.- PROJECT TITLE: "Non-invasive Estimation of Blood Lactate Levels in Athletes after Maximal Effort Tests by Pulsioximetry. This study was carried out jointly with the CNM-CSIC , ICAI Biomedical engineering and the Professional School of Medicine Physical Education and Sport of the UCM. This investigation supports the idea estimation of Lactate Levels / Respiratory Zone is possible by the oxygen saturation measurements by pulsioximetry and application in wearables.

12.- PROJECT TITLE: "steroid profile in athletes and their relation to physiological and genetic parameters. Development of mathematical models for the determination of steroid levels thresholds doping control "Financing Agency: project funded by National R + D + I (DEP2009-14788-C03-03). January 2010 TO: December 2013. This study was carried out jointly with the Unit for Research Support of the Hospital San Carlos de Madrid, Anti-Doping Agency and the Professional School of Medicine Physical Education and Sport of the UCM, for the development of mathematical models to determine threshold levels of steroids in doping control.

13. PROJECT TITLE: "Sports crossover clinical trial in UGT2B17 population by polymorphism. Impact on the steroid profile ".Financing Agency: project funded by National R + D + I (DEP2012-40156). January 2013 TO: December 2015. This study was carried out jointly with the Unit for Research Support of the Hospital San Carlos de Madrid, Anti-Doping Agency and the Professional School of Medicine Physical Education and Sport of the UCM, for validation of mathematical models to determine threshold levels of steroids in doping control.

14.- METHODOLOGICAL DEVELOPMENT FOR SCREENING STEROID CONSUMPTION IN THE FIELD OF SPORT PRACTICE BASED IN AR (androgen receptor) (DEP2016-78559-R) ;This study was carried out jointly with the Unit for Research Support of the Hospital San Carlos de Madrid, Anti-Doping Agency and the Professional School of Medicine Physical Education and Sport of the UCM, Previous studies by other research groups have shown that performing studies on androgen receptors obtained from yeast with bioluminescence assays, that androgen activity in urine increased 4.5 times and was closely associated with the unconjugated or free testosterone independent of the UGT2B17 genotype. This data supports the idea that trials with androgen receptors (AR) can serve as a complement to the urine values of testosterone/epitestosterone (T/E) as evidence of doping, because the ranges of determination significantly influenced by the UGT2B17 gene deletion polymorphism.

## 5. Selected Peer-Reviewed Publications:

### *The most relevant books:*

1. **Martín Escudero, P.** Pediatrics and physical exercise (in spanish). You & Us. Noviembre 2000.
2. **Martín Escudero, P.** Physical exercise in patients with VIH (in spanish). You & Us. 2001. ISBN: 11-01-CRX-00-E-3087-B
3. **Martín Escudero, P.** Physical exercise and diabetes (in spanish). You & Us . 2004.
4. **Martín Escudero, P.** Physical exercise and osteo-articular pathology (in spanish). You & Us . 2006. ISBN: 84-689-4644-3
5. **Martín Escudero, P.** Exercise and depression. Benefits of physical exercise in the prevention and treatment of depression (in spanish). You & Us . 2007. ISBN: 978-84-690-3618-1
6. **Martín Escudero, P;** Galindo Canales M. Exercise and asthma (in Spanish). You & Us . Año 2008. ISBN: 978-84-691-8237-6.
7. **Martín Escudero, P;** Physical exercise in HTA and concomitant pathologies: left Ventricular hypertrophy, obesity, Diabetes and metabolic syndrome (in Spanish) You & Us . 2010. ISBN: 978-84-693-0426-6; DL: M-18752-2010.
8. **Martín Escudero, P;** Galindo Canales M. Physical exercise and migraine. You & Us . 2010. ISBN: 978-84-693-1788-4

### *Ten most relevant peer-reviewed papers:*

1.- **Martín Escudero P.** "Prescribing exercise in Hepatitis" (in spanish). Revista Española de Enfermedades Digestivas.2002; 94 (3): 149-158.

2.- Giannetti R, Silveira Martín JP, Dotor ML, Golmayo D, **Martín P,** Miguel-Tobal F, Bilbao A. "An Innovate signal processing algorithm for near infrared laser-based pulse oximeter". Proceedings of 10th Internacional Symposium on Development in Digital Measuring Instrumentation, Naples, Italy, September 17-18,1998. Pascale Daponte, Máximo D'Apuzzo, and Antonio Langella, Eds IMEKO TC-4, Sept 1998, pp 153-156.

3.- S.M. López Silva, M.L. Dotor, J.P. Silveira, R. Giannetti, D. Golmayo, **P. Martín**, F. Miguel, J.L. Álvarez-Sala, L. Herrera. "Transmittance photoplethysmography and pulse oximetry with near infrared laser diodes." Proceedings of 10th International Symposium on Development in Digital Measuring Instrumentation, Naples, Italy, September 17-18, 1998. Pascale Daponte, Máximo D'Apuzzo, and Antonio Langella, Eds IMEKO TC-4, Sept 1998, pp 320-324.

4.- S. M. López Silva, R. Giannetti, M. L. Dotor, D. Golmayo, **P. Martín**, F. Miguel-Tobal, A. Bilbao, J. P. Silveira. Fotoplethysmografía por transmisión con diodos láser en el infrarrojo cercano durante el ejercicio. Óptica pura y aplicada (revista de la Sociedad Española de Óptica); 2005;38 (1) : 31-39

5.- **Martín-Escudero P**, Miguel-Tobal F, Bilbao Monasterio A, Galindo Canales M, Silveira Martín JP, Dotor Castilla ML, Golmayo Fernández D, Gianetti R, López-Silva S. "Aportaciones Fisiológicas de la medida continua de la saturación de oxígeno en atletas de ambos sexos que realizan pruebas de esfuerzo máximas". Selección. 2006; 15 (3): 132-143.

6.- **Martín-Escudero P**. Physical exercise in epilepsy (in spanish).Semergen. 2007; 32: 127-139

7.- S.M. López Silva, M.L. Dotor, J.P. Silveira, R. Giannetti, **P. Martín-Escudero**, F. Miguel-Tobal, A. Bilbao, M. Galindo Canales. "Pulse rate measurement from transmittance photoplethysmography in cycle ergometer test". Proceedings IMTC2 International Instrumentation and Measurement Technology Conference, USA Austin Texas. Mayo3-6 2010.

8.- Marca Fuertes C; Galindo Canales M; Miguel-Tobal F; **Martín-Escudero P**. La pulsioximetría y su aplicación en pruebas de esfuerzo máximo". Apuntes Medicina del Esport. 2011;46 (169):23-27.

9.- S. M. López Silva, R. Giannetti, M. L. Dotor, D. Golmayo, JP. Silveira, F. Miguel-Tobal, A. Bilbao, M Galindo Canales, **P. Martín Escudero**. Heuristic Algorithm for Photoplethysmography Heart Rate Tracking during Athletes Maximal Exercise Test". Journal of Medical and Biological Engineering (JMBE).2012; 32( 3): 181-188.

10.- **Martín-Escudero P**, Muñoz-Guerra J, Del Prado N, Galindo Canales M, Fuentes Ferrer M, Vargas S, Soldevilla AB, Serrano-Garde E, Miguel-Tobal F, Maestro de Las Casas M, Fernandez-Pérez C. Impact of UGT2B17 gene deletion on the steroid profile of an athlete. Physiol Rep,2015; 3 (12), e12645.

11.- Chauvet M, **Martín-Escudero P**, Martínez-de-Haro V, J, Cid-Yagüe L. "Physical Activity and smoking habit in Adolescent Students". Revista Internacional de Medicina y Ciencias de la Actividad Física y el Deporte.2018, 18 (69); pag 151-164.

12.-**Martín-Escudero P**, Muñoz-Guerra J, Vargas S, Serrano-Garde E, Soldevilla AB, Galindo-Canales M, Del Prado N, Fuentes-Ferrer M, Fernández-Pérez C. Impact of the UGT2B17 polymorphism on the steroid profile. Results of a crossover clinical trial in athletes submitted to testosterone administration: Steroid ISSN: 0039-128X: 2019, 141;104-113

## 6.- Patents:

1.- **PATENT**.- Authors: Giannetti R, Silveira Martín JP, Dotor ML, Golmayo D, **Martín Escudero P**, Miguel Tobal F, Bilbao A, López S; METHOD OF PROCESSING PHOTOPLETHYSMOGRAPHIC SIGNALS OBTAINED FROM A PERSON OR ANIMAL AND OXIMETER USING SAID METHOD. Nº: ES200501425, date of priority: 13 jun 2005. Spain.

2.- **PATENT**.- Authors: Giannetti R, Silveira Martín JP, Dotor ML, Golmayo D, **Martín Escudero P**, Miguel Tobal F, Bilbao A, López S Nº: PCT/ES06/070080, date of priority: 12 jun 2006. (WO/2006/134197) METHOD OF PROCESSING PHOTOPLETHYSMOGRAPHIC SIGNALS OBTAINED FROM A PERSON OR ANIMAL AND OXIMETER USING SAID METHOD

3.- **PATENT**: National P201630398 Date of reception: 01 abril 2016, 14:28 (CEST).

Authors: Giannetti R, Sanchez Miralles A, Dotor ML, **Martín Escudero P**, Miguel Tobal F, Galindo Canales M, López S. SENSOR, DEVICE, SYSTEM AND METHOD FOR DETERMINING INTERVALS NON INVASIVE TRAINING FOR CONDUCTING AN EXERCISE.

4.- **PATENT**: (internacional) PCT/ES2017/070195 fecha de recepción: 31 March 2017. Authors: Giannetti R, Sanchez Miralles A, Dotor ML, **Martín Escudero P**, Miguel Tobal F, Galindo Canales M, López S; SENSOR, DEVICE, SYSTEM AND METHOD FOR DETERMINING INTERVALS NON INVASIVE TRAINING FOR CONDUCTING AN EXERCISE.