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When I came to the Netherlands, I didn't know that there was a disease called pelvic organ prolapse. This thesis is the result of five years of hard work on the pathophysiology of this all too common condition. I encountered to the world of urogynaecology by chance and now I am making it my career path. Over the course of my PhD I had the privilege to work as part of a multidisciplinary team with very enthusiastic, encouraging and knowledgeable people, and I am very grateful for that.

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ABOUT THE AUTHOR



Alejandra Maria Ruiz Zapata was born on the 2nd of December 1980 in Medellin, Colombia, the first daughter of Luis Norberto Ruiz Robledo and Clara Patricia Zapata Arango. She graduated from the Teresiano School in 1998, and subsequently obtained a 1st class bachelor's degree in Biomedical Engineering from the Escuela de Ingeniería de Antioquia (EIA) and the Universidad CES, Medellin in 2003. In the last year of her BSc degree, she had her first experience of doing research abroad, doing an internship at the Centre of Biomaterials at the Polytechnic University of Valencia (UPV)

with the project: “scaffolds with interconnected structures for tissue culture development”, under the supervision of Prof. José Luis Gómez Ribelles in Valencia, Spain. She also did an internship at the Cardiovascular Dynamic Group of the Saint Mary's Cardiovascular Clinic under the supervision of Dr. Jhon Bustamante in Medellin. In 2003 she obtained two scholarships: one from the Spanish Agency of International Cooperation for Development to attend the Latin American Conference on Biomaterials for health sciences in La Antigua, Guatemala, and another from Los Andes University to attend the International School of Polymers in Merida, Venezuela.

In 2004 she travelled to London to study English, and after two years of saving money whilst working in a cinema, she did a master's degree in 2007 in Bioengineering and Physical Science in Medicine at Imperial College of London. During that time she was awarded a Sir Brigit scholarship, and also did an internship in tissue engineering at The Steven's group, where she broadened her expertise and her love for cells, whilst doing research in cellular responses to hypoxia mimicking bioactive glasses and *in vitro* angiogenesis models, until early 2010.

In May 2010 she moved to the Netherlands to start her PhD at the department of Orthopaedic Surgery of the VU University Medical Center, in collaboration with the Department of Oral Cell Biology of the Academic Centre of Dentistry (ACTA) in Amsterdam, resulting in this thesis entitled: “Pathophysiology of pelvic organ prolapse: cells, matrices and their interactions”. Her work was supervised by Prof. Theo Smit, Dr. Marco Helder and Dr. Manon Kerkhof. For part of this work she received a best poster presentation award at the 4th International Conference on Tissue Engineering, 2011. She is currently a postdoctoral researcher at the obstetrics and gynecology department at the Radboudumc, Nijmegen, in collaboration with the urology department, and as part of the reconstructive and regenerative medicine research theme at the Radboud Institute for Molecular Life Sciences (RIMLS). Her new challenge is to start the experimental urogynaecology research group at the Radboudumc. She has also been a member of the research and development committee of IUGA since 2014.

List of publications

Ruiz-Zapata A.M, Kerkhof M.H, Zandieh-Doulabi B, Brölmann H.A.M, Smit T.H and Helder M.N. (2014) Functional characteristics of vaginal fibroblastic cells from premenopausal women with pelvic organ prolapse. *Mol Hum Reprod*, 20:1135-43.

Kerkhof M.H, **Ruiz-Zapata A.M**, Bril H, Bleeker M.C.G, Belien J.A.M, Stoop R. and Helder M.N. (2014) Changes in tissue composition of the vaginal wall of premenopausal women with prolapse. *Am J Obstet Gynecol* 210:168.e1-e9.

Ruiz-Zapata A.M, Kerkhof M.H, Zandieh-Doulabi B, Brölmann H.A.M, Smit T.H and Helder M.N. (2013) Fibroblasts from women with pelvic organ prolapse show differential mechano-responses depending on surface substrates. *Int Urogynecol J*, 24:1567-75.

Ruiz-Zapata A.M, Kerkhof M.H, Ghazanfari S, Zandieh-Doulabi B, Stoop R, Smit T.H, Helder M.N. Pelvic organ prolapse decreases the quality of the matrix produced by vaginal fibroblastic cells *in vitro* (submitted for publication).

Ruiz-Zapata A.M, Kerkhof M.H, Zandieh-Doulabi B, Ghazanfari S, Smit T.H, Helder M.N. Influences of extracellular matrices on myofibroblast differentiation in pelvic organ prolapse – a pilot study (submitted for publication).

Kerkhof M.H, **Ruiz-Zapata A.M**, Zandieh-Doulabi B, T.H. Smit, Brölmann H.A.M, Stahlecker-Vosslamber S. and Helder M.N. Microarray analysis of the anterior vaginal wall from premenopausal patients with pelvic organ prolapse (submitted for publication).

IUGA R&D committee opinion paper: Prevention of pelvic floor disorders (2015) **Ruiz-Zapata A.M** invited contributor of the section: Biomechanics in prevention of pelvic floor disorders (accepted manuscript).

Vashaghian M, **Ruiz-Zapata A.M**, Kerkhof M.H, Zandieh-Doulabi B, Werner A, Roovers J.P and Smit T.H. Towards a new generation of pelvic floor implants with electrospun nanofibrous matrices (in preparation).

International meetings attended

- 2011-2015 Annual Meeting of International Urogynecological Association (IUGA). 2011 Lisbon, Portugal (attendee); 2012 Brisbane, Australia (podium presentation); 2013 Dublin, Ireland (poster), 2014 Washington D.C, USA (oral poster presentation); 2015 Nice, France (poster).
- 2014 1st Matrix Biology Europe Conference (MBE), Rotterdam, the Netherlands (oral presentation).
- 2011 4th International Conference on Tissue Engineering. Crete, Greece (prize for best poster presentation).
- 2011 4th European Cell Mechanics Meeting, Amsterdam, the Netherlands (poster).
- 2002 Latin American conference on biomaterials for health sciences, La Antigua, Guatemala.

National meetings attended

- 2010-2013 Annual Meeting of the Netherlands society for biomaterials and tissue engineering (NBTE). Lunteren, the Netherlands. 2010, 2011 (poster), 2012 (oral presentation), 2013 (poster presentation).
- 2011-2014 Annual meeting of the MOVE Research Institute Amsterdam, Amsterdam, The Netherlands. 2011 (poster), 2012 (poster), 2013 (poster), 2014 (oral presentation).
- 2014 New Frontiers Symposium in Regenerative Medicine. Nijmegen, the Netherlands.