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Biophysicist in Profile



Ligia G. Toro de Stefani

Her 81-year old father, Hermilo Toro, still practices medicine in Mexico City. "When I look at him at his age still working," Ligia Toro de Stefani says, "I say to myself, there is no reason why I should not be working very hard."

But it is more than a strong work ethic that drives Toro de Stefani. It is a passion for learning, for teaching, and for living. "Everyday is a great achievement," she says, "because everyday that I wake, I learn something new."

One of her former postdocs, Yoshio Tanaka, now Associate Professor in the Chemical Pharmacology Department at Toho University School of Pharmaceutical Sciences, says that he "learned a life philosophy" from Toro de Stefani. "Not only did I learn about ion channels from her, but I learned how to write, how to present that which I write, and how to conduct myself in the lab."

She would always say, "nothing is impossible in life if you want it."

Born in Mexico City, Toro de Stefani was surrounded by science and medicine through her father, an immunologist, and

her mother, the late Herlinda Calzada, who was a nurse anesthetist. Both parents instilled in her and her five siblings – three of whom also pursued careers in science and medicine – the determination to create their own opportunities and the importance of remaining passionate about what they chose to do in life. Toro de Stefani recalls her father constantly posing challenging questions to her and her siblings, forcing them to be analytical thinkers. Through her parents' work in a birthing clinic they founded together, Toro de Stefani witnessed firsthand the impact that science and medicine could have on society.

As a small child Toro de Stefani wanted to be a teacher. Her true passion for science started in secondary school when she began to take chemistry and biology classes. She was transfixed when she heard a story about Louis Pasteur looking into the tiny crystals of paratartronic acid and seeing two types of crystals, one mirror image of the other, which led to his discovery of dextrorotatory (d) and the levorotatory (l). After that, she could not get enough of being in the lab conducting crystallization experiments. She credits her chemistry teacher with encouraging her always to ask, "why" and to never be content with accepting a simplistic explanation.

After graduating from secondary school, Toro de Stefani attended the Universidad Iberoamericana, where she

received an undergraduate degree in Chemistry. She went on to receive her Masters and Ph.D. from Universidad Autónoma

Metropolitana-I and Centro de Investigación y de Estudios Avanzados del IPN (CINVESTAV), respectively.

While attending CINVESTAV and working on her thesis, she met Enrico Stefani, who at the time was her thesis

"Everyday is a great achievement..."

advisor and mentor. Toro de Stefani was captivated by the precision in Stefani's hands when conducting experiments and found him "always happy and enthusiastic." Following in her parents' footsteps – they too had met while pursuing individual careers in the same arena, fell in love, and made the choice to marry and collaborate professionally – Toro de Stefani and Stefani married and became colleagues. The commonality and passion they share for biophysics is evident when she speaks of their professional relationship. She explains that they are not unique in that there are a number of scientific husband and wife teams, and from her perspective this can be a big plus. Each influences and complements the other; both grow together.

Following completion of her Ph.D. program, Toro de Stefani remained in Mexico for one year working on her post-doctoral training at Centro de Investigación y de Estudios Avanzados del IPN before permanently moving to the states, where she continued her training at Baylor College of Medicine in Houston, Texas.

In 1987 she accepted a Research Associate position at Baylor and left there in 1994 as an Assistant Professor. She then joined the staff at David Geffen School of Medicine at UCLA, where she currently holds an appointment as Professor of Anesthesiology in the Division of Molecular Medicine with a secondary appointment in the Department of Molecular & Medical Pharmacology. Her husband Enrico Stefani is also on staff at UCLA, where he is the Director of the Division of Molecular Medicine of the Department of Anesthesiology, Vice Chairman of Research and Professor of Anesthesiology and Physiology.

"Basic research is the basis for the advancement of medicine, the advancement of technology," she states, "without research we cannot keep growing." Her research work reflects this philosophy. Although not a physician, Toro de Stefani is adamant that her research relate to a clinical aspect that will contribute to the

advancement of medicine.

Ramon Latorre, who met Toro de Stefani at Baylor, says that "Ligia combines an immense working capacity with lots of brain, a mixture difficult to beat." Latorre, currently at the CECS in Chile,

"...if you want to do this, study hard, recognize your potential, and create your own opportunities. If you produce good-quality work, you will be recognized for it."

explains that Toro de Stefani "has been important in the development of our knowledge of the structure and modula-

tion of the BK channel by beta subunits. The membrane topology proposed by Ligia and her team for the BK channel is now accepted by all researchers working in the field."

Her current research in ion channels and smooth muscle K channels will provide tools for molecular medicine and will help understand and treat cardiovascular disease in the growing aging population. The research team is studying calcium activated potassium (Ca-activated K-MaxiK) channels that control vascular tone and the changes that occur during aging to the blood vessels as it relates to this ion channel. They are studying the basic mechanisms of how the channel works and how it affects the physiology of the vascular system.

She is also a Co-PI, working with her husband, on studies involving remodeling of cardiac and smooth muscle K channels by sex hormones. This research further expands her studies investigating ion channel remodeling during functional cardiac hypertrophy in pregnancy. In their efforts to understand the genes that are expressed during pregnancy, they have discovered that the genes that are markers for hypertrophy are not turned on during



Ligia Toro de Stefani and her husband *Enrico* (left), on a recent visit to Japan. Also pictured (left to right) are *Kaoru Tanaka*, *Yoshio Tanaka* (former postdoc), and son *Michio*.

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MAC Activities

This year's Society for the Advancement of Chicanos and Native Americans (SACNAS) meeting was held in Austin, TX from October 21-24. The Biophysical Society was once again represented by a booth with programs and flyers giving an introduction to the field of Biophysics, as well as flyers and pamphlets from various programs from contributing schools and labs. Grant applications for the FASEB/MARC travel awards to attend our Annual Meeting and information on our Summer Mini-course in Biophysics was also displayed. Over the course this three-day meeting, the largest amount of response came from two groups of attendees: faculty at various schools interested in the Summer Mini-course in Biophysics and students curious about the field of Biophysics. It has become obvious in working conferences over the last couple of years that there is still a misunderstanding of what the field of biophysics is, as well as a misunderstanding in the research and potential employment within the field. These are subjects we as a Society need to address in order to gain interest from our students at an earlier point in their education careers. On another note, SACNAS has done a wonderful job of getting interest and attendance from K-12 teachers. We were approached by several teachers interested in whether we had any information pertinent to students at their level. We should consider ways to do this for the next meeting. Lastly, I would like to give special thanks to *Alberto Roca* for helping with running the Biophysical Society booth at this year's meeting. Overall, I think we have made significant strides with the SACNAS community and with additional changes will continue to increase our numbers of both Chicano and Native American Biophysicists.

—*Gabriel A. Montaña*, Los Alamos National Laboratory

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pregnancy. The only gene that changes both in hypertrophy during pregnancy and hypertrophy in a deceased state is an ion channel called Kv4.3. The genes that are turned on during hypertrophy in pregnancy are not turned on in hypertrophy in a deceased state, which is believed to be the reason why the heart does not fail and recovers after partum. This research could potentially lead to important breakthroughs in the treatment of cardiovascular disease in the aging population.

In addition to her research, Toro de Stefani finds great satisfaction in teaching, although she does not feel that research and teaching are separate functions. She finds that teaching enhances her learning process and growth, and seeing students grow is a great satisfaction. She advises her students and all those interested in research that "if you want to do this, study hard, recognize your potential, and create your own opportunities. If you produce good-quality work, you will be recognized for it."

Since joining the Biophysical Society in 1980, Toro de Stefani has remained very active in Society activities. She currently serves on the Executive Board and the Program Committee. She is also Chair of the International Relations Committee. "From every committee, I have learned," she says, but "everything has responsibilities and I try to do what I say I am going to do and follow through." She feels her service on the Program Committee is particularly important. There, she explains, "you are delineating where science is going and showing the new things that are being done, that's why you recommend speakers. I think

the symposia are important for the members of the Society to keep them abreast and informed of new innovations in the world of science." She also notes the important work of the International Affairs Committee, whose efforts "make a difference to those who are abroad and do not have the opportunity to come to the United States or be exposed to a vast

"...you chose what you think is a priority and you just do it."

array of scientists." That committee awards travel grants to the Annual Meeting each year, and Toro de Stefani knows firsthand how important those awards are. When living in Mexico, she was herself a recipient of a Society travel award. She attended her first annual meeting in New Orleans in the early 80s, and to date has not missed a meeting. "The work of the International Affairs Committee can be the deciding factor for a young person to make the decision to become a scientist," she believes, "because the travel award alleviates economic constraints or barriers some may have."

In addition to her work, Toro de Stefani loves spending time on the beach with her husband, daughter Paola, and two grandchildren, Andrea, age 11 and Ivan, age 8.

Whether work or play, "there are always time limitations and deadlines," she says, "but you choose what you think is a priority and you just do it." And if she follows in her father's footsteps, she'll be doing it for a long time to come.