

Obituary

Raúl Mena: 1953–2014

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We are greatly saddened by the recent death of Raúl Mena, our mentor, collaborator, and friend. He was a professor in the Department of Physiology, Biophysics, and Neurosciences of the Advanced Research Studies Center (CINVESTAV-IPN) in Mexico City. Raúl was born on July 23, 1953 in Merida, Yucatan, Mexico. He was proud to be of Mayan descent.

After suffering a stroke in 2011, he retired from his scientific and academic work to recover with his family, with all the love from his mother and his sister “Amor” (love). Friends, students, and coworkers hoped that Raúl could return to scientific work, but he passed away suddenly on 11 June 2014 (Fig. 3). Raúl, who studied with such a passion the tau molecular processing in Alzheimer's disease (AD), also founded the first brain bank in Latin America.

Raúl Mena began his studies in medicine at the faculty of Medicine in Yucatan under the supervision of Jorge Zavala-Vázquez. He moved to Mexico City to attend the Postgraduate School at the CINVESTAV, initially with Adolfo Martínez-Palomo, and later with Victor Sutsumi-Fujiyoshi. Finally, he got his PhD in the laboratory of Eugenio Frixione-Garduño.

However, Raúl's first contact with AD was during his first postdoctoral fellowship in the laboratory of Claudio Cuello of McGill University. In 1989, his first studies concerned the use of the new antibody 423, on neuropathological immunohistochemistry of neurofibrillary tangles. The antibody 423 was developed

by professor Claude Wischik of Cambridge University, UK. Using this antibody, Raúl proposed a sequence of tau protein aggregation in neurons, leading to paired helical filaments [1]. This work led professor Wischik to invite him for a fellowship at the MRC in Cambridge University, UK. During his stay at Cambridge, Raúl met professor Brad Amos, the inventor of the confocal microscope, which led to both receiving an award from BIO-RAD for the development of neurological applications for confocal microscopy. In professor Wischik's laboratory, Raúl studied tau and amyloid- β assembly into neurofibrillary tangles and senile plaques using a new label, thiazin red. These studies led him to propose thiazin red as a new rapid marker for AD [2].

Raúl returned to Mexico in 1994, and initially worked for the health security system of Mexico. After that he received an offer from Pablo Rudomin to join CINVESTAV. One of his initial focuses was to constitute the first brain bank in Mexico. He received his first samples from the General Hospital with the collaboration of Laura Chávez. After that he started collaborative work at the National Institute of Neurology with Elisa Alonso, Zoila Trujillo and Ana Luisa Sosa. He also worked to provide the best conditions for the elderly. He was named coordinator of the National Committee of Elderly People Attention (CONAEN). During this work he focused on aging, AD patients, and other dementias and on the caregivers. He also worked as scientific assessor for the Mexican Alzheimer Federation (FEDMA). He also was a founder of the 10 66 group, a Latin America group developing research in dementia.

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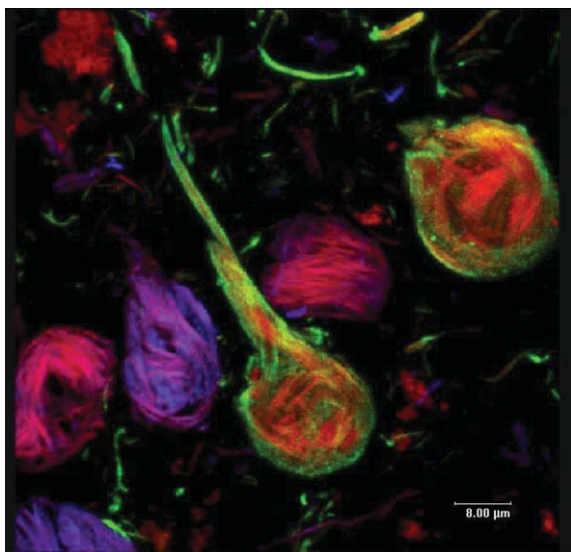


Fig. 1. “The rainbow of dementia”. Triple labeling of neurofibrillary tangles in AD brain. Two antibodies against tau protein (green and blue channels) and contrasted with thiazin red dye (red channel). Lecia SP8 José Luna/Raúl Mena. Brain Bank LaNSE CINVESTAV.



Fig. 2. From left to right, row 1: Paola Flores, Raúl Mena, Vanessa Ibarra, Alejandra Martínez. Row 2: Amparo Viramontes, Benito Mijares, Miguel Angel Ontiveros, Eduardo Vera, José Luna and Erick Pérez. Dear Raúl Mena.

Raúl’s knowledge of the neuropathology of AD was transmitted to his students, friends, and the scientific community. He loved to teach (Fig. 2). He often taught courses to children, undergraduates, and postgraduate students. Particularly important to him was his collaborative work of teaching and speaking with families

and caregivers of AD patients. He spent a lot of time on this social work. He often made jokes, smiled, and told the audience many of his own experiences. In the case of one of the authors (JG), he met Raúl when was a speaker at Veracruz Mexico in 1992. As an undergraduate student, JG began to work in Raúl’s laboratory in early 1995. During this period, Francisco García-Sierra, a PhD student, was working in Cambridge with Professor Wischik. Dr. Francisco Garcia-Sierra continues the line of research on tau pathological assembly at CINVESTAV to this day.

Raúl Mena sent JG to Montreal, Canada, and established a collaboration with Remi Quirion at McGill University and with Yves Robitaille and Yves Joannette at Montreal University. These collaborations still continue.

During JG’s stay in Montreal, Raúl Mena visited often to discussed advances in research [3]. JG was often surprised by his knowledge in many fields. He loved to cook and enjoyed good wines. He and JG combine the love for food with long talks. José Luna said one time that during a dinner with Ignacio Brusco, he

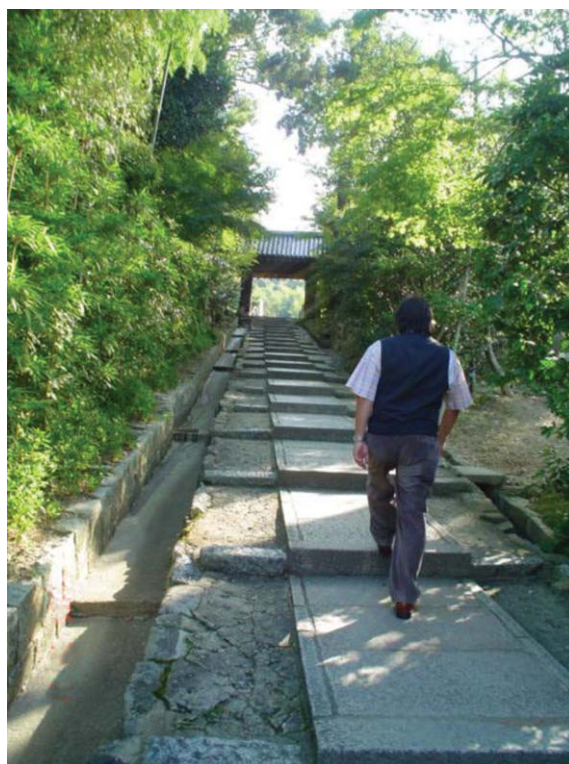


Fig. 3. “Walker, your treads are the path and nothing more; walker, there is no path, the path is made when walking (Antonio Machado). Caminante son tus huellas el camino y nada más; caminante no hay camino. Se hace camino al andar” (Antonio Machado).

(Brusco) said he loved talking with Raúl Mena because his talks were quiet magic as defined Raúl as the “big fish”, like in the film with the same name. Furthermore, Marsel Mesulam in Chicago said of Raúl “his research is so beautiful that is impossible that it was not true, because beauty and the true were identified in him”.

One of us (JL) was the youngest student in the laboratory when Francisco García-Sierra and JG arrived. José was initially the technician helping Raúl Mena in his projects. He followed all the knowledge of Raúl, especially the small details to obtain high quality images. José obtained his PhD and became a full coworker. But Raúl always said “José is my right arm”. “No matter if the lab is destroyed, if José is here we can do anything”. José continues Raúl Mena’s legacy at CINVESTAV.

Raúl Mena’s work created an art form: the histopathological analysis of tau protein in AD using confocal microscopy. His confocal AD images are like paintings filled with colorful and rich paints. Raúl

Mena always said, “I consider AD pathology as the rainbow of dementia.” (Fig. 1).

ACKNOWLEDGMENTS

Authors want to thank to “ASPELAB DE MEXICO” for all the unvaluable support to DR. Raúl Mena and JL and JG.

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