Profile

Nubia Muñoz: defining the role of HPV in cervical cancer

Nubia Muñoz learned at a young age the devastating impact that infectious diseases can have on families. She was 6 years old when her father, a farm worker in the city of Cali, Colombia, died of diphtheria, leaving her mother to care for five children—four boys and Nubia, the youngest. Looking back, Muñoz realises her father’s death was particularly terrible because it was potentially preventable. “At that time, penicillin was just arriving in Colombia”, she says. “So he was not well treated.” Her father’s death left the family with no income, so her mother took work as a maid and her older brothers all started working as soon as they finished high school. “I was brought up in a humble ambience, but it was a close family. My brothers took care of me well”, she says. Unlike her brothers, however, Muñoz went on to university, making a snap decision to sit the tough entrance exam for the medical faculty at Universidad del Valle, Cali.

She got in, and then discovered that the medical school had a system for charging tuition fees that provided an incentive to keep doing well. Each year, the person who topped the class paid nothing, and the second place winner paid half. “During the first year, a boy who was very rich got the first prize and I got the second”, she laughs. “But after that I decided I had to be first to help myself and my family. I got the first place in all 6 years of my medical studies.”

After graduating, Muñoz gravitated towards pathology. The head of the pathology department, Pelayo Correa, had set up a cancer registry in the city—the first in South America. Muñoz helped with the project, and Correa became a mentor. “She was not only the most outstanding student in her class, but she also had a keen interest in knowing more about the reasons for the biological phenomena and the impact of disease on our society”, recalls Correa, now at Vanderbilt University in the USA. After passing the pathology course, Muñoz asked Correa what line of work had the greatest potential to benefit the community. “My response: politics”, he says. “She told me that she was not interested in becoming a politician. Then, I told her, the second most promising choice will be doing research on cancer epidemiology.”

Muñoz followed that advice, training in pathology in Cali before gaining a fellowship from the International Agency for Research on Cancer (IARC) to study for a Masters of Public Health in the USA at Johns Hopkins University’s School of Public Health. From there, in 1970, she was quickly recruited to the IARC headquarters in Lyon, France. Her first projects focused on cancers arising from infectious agents. Muñoz went on to work at the National Cancer Institute in Bethesda investigating herpes simplex type 2, at that time a leading candidate for the causative agent for cervical cancer, but returned to IARC and focused again on cancer epidemiology.

In the mid-1980s, Muñoz took control of her own unit at IARC, where she began to lead a huge effort to confirm the link between human papillomavirus (HPV) and cervical cancer. “Nubia is strong and determined”, says her colleague Xavier Bosch, who worked with her at IARC, and now at the Catalan Institute of Oncology in Barcelona, Spain. “She never bends to a position that she does not accept. She is intuitive and very hard working.” Muñoz and her colleagues embarked on an international series of case-control studies in more than 30 countries. Eventually, their work showed that HPV infection was one of the strongest risk factors for cervical cancer ever found. This work created a global community of researchers, Bosch says: “On each occasion that we started a new programme in the field she would initiate a close relationship with the local scientists. Many of these relationships continue to be active in an extremely successful international net, where work and friendship intermix.”

In 1993, Muñoz organised the first meeting on HPV vaccines. “Her discoveries made it possible to focus on preventive measures, including the development and testing of highly effective vaccines against HPVs”, says Correa. “Because of her work, every year thousands of women, many of whom are the only support of several children, will be spared a premature death from cervix cancer.” Muñoz later convinced IARC to convene a group of experts to reach a consensus concerning the classification of HPVs as carcinogens. In 1995, experts classified HPVs 16 and 18 as group 1 human carcinogens. “This monograph had an enormous impact in subsequent prevention research and policy”, declared the International Epidemiological Association in awarding Muñoz the association’s inaugural 2008 Sir Richard Doll Prize in Epidemiology. This year Muñoz, who was nominated for the Nobel Prize last year, received the Charles Rodolphe Brupbacher Prize for Cancer Research, which she shared with Sir Richard Peto. Last month she also received the 2009 Canada Gairdner Global Health Award.

Muñoz retired from IARC in 2001, 5 years before the first HPV vaccine hit the market. But she continues to publish research, including in this journal, and has retained active links to the companies developing the vaccines as well as with the Catalan Institute of Oncology, Barcelona, and the National Cancer Institute, Bogota, Colombia, where she is Emeritus Professor. Muñoz says she is surprised by what she has achieved in her career: “It’s like a dream. I never would have imagined I would be able to do and to live what I have lived. The experience has been fantastic, and the work I don’t consider work because it was so much fun.”

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For Muñoz and colleagues’ recent paper on an HPV vaccine see Articles Lancet 2009; 373: 1949-57.