GENETICS
and MOLECULAR BIOLOGY

Obituary

Willy Beçak (1932-2023): Devoted to science and family

Willy Beçak

The Genetics Community is deeply saddened by the loss of Willy Beçak, a prominent biologist and one of the key pioneers of genetics in São Paulo State and Brazil. On April 26, at the age of 90, Willy Beçak passed away due to post-surgical cardiac complications, leaving behind a legacy of groundbreaking contributions.

Born on October 26, 1932, in Mulhouse, France, Willy Beçak's family moved to Brazil when he was just one year old. Embracing his dual French-Brazilian heritage, he dedicated an astounding 60 years of his life to the Butantan Institute, starting in 1956. In 1960, Prof. Beçak embarked on his journey at the Laboratory of Genetics within the Butantan Institute, already during his doctorate. His involvement was catalyzed by an invitation from the institute's director at the time, Afrânio do Amaral, who sought to bring fresh perspectives into the research team, historically dominated by medical professionals. The young graduate was granted full autonomy to initiate genetic research in the Institute, a groundbreaking step that had not been undertaken by any Brazilian institution until then. This decision furthered his innovative spirit and foresight, especially given that the field of genetics was still in its infancy on a global scale.

In 1953, Francis Crick and James Watson proposed the molecular structure of DNA. This remarkable discovery opened countless possibilities for research, initiating then the Molecular Biology and Genomics Era. In 1956, Jérôme Lejeune identified the first chromosomal anomaly related to a human syndrome, Trisomy 21, then called "mongolism" and now recognized as Trisomy 21 or Down Syndrome. The Laboratory of Genetics of the Butantan Institute pioneered cytogenetic studies of human chromosomes in Brazil, producing the first published study on the Down Syndrome in the country.

In the early years, the Laboratory of Genetics generated numerous publications on the Down Syndrome and also new syndromes, with or without chromosomal anomalies. This approach significantly stimulated the curiosity of both national and international scientists, fostering a keen interest in collaborative exchanges, driven by the innovative work outlined in the institute's publications.

In 1955, Willy Beçak graduated in Natural History from the School of Philosophy, Sciences, and Humanities at the University of São Paulo (USP), which subsequently gave rise to the Biosciences Institute (IB-USP). There, he completed his Doctorate in Genetics in 1964 under the supervision of Crodowaldo Pavan. His academic journey was accompanied by notable accomplishments; he held the esteemed position of Full Professor of Medical Sciences at the Santa Casa de Misericórdia de São Paulo and also at the Faculty of Medicine in Marília-SP. His contributions led to his recognition as a Full and Honorary Member of several national and international Councils and Societies, including the Brazilian Academy of Sciences. His remarkable achievements were further acknowledged by the Brazilian President, who bestowed upon him the esteemed title of Commander of the National Order of Scientific Merit in 1996.

Another notable contribution he made after his retirement at the age 70. Prof. Beçak was then invited to advise on the structuring of the Department of Genetics at the Federal University of Latin American Integration (UNILA) in Foz do Iguaçú, PR, Brazil, whose mission is to conduct academic exchanges and solidary cooperation with member countries of Mercosur and other Latin American countries.

Willy Beçak published over 170 scientific articles and wrote 13 books on biology, genetics, and evolution. In addition to being and outstanding professor and scientist, Willy Beçak was a gentle and affectionate husband, father, grandfather, and great-grandfather.

He was the General Director of the Butantan Institute between 1983 and 1991, an idealizer and the founder of the Butantan Foundation, in 1989. He was also designated its first General Director from 1989 to 2000. Leading both entities, Willy Beçak proportionally encouraged scientific research and biotechnological development to generate immunobiological products, a mainstay that has allowed the insertion of the current Butantan Complex into the national pharmaceutical universe.

One of the most notable international acknowledgements came from the scientist and molecular biologist Susumo Ohno (1928-2000), affiliated with the City of Hope Medical Center in California. He is renowned for pioneering the concept of evolution through genetic duplication. The distinguished Japanese-American geneticist found inspiration in Beçak's doctoral thesis, defended in 1964. This groundbreaking thesis, presented a comparative study of the evolution of several snakes, uncovering the sex chromosomes in lower vertebrates. Impressed by his work, Susumo invited Beçak to collaborate with the research center in the United States.

With Prof. Beçak we lost an outstanding scientist who achieved groundbreaking milestones in the field of Down Syndrome, gene regulation mechanisms, and chromosomal sex differentiation in vertebrates. Along with his lifelong partner and wife, fellow scientist Maria Luiza Beçak, Willy Beçak made a significant contribution in 1966, describing the polyploidy in naturally occurring bisexual species of vertebrates, a landmark in the global scientific literature in the field of speciation in evolutionary genetics.

From the 1990s onwards (1990-2023), Willy Beçak and his team conducted basic and applied research on Bovine Papillomavirus (BPV) and Human Papillomavirus (HPV), along with the cancers associated with these viruses. Their studies aimed not only to identify therapeutic targets but also to develop vaccine prototypes with both prophylactic and therapeutic potential against BPV and HPV infections, which have the potential to trigger cancer. These studies resulted in several scientific contributions about cancer and vaccines, all spearheaded by the pioneering work by Willy Beçak.

Furthermore, the relevance of the topics explored by the teams of Willy and Maria Luiza Beçak has granted us profound insights regarding the interplay between Down Syndrome, polyploidy, and cancer. For instance, only a tiny extension of an extra telomere of chromosome 21 can suffice to trigger the entire Down Syndrome phenotype in humans. Notwithstanding, certain vertebrate species survive very well with complete genome duplications, maintained through a delicate equilibrium within the mechanisms governing gene regulation. These mechanisms meticulously manage the levels of essential products required for optimal organismal performance. Conversely, the onset of cancer can be attributed to polyploidy events in some cells and failure in the cell death program, called apoptosis. This disruption catalyzes the progression of tumorigenesis, metastasis, and, ultimately, the demise of the afflicted individual. Conceivably, there exists a nexus and potential insights connecting these three enigmatic realms, awaiting further exploration, and this could potentially unveil therapeutic targets and the development of novel products. This legacy left behind by Willy Beçak will guide forthcoming generations of scientists. It extends beyond his contributions to science, fostering a diverse cultural arena, while also propelling scientific and biotechnological research involving animal biology, venoms, toxins, sera, and vaccine development, as is already the case at the Butantan Institute and the Butantan Foundation.

Notably, Willy Beçak was the President at the Brazilian Society of Genetics (SBG) from 1978 to 1980. His exceptional contributions to genetics and scientific inquiry in Brazil were acknowledged in 2011, when he was honored as a distinguished genetic researcher at the 57th Brazilian Congress of Genetics. He leaves behind his wife and lifelong companion, Maria Luiza, a son, two daughters, four grandchildren, and a great-granddaughter. His departure also leaves a void within the genetic community, where he had built numerous cherished friendships.

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