



Commentary: John C. Martin (1951–2021)

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John Charles Martin, a chemist, longtime chief executive officer of the biopharmaceutical company Gilead Sciences, and more recently, a philanthropist and global health advocate dedicated to addressing health disparities in communities around the world passed away on 30 March 2021 (Figure 1).

John was born in Easton, Pennsylvania, on 7 May 1951 to Dr Tellis Alexander Martin and Janet Sacks Martin, both chemists by training. Growing up as the eldest of four children in Evansville, Indiana, John's first of many subsequent jobs was picking strawberries. Seemingly unrelated to the career path he would take, his work ethic, humility, and perseverance were evident even at a very young age.

College took John to Purdue University, where he graduated with honors in Chemical Engineering (1973). Continuing on to University of Chicago and joining the laboratory of Professor Josef (Gus) Fried, John worked on the synthesis of prostaglandins, where he solved many unique synthetic chemistry challenges [1]. After receiving his PhD in organic chemistry (1977), John joined Syntex in Palo Alto and quickly advanced to section leader in drug discovery. During this time, John attended evening classes and earned an MBA from Golden Gate University in San Francisco (1984), an experience that years later led him to design and implement an onsite and subsidized MBA program for employees of Gilead Sciences, many of whom would neither have had the time nor resources to advance their education. This program was one of many examples of John's unwavering focus on supporting the development of his employees, in all roles and at all levels.

A creative and prolific synthetic chemist, John, had an extraordinary ability to mentally visualize the orientation and symmetry of atoms and molecules in 3 dimensions. At

Syntex, he continued to invent new chemistries to allow efficient synthesis of complex molecules [2,3]. He synthesized ganciclovir, thus co-inventing the first acyclic nucleoside antiviral drug to treat and prevent infections caused by cytomegalovirus [4–6]. This drug and its pro-drug remain cornerstones in the management of cytomegalovirus infections today [7]. John joined Bristol Myers in 1984 to lead its antiviral and anti-infective research programs in Syracuse, New York, where he directed the development and eventual licensure of two dideoxynucleoside antivirals to treat HIV/AIDS—didanosine and stavudine [8–11]. While at Bristol Myers, John initiated collaborations with Professors Antonín (Tony) Holý in Prague and Erik De Clercq in Leuven, and together they forged the new field of nucleotide antivirals [12].

Innovative science to fulfill unmet medical needs

In 1990, John joined the then early-stage biotechnology company Gilead Sciences in California and led the evolution of its research. John's first accomplishment was negotiating rights from Tony and Erik to a library of nucleotide analogs. After sustained research and development of these compounds [13,14], Gilead was transformed to become the world's powerhouse of antiviral drug manufacturing and commercialization [15–21]. Gilead's continuous success drove the productivity level of an entire industry and, most importantly, reduced life-threatening viral infections to manageable chronic diseases.

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Figure 1. John Martin in San Mateo, CA (2019)

In 1996, John was appointed Gilead's chief executive officer, a role he would hold for the next 20 years. During that timeframe, John launched 20 innovative medicines, made Gilead drugs accessible to millions of patients in developing countries, and increased the company value 140-fold to 120 billion USD. He was appointed Chairman of Gilead's Board of Directors in 2008 and would remain in that role until 2019. His tenure and leadership at Gilead was—and will continue to be—nothing short of legendary. Under his leadership, the company developed multiple breakthrough medicines, perhaps most notably for people with HIV, hepatitis B and hepatitis C. These inventions changed the treatment paradigm; John's leadership reshaped the foundation of global access to life-saving therapies.

To simplify HIV treatment, John directed Gilead in forming an unprecedented partnership between three companies, that led to the creation of the first single tablet regimen of three best-in-class anti-HIV medicines formulated into one pill dosed once daily [22]. This single tablet regimen, approved by the FDA in 2006, transformed the care of people living with HIV by avoiding regimens of multiple pills that made compliance challenging and led to the potential for drug-resisting treatment failures [19]. A few years later, following John's vision, the company gained regulatory approval for the first HIV medication indicated to prevent the transmission of the infection, an approach known as pre-exposure prophylaxis, or PrEP, for

people at risk for HIV infection [16,18,23]. To continually advance patient care, John's directive was that "we must continue to innovate to make our own products obsolete," such that each innovation improved on the prior advance. Meanwhile, John turned his focus to curing hepatitis C with an unwavering conviction and put Gilead in the lead to bring to patients several ground-breaking, safe and curative regimens, essentially eliminating the need for liver transplantation caused by hepatitis C [20].

Providing medicines to fulfill unmet access needs

John's pursuit of innovative science expanded into pioneering solutions for global health. In 2003, when John traveled to Africa with Tommy Thompson (then the U.S. Secretary of Health and Human Services) he was struck by the immense devastation HIV/AIDS was having across the continent. He recognized that this devastation extended beyond human lives, impacting economies and societies as a whole. There was no precedent or blueprint for how a company could enable equitable access, but Gilead forged the path under John's leadership. He directed the design of a revolutionary access program that would deliver the company's HIV treatments to more than 130 resource-limited countries. This access program provides licenses and technology transfers to generic manufacturers in India and other countries, thus enabling the licensees to rapidly produce quality drug products in high volume and at low cost [24]. The program later extended beyond HIV to include Gilead's medicines for viral hepatitis B and C [25]. Today, more than 18 million people in low-income countries around the world receive these life-saving medicines each day, owing to John's business ingenuity, engineering excellence and kind-heartedness.

John's commitment to addressing health disparities was fueled by a deep understanding that can only come from first-hand experience. He met with healthcare providers, public policy experts, and community workers, whether in low-income countries or devastated neighborhoods in the United States, to develop a better understanding of the barriers individuals faced daily. John stimulated the formation of the Gilead Foundation in 1995 for improving health and well-being in underserved communities around the world. Separately, in 2014, John established his private foundation, the John C. Martin Foundation, with the goal of facilitating the establishment of sustainable improvement of health care for populations in socially and economically disadvantaged settings (<https://thejcmfoundation.org>) [26,27].

Recognitions and services

John was widely recognized for his scientific and global health contributions to humanity. He received many awards, including the Horace S. Isbell Award from the



Figure 2. John Martin, Lillian Lou, Laura Lehman, and Richard Whitley on Little Cumberland Island, GA (2007)

Carbohydrate Division of the American Chemical Society (1990), the Gertrude Elion Memorial Lecture Award from the International Society for Antiviral Research (2003), the Lifetime Achievement Award for Public Service from the Institute of Human Virology at the University of Maryland School of Medicine (2014), the Biotechnology Heritage Award from the Biotechnology Industry Organization (2017), the Stanford Medicine Lifetime Achievement Award for contributions to science benefitting humanity (2019), and the National Academy of Sciences Award for Chemistry in Service to Society (2019). He was elected to the National Academy of Engineering in 2008.

In addition, John was honored by Belgium's Order of the Crown (2017), Senegal's Order of the Lion (2017), and the Republic of Georgia's Golden Fleece (2017). He accepted Honorary Doctoral Degrees from Katholieke University Leuven (2017) and The Scripps Research Institute (2019).

John's expertise was widely sought after through many private and public sector appointments. John was president of the International Society for Antiviral Research (1998–2000) and chaired two leading industry organizations (California Healthcare Institute, 2005–2006 and 2009 and BayBio, 1999–2001). He served on the boards of Golden Gate University, University of Southern California, University of Chicago, University of California School of Global Health, The Scripps Research Institute, Sarepta Therapeutics, Leyden Labs, and Kronos Bio. He was a member of the National Academy of Engineering's COVID-19 Call to Action Committee (2020–2021), and National Academies of Sciences, Engineering, and Medicine's Board on Global Health (2020–2021), and Committee on Advancing Pandemic and Seasonal Influenza

Vaccine Preparedness and Response—Vaccine Research and Development (2021). John's public service included the National Institute of Allergy and Infectious Diseases Council and AIDS Research Advisory Committee (2000–2003), the U.S. Centers for Disease Control and Prevention Health Resources and Services Administration's Advisory Committee on HIV and STD Prevention and Treatment (2004–2007), and the Presidential Advisory Council on HIV/AIDS (2006–2009).

A quiet, unassuming force, John was a visionary leader, an admired mentor, a trusted friend, a loving father, and an endearing partner (Figure 2). His overwhelming generosity and humility remained notable characteristics. Never one to seek the spotlight, he took great joy in celebrating others' accomplishments, even when those accomplishments were achieved through his steady guidance and support. His brilliance changed forever what a diagnosis of HIV or viral hepatitis mean, and his commitment to helping people around the world never faltered.

Summary

We celebrate the life and contributions of John C. Martin. His impact on the treatment of life-threatening viral infections will endure forever. Let all who read this Commentary continue the outstanding global work he initiated.

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