



The life and legacy of Dr. Emil J. Freireich

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Dr. Emil J Freireich 1927–2021

On February 1, 2021, Dr. Emil J Freireich, a pioneer in the field of oncology for his groundbreaking therapies for childhood leukemia, passed away peacefully in the Texas MD Anderson Cancer Centre where he spent over five decades of his career treating cancer patients; he was 93 years old. Freireich's, "out of the box" thinking and his determination and dedication for finding a cure for childhood cancer will not be forgotten among his patients, colleagues and students. Frequently referred to as the "founding father of modern leukemia therapy" [1] Freireich, was a pioneer of cancer treatment, and because of his willingness to always question conventional wisdom coupled with his devotion and empathy to the thousands of patients he treated throughout his career, he will undoubtedly be a legend in the history books for many decades to come.

Born during the Great Depression on March 16, 1927, Freireich grew up in poverty. At the age of two, his father died suddenly, a tragic circumstance that shaped who he became later in life. After his father's death, his mother had to work in a factory for long hours to support him and his sister. This left ample time for the two children to get into trouble however, they learned to fend for themselves, a trait that Freireich, later in life, said gave him the ability to face adversity in his formative years [2].

As a young boy, Freireich would pass his time delving into science books and took an interest in physics in his early teens. His ability to process information and turn what he had learned into questions that were beyond the scope of a young teenager with no post-secondary training caught the eye of his physics teacher who strongly suggested he attend university and pursue the field of Sciences [3]. At the age of 16, Freireich graduated high school with honors and was accepted into the University of Illinois College of Medicine where he waited tables to pay his tuition. He graduated sixth in his class in 1949 at the age of 22 [4].

Upon graduating, Freireich completed his internship and residency in two Chicago hospitals, and, in 1955 he was hired at the National Cancer Institute in Bethesda, Maryland, and was assigned the daunting task of caring for children with leukemia. Back then, nobody wanted to work in that area as it was known as "a blood bath unit with blood on the walls, pillows, floors" [5] due to the excessive hemorrhaging of the patients. Freireich stated "Leukemia at the time was a horrible illness, a death sentence, most children only lived 8 weeks after being diagnosed and 99 % died in a year" [6].

Perplexed by why the children were hemorrhaging and dying so quickly, Freireich turned his focus to research. He had heard of atomic bomb victims during World War II bleeding out and dying rapidly. He learned through his research that most of the victims had little to no platelets after receiving radiation and that the cause of death from having no platelets was hemorrhaging, the same as his young leukemic patients [7].

Freireich was convinced that the patients were bleeding to death because patients were receiving old blood due to the blood bank protocol of using the oldest blood first [8] however, that was dismissed quickly by his superiors. Freireich pointed out that the platelets in the donated blood only lasted for 48 h, therefore giving patients expired platelet blood was useless. To further his suspicions Freireich drew his own blood and gave his platelets to a leukemic patient and, as he suspected, the hemorrhaging ceased in the child and he survived [9], eliminating bleeding to death as a result of having leukemia.

Freireich didn't stop there and began researching the fact that tuberculosis patients had been given three controlled drugs and it had cured them of the disease. On a hunch, he pitched the idea of treating leukemia patients with a cocktail of drugs, four to be exact, to be administered all at once instead of singularly, to his colleagues at the N. C. I (National Cancer Institute) however, his theory was quickly dismissed. Fortunately, one of his colleagues, Dr. Emil Frei III, agreed with Freireich and they tested his hypothesis on several young leukemia patients. The results were as he expected, the patient went into remission but only for a short time. Now, with the support of his colleagues at the NCI, the two proposed they treat patients for a year with the cocktail and, in doing so, 90 % of the patients went into remission [10]. This treatment, known as early intensification, is still used today throughout the world.

Still, Freireich had work to do. Going back to his initial discovery that platelets in donated blood only lasted for 48 h, he believed there was an easier way to ensure patients were receiving fresh blood and white cells so, he teamed up with George Judson an engineer at IBM, whose son had leukemia [11]. After months of trial and error the two came up with the first continuous-flow blood cell separator with a high speed centrifuge that enabled platelets and white blood cells to be extracted from the whole blood of donors for leukemia patients [12]. The continuous-flow blood machine was lauded by oncologists and Freireich was given the patent in 1966 [13].

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Known nationwide at this point, Freireich was recruited by the MD Anderson Cancer Centre in 1965 and was asked to launch the chemotherapy program. He enlisted Dr. Emil Frei III and the two formed the Department of Developmental Therapeutics where, based on their findings, young scientists developed different drug combinations to cure various forms of cancer. During his time at MD Anderson Freireich trained hundreds of young physicians and scientists as a faculty member for over fifty years, contributed to over 600 scientific papers and more than 100 books. In those fifty years, Freireich did not rest on his accolades and continued to research and treat the thousands of patients he met over his 55 year career.

“What brings me joy is seeing my patients recover. It has not happened once, not twice, but many times, that I have seen my young patients I treated in their childhood come to me as adults and tell me I am the reason they have chosen to study in the field of science. They want to continue finding a cure for cancer” [14].

Freireich died peacefully at the age of 93, with his family by his side in the MD Anderson Cancer Unit where he spent over five decades of his career.

References

- [1] <https://www.mdanderson.org/newsroom/legendary-md-anderson-faculty-member-dr-emil-j-freireich-passes.h00-159458478.html>.
- [2] <https://www.youtube.com/watch?v=F0vO1mfzfs&t=690s>.
- [3] https://www.washingtonpost.com/local/obituaries/emil-freireich-a-pioneer-of-chemotherapy-and-towering-figure-in-oncology-dies-at-93/2021/02/04/0895e4fe-66e9-11eb-886d-5264d4ceb46d_story.html.
- [4] <https://ascopubs.org/doi/full/10.1200/JCO.21.00493>.
- [5] <https://www.mdanderson.org/publications/annual-report/annual-report-2015/the-man-who-helped-cure-childhood-leukemia.html>.
- [6] <https://www.mdanderson.org/publications/annual-report/annual-report-2015/the-man-who-helped-cure-childhood-leukemia.html>.
- [7] https://www.washingtonpost.com/local/obituaries/emil-freireich-a-pioneer-of-chemotherapy-and-towering-figure-in-oncology-dies-at-93/2021/02/04/0895e4fe-66e9-11eb-886d-5264d4ceb46d_story.html.
- [8] <https://www.mdanderson.org/newsroom/legendary-md-anderson-faculty-member-dr-emil-j-freireich-passes.h00-159458478.html>.
- [9] <https://books.google.ca/books?id=PiDWDwAAQBAJ&pg>.
- [10] <https://www.mdanderson.org/publications/annual-report/annual-report-2015/the-man-who-helped-cure-childhood-leukemia.html>.
- [11] <https://www.nytimes.com/2021/02/07/science/emil-freireich-dead.html>.
- [12] <https://www.nytimes.com/2021/02/07/science/emil-freireich-dead.html>.
- [13] <https://www.youtube.com/watch?v=F0vO1mfzfs&t=690s>.
- [14] <https://www.youtube.com/watch?v=F0vO1mfzfs&t=690s>.