

## Holbrook Kohrt: In Memoriam (1977–2016)

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On Wednesday, February 24, 2016, Holbrook Kohrt, MD, PhD, assistant professor at the Stanford University School of Medicine, died at the age of 38 of complications from severe hemophilia. His premature departure is a terrible loss for family and friends, for his patients, and for the field of immuno-oncology, to which he made great contributions. Although short, Holbrook's life is profoundly inspiring. Here, we—his colleagues and friends from Stanford University—share part of what we believe is his spirit and his legacy [his scientific contributions have been summarized elsewhere (1)].

Holbrook was born on December 14, 1977, and grew up in the rural town of Paupack, PA. He was diagnosed with severe hemophilia at the age of 3 months. As a child in the 1980s, Holbrook witnessed many of his hemophilic friends dying of AIDS at a time when blood products transfused to treat these patients were often contaminated with HIV. Holbrook was one of the lucky few who did not contract HIV, although he did acquire, and eventually recover from, hepatitis C. This close contact with death early in his life was a formative experience. Holbrook's chronic and life-threatening blood disease shaped his character, relationships, career choice, and pace of life. To understand him, one needs to remember that, before becoming a doctor, Holbrook was first a patient.

Holbrook arrived at Stanford University as a medical student in 2000, where he then completed his internal medicine residency (2005–2007) and fellowship (2007–2011). Concurrently with his fellowship, he completed a PhD through an Advanced Research Training Scholarship, simultaneously conducting immunotherapy and bone marrow transplantation projects in the laboratories of Professors Ron Levy and Sam Strober, respectively. In 2012, Holbrook became an assistant professor at the Stanford University School of Medicine and started his own laboratory.

Holbrook's life is unique in the sense that it is the story of a "hemophilic hematologist," the story of a patient with a life-threatening disease, and the story of a brilliant and passionate doctor and researcher who dedicated his life to improve the condition of cancer patients.

Many of us at Stanford had the privilege to work with Holbrook over the years and we all have been profoundly influenced by him. He brought us many insights into life, work, patient care, and research. Here, we share and remember those lessons for the benefit of all.

### No Obstacles in Life Are Insurmountable, Try Your Best to Overcome Them

Since he was diagnosed with severe hemophilia at an early age, everyone knew that Holbrook's life would not be "normal." Holbrook had to wear a helmet until he was seven years old to prevent him from a possible fatal head injury. He also learned to inject himself with Factor VIII when he was still a child. However, rather than resign or give up, Holbrook proved that he could do most things as well as or even better than "healthy" people. As a child, Holbrook became a spokesman for hemophilia to encourage people to give blood. Thanks to his efforts and his mother's commitment, his small town soon had the highest percentage of eligible adults donating blood—more than any other county in the state. Holbrook was not shy about sharing the story of his life and he chose to make it very public (2). He used it to inspire others and never to seek sympathy.

Due to recurrent joint bleeding, Holbrook experienced chronic pain since his childhood. Additionally, because of the

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severity of his hemophilia, he had to inject himself with Factor VIII very frequently. However, he would never complain. Only his close family and friends actually knew about his continuous suffering from pain in his joints. By suffering silently, Holbrook taught us that we should complain less and channel our energy to making a difference for others. Although he had chronic joint pain, Holbrook chose to live in an apartment with steep stairs and no elevator in the hills of North Beach in San Francisco! The views of the city and bay from his apartment rooftop were amazing, and that made it all worth it. Holbrook taught us that the main limits in our lives are those that we allow for ourselves.

### Choose a Goal That Serves Humankind

Because he was a patient and because he had seen many of his hemophiliac friends die of AIDS after blood contamination, Holbrook was more conscious than anyone about the importance of medicine. He intimately understood the value of translational research, having experienced through his own life the therapeutic innovations from the purification of Factor VIII from donated plasma to the cloning and production of pure recombinant Factor VIII protein. He felt indebted to medical science for the advances made in the treatment of hemophilia. This explains why he was so devoted to fight for his patients' lives and to dedicate so much time and effort to medical research. This career can be tough and competitive, but Holbrook never forgot why he was doing it: to improve the outcomes for patients with life-threatening diseases. And because he knew that time was limited, there was no place in his agenda for long meetings or politics.

### You Have a Purpose beyond Your Ego

Due to his life-threatening disease, Holbrook knew better than anyone that life should not be taken for granted. He was therefore humble in the face of his own achievements and did not enjoy spending time on people with oversized egos. His vulnerability would make Holbrook very attentive to the fragility of others and available for everyone in need, even though he overfilled his agenda. As a hematologist he could have focused his career on hemophilia research, but instead he dedicated his time and effort to another more prevalent, deadly disease: cancer. Holbrook taught us to receive life as a fragile and precious gift and to fight for a cause greater than ourselves.

### Team Work Makes Your Dreams Work

We remember Holbrook as an extremely generous person giving presents, sharing reagents and ideas, and always willing

to give his time and to collaborate. Holbrook taught us that we succeed as a team, not as individuals, and that collaboration accelerates projects and broadens our opportunities. For instance, one of his last projects of great importance to him was to harmonize immune monitoring techniques in order to facilitate comparisons across studies and boost cancer immunotherapy research (3).

### Live Fast and Furious

His close friends (and lab mates!) know that Holbrook was a huge music fan. He was always playing music while working and was an avid concertgoer. Many would describe Holbrook as overly busy. He conducted two PhD projects simultaneously. He slept no more than a few hours a night and showed up at work early in the morning (4 am was not unusual!). Holbrook lived his life with a sense of urgency. He knew better than anyone that life is short and that every single day is precious. He always wanted to make the most of the time he had. Holbrook was extremely achievement oriented, pushing hard to accomplish as much as he could. Although he was goal directed, he had an amazing curiosity and a capacity to explore different fields: from bench to bedside research, from academic projects (he cofounded Ovacure.org, a website dedicated to ovarian cancer) to private companies (he cofounded two companies, CombImmune, Inc. and Tusk Therapeutics), from Stanford to the rest of the world (Cuba, Belgium, the UK, France, and beyond). Holbrook was grateful to witness the advent of immuno-oncology during his lifetime. He was constantly sought out for his expertise by both the academic and industrial communities. Holbrook became a rock star in the burgeoning field of immuno-oncology. Like many rock stars, he departed far too soon, at the height of his career.

Holbrook lived a life of passion and compassion. In Holbrook, a terrible disease met an incredible character and an exceptional intellect, leading to a unique destiny. His short but brilliant life will leave indelible tracks on our souls. We are determined to keep Holbrook's memory and spirit alive so that it continues to inspire us and others. He had written that his mission in life was to "give people more time for them to express their love," and no doubt that is exactly what he accomplished. Holbrook, we thank you for what you have been and for what you taught us. We will miss you forever.

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