

## OBITUARY



### In Memoriam: A Tribute to Esmail Zanjani, 1938–2019

Our dear colleague, friend, and mentor, Dr. Esmail Dabaghchian Zanjani passed away on Saturday, October 5, 2019, at the age of 80. In addition to his children, five grandchildren, and brother, Esmail leaves behind many friends and colleagues in the fields of experimental hematology and fetal cell and gene therapy. His innumerable pioneering contributions to these fields are of such importance as to almost defy quantitation. Indeed, he is owed a vast debt of gratitude by his legacy of literally hundreds of scientists and clinicians from around the globe who have been shaped by his scientific leadership and deeply touched by his sparkling intellect, his incomparable charm and sense of humor, and his unbounded passion for science and for life.

Esmail was born in Resht, Iran, on December 23, 1938. His childhood and life vision were molded by the rigorous work ethic that he developed by helping his father with the grueling leather tanning family business. At the age of 18, Esmail followed his dreams, which took him to New York City, where he pursued a bachelor's degree at New York University (NYU). This move was to prove fortuitous on two accounts. It began Esmail's scientific career, and it also placed him in the right place at exactly the right time to meet Sally Zanjani, who became a writer known for her engaging books portraying the history of Nevada and the love of his life.

Following completion of his bachelor's degree, Esmail remained at NYU to obtain his master's degree and a PhD, investigating erythropoiesis. Esmail worked in the laboratory of Dr. Albert Gordon at the Washington Square campus of NYU. This laboratory focused on hematopoiesis and generated a series of PhDs that have greatly influenced American hematology (Drs. Broxmeyer, Sharkis, Van Zant, Monnette, Camiscoli, Meagher, Gallichio, Orlic, LoBue,

and Lutton to name a few). As an early indication of his outstanding scientific abilities, Esmail authored 11 articles during his postgraduate training. Needless to say, this remarkable productivity attracted the attention of several leaders in the hematology world, and Esmail was quickly recruited to join the faculty at the Mount Sinai School of Medicine. There he worked with Lou Wasserman, a leader in polycythemia vera, and Ron Hoffman in studies on severe aplastic anemia as well. These efforts established Esmail early on as a bench-to-bedside researcher. He also worked with Hal Burlington to begin the study of in utero hematopoiesis in sheep. Esmail stayed at Mount Sinai for 8 years, rising through the academic ranks, until he was recruited to the University of Minnesota School of Medicine with concurrent full professorships in the Departments of Medicine and Physiology. While in Minnesota he worked tirelessly on several projects, including in vitro aspects of the anemia of chronic disease and the influence of erythropoietin on hematopoiesis, with his fellows, including Joao Ascensao and David Roodman. He also continued his innovative studies of in utero transplants into sheep and hemoglobin switching with trainee Phil McGlave and collaborators such as George Stamatoyannopoulos in Seattle and the experimental veterinarian James Clapp at the University of Vermont. After 10 highly productive years in Minneapolis, Esmail relocated to Sally's hometown of Reno, Nevada. There he was to spend the remainder of his career in joint appointments at the VA Medical Center and the University of Nevada, where he eventually served as the Chair of the Department of Animal Biotechnology and the Director of the Nevada Genomics Center for approximately a decade before retiring. During this fertile and prolific period he continued his studies on in utero transplants with his major collaborators,

Graca Almeida-Porada and Chris Porada, Michael Harrison and Alan Flake from the University of California at San Francisco, and many others.

Among his greatest contributions were advances in fetal stem cell transplantation and its use for gene therapy, a field he launched with his remarkable report in *Science* [1]. This study showed that it was possible to transplant hematopoietic stem cells into early-stage-gestation sheep fetuses and achieve long-term hematopoietic chimerism. This finding introduced the possibility of correcting a variety of human diseases/disorders in utero, thus enabling the birth of a healthy infant. Esmail spent the majority of his career passionately and tirelessly working to make this amazing dream a clinical reality, establishing a series of international symposia dedicated to in utero stem cell transplantation and gene therapy. These efforts were ultimately rewarded when he used this approach to achieve the first cure of a human patient with X-linked severe combined immunodeficiency [2].

Esmail received many honors and awards during his career, including the Society of Sigma Xi Award, the Jay F. Krakaur Award, and the Gladys Mateyko Award for Excellence in Biology. He was also the recipient of a highly coveted MERIT Award from the National Heart Lung and Blood Institute (NHLBI). He served as president of the International Society of Experimental Hematology (ISEH) in 2001, as the Editor-in-Chief of *Experimental Hematology* from 2004 to 2010, and as a member of the editorial boards of several other internationally renowned hematology journals such as *Blood*. He served on countless National Institutes of Health Study Sections, and authored or co-authored numerous transformational textbooks and more than 250 high-impact peer-reviewed scientific articles.

While Esmail's scientific achievements alone are certainly laudatory and undoubtedly earn him an everlasting place at the top of the annals of hematology, it was his compassion and personal touch that have left the most permanent mark. Esmail's love for science was like a highly contagious disease that spread to all who were privileged to work with him. He was able to communicate his ideas in a way that made all of his trainees rethink the possibilities and hypothesize outside the box. He had an almost uncanny ability to see into the heart of the people who worked with him, and he treated everyone in the lab as his extended family. It was an unspoken truth that Esmail was our safety net, and we could count on him for anything we might need.

Esmail worked tirelessly to promote the careers of young researchers, both men and women. It was unthinkable to him that one of his trainees would ever

fail; he even maintained belief in those who doubted themselves. He wanted only the best to show of each and every one of his trainees. He took great pride in those he mentored; everyone who spent time in his laboratory had a special place in his heart forever. He supported all his mentees, regardless of where they might be, by suggesting or recommending them for prestigious awards or professional memberships. He fought hard to get his mentees placed in positions he thought they deserved to hold. And regardless of the professional or personal hardships that arose, Esmail always had the miraculous ability to maintain a positive outlook, believing that the best was yet to come. Even when things did not go well, he would just say: "Don't worry; everything will be all right." And amazingly, with his help and guidance, it always was. Esmail also had a wonderful sense of humor. He was always telling jokes, and he made science fun. His antics in the lab are legendary but were also purposeful. He was a non-traditional person—known to go to the movies in the middle of the day. Actually it is not clear that he really went to the movies. His real purpose was to give his trainees space and allow us all to grow professionally and personally. He was not only our mentor but also a lifelong friend.

In addition to the wealth of scientific knowledge that Esmail bestowed upon his mentees, he also made sure it was clear that, although science is beautiful, the love for family and friends is what sustains us and gets us through challenging times. It is this perspective that Esmail truly embodied. While some might mirror his magnificent professional career, the extensive publications, and the prestigious scientific work he achieved, few will ever touch and enrich the life of his mentees, colleagues, and friends the way Esmail did. He will be sorely missed, as the world is truly a far poorer place with his passing.

João Ascensão  
Chris Porada  
Graça Almeida-Porada  
Phil McGlave  
Ron Hoffman

## References

1. Flake AW, Harrison MR, Adzick NS, Zanjani ED. Transplantation of fetal hematopoietic cells in utero: the creation of hematopoietic chimeras. *Science*. 1986;233:776–778.
2. Flake AW, Roncarolo MG, Puck JM, Almeida-Porada G, Evans MI, Johnson MP, Abella EM, Harrison DD, Zanjani ED. Treatment of X-linked severe combined deficiency by the in utero transplantation of CD34 enriched paternal bone marrow. *N Engl J Med*. 1996;335:1806–1810.