



Seed Money Strategies Reap Research Rewards

OREF Studies Help Advance Arthritis Treatments and Transplant Success



Dr. Victor M. and Mrs. Harriet Goldberg

Victor M. Goldberg, M.D.'s research, funded in part by OREF, led to better transplant tissues that were less likely to be rejected by the patient's body, as well as new treatments for arthritis. Now Dr. Goldberg hopes his

contributions to OREF will fund equally important research for the future.

Becoming a Clinician Scientist

Dr. Goldberg first became interested in the topics of rheumatoid arthritis and transplant immunology during his post-residency training at the Clinical Research Center at Northwick Park, England's equivalent to the United State's National Institutes of Health (NIH), in pursuit of his goal to become a clinician scientist.

At the clinic, Dr. Goldberg worked with **Eugene Lance, M.D., Ph.D.** who held a Ph.D. in immunology in addition to being an orthopaedic surgeon. The goal of the team at the Clinical Research Center was to investigate the processes that led to rheumatoid arthritis and other inflammatory arthritic conditions, as well as to better understand the whole process of transplantation and transplant immunology.

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The unit in which Dr. Goldberg worked also contained a large population of patients suffering from arthritic conditions.

“That’s really how I became interested in studying arthritis,” Dr. Goldberg said. “I spent a little over a year doing work in that area in transplant immunology, and at the same time developed techniques to better understand the causes and etiology of rheumatoid arthritis.”

Research Summary



Victor M. Goldberg, M.D.

1973, 1975, and 1979
Research Grant recipient

Topic:

Studies of the causes of joint distress in rheumatoid arthritis and other arthritic conditions

Result:

Development of specific therapies and approaches to care for arthritic joints

Patient Care Application of Results:

Lessening of pain for arthritis patients

When he returned to the United States in 1972, Dr. Goldberg accepted a position at Case Western Reserve University. He became the director of a comprehensive arthritis program and worked with rheumatologists as an orthopaedic surgeon consultant to manage patients’ complex rheumatoid arthritis.

“We took the holistic approach — it was operative, non operative, and rehabilitation — the whole program. At the same time, I wanted to continue my laboratory work, and the department was very good in providing me with a lab and a small amount of funds just to get started.”

Dr. Goldberg began building parallel clinical and basic science research programs. The clinical program investigated the underlying causes of rheumatoid arthritis. The laboratory program created an animal model of rheumatoid arthritis, and Dr. Goldberg used that as the basis for his OREF grants.

How Research Advanced the Treatment of Arthritis

In the 1970s, Dr. Goldberg received three OREF Research Grants to continue investigating the processes contributing to the development of rheumatoid arthritis. Through this research, he found that there are specific antigenic markers, or specific molecules that stimulate the production of antibodies related to autoimmune disease.

“We found that it was probably genetically determined to some extent, and it essentially created a problem for the patient because their own immune system turned against them, creating an inflammatory response that ultimately destroyed their joints,” Dr. Goldberg said.

These results indicated that rheumatoid arthritis is an autoimmune disease.

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— Victor M. Goldberg, M.D.

From this work came an understanding of how the environment that leads to the destruction of bone, cartilage, and ligaments develops. This was the basis for further investigations of how to stop the destruction, ultimately leading to drugs that can help deter arthritis.

“Now, as you look back at some of that work, it clearly allowed other people to develop specific therapeutic drugs to stop that process.” Dr. Goldberg said. “A lot of the drug treatments now, for example, are directed toward specific chemokines, or mediators of inflammation. I think what’s occurred in the advancement of rheumatoid arthritis treatments is the development of drugs that are the silver bullets toward specific mediators of inflammation.”

How Research Improved Musculoskeletal Transplants

In addition to his investigations of the causes of arthritis, Dr. Goldberg also used his OREF grants to explore and build preliminary data on the subject of transplant immunology — the study of

the body's immune response to a tissue transplant. Providing insight to how musculoskeletal tissue, such as bone, cartilage, and ligaments are incorporated into the body, the results of Dr. Goldberg's research taught orthopaedists how to modify the process to reduce transplant rejection rates.

Nearly 30 years after Dr. Goldberg's original research was completed, the use of bone to reconstruct bony defects caused by trauma, arthritis, or tumor has vastly improved and become standard procedure for most orthopaedists. Dr. Goldberg said that this is another example of how research supported by OREF has translated clinical problems into better results and surgical treatments for patients.

"The majority of orthopaedic surgeons use banked tissue every day in their practice. Because of the work supported by the Orthopaedic Research and Education Foundation, we understand the whole physiologic process of how bone is either accepted by the body or rejected by the body," said Dr. Goldberg.

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"So because of that, we were able to modify the material orthopaedic surgeons use for transplants to make it a better material; a material that is accepted by the patient for a successful outcome. So in everyday practice, whether it's sports medicine, total joint, spine — the whole orthopaedic sub-structure — the orthopaedic surgeon uses tissue that has been processed and preserved and made in a way which will lead to success."

Pushing the Envelope for the Future

The results of the OREF-funded studies gave Dr. Goldberg enough data to publish papers on transplant immunology, which he used as the basis to write his first NIH grants. Since then, the NIH has continuously funded Dr. Goldberg's research on transplant immunology, cartilage transplantation, and regenerative medicine. This was important to Dr. Goldberg since one of his goals in life was to be a clinician scientist.

"I was going to move the envelope, so to speak, of medicine, and develop concepts that would ultimately transfer to improved patient treatments. And it's been a wonderful 35 years. I hope I've moved the envelope a little. I hope I've made some difference."

But according to Dr. Goldberg, it would have been difficult to do without the start-up funds he received from OREF.

"I had a very significant time commitment to the clinical side — taking care of patients with arthritis — and if I hadn't had the seed money from OREF to continue to run my laboratory, for the technical help as well as the equipment and other necessities, I don't believe I could have continued as a clinician scientist. I would have been only a clinician, and that would have been

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okay, but it wasn't the reason I was at the university."

A member of the Shands Circle since it was founded in 1994 and a longtime Order of Merit donor, Dr. Goldberg and his wife, **Harriet**, made a \$1 million commitment to OREF through cash and stock gifts in 2003. Dr. Goldberg said that he did so in part because he is a strong advocate of young clinician scientists who, he believes, will make important discoveries for improved orthopaedic treatments.

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If his generation does not support the clinician scientists of tomorrow, Dr. Goldberg fears that the specialty will come to a standstill and orthopaedists will never realize the full potential of the human body's own healing abilities.

"One example is regenerative medicine — how do we use the body's capabilities to regenerate its own tissues? I feel very strongly that we're responsible for the future and that means giving back in some way. I only wish I could be a fly on the wall 25 to 30 years from now to see what's going to happen." ■