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Letter to the Editor

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Letter to the Editor: Not the Last Word: Prizes for Cures

Regis J. O'Keefe MD, PhD

To the Editor,

In his *Not the Last Word* column, Dr. Bernstein makes a strong case for a prizes-for-cures approach, whereby the NIH and other granting organizations provide financial prizes for scientific breakthroughs that lead to new therapies that cure human diseases [1]. The creation of innovative orthopaedic therapies is critically important. While major therapeutic advances have been made in areas such as cancer therapeutics, cardiovascular diseases, endocrine disorders, and immune diseases, two major conditions that orthopaedic surgeons commonly encounter, osteoarthritis and degenerative disc disease, have no effective medical treatment [4, 5].

In the early 1960s, Sir John Charnley developed the concept of the metal and polyethylene joint articulation and performed the first successful joint arthroplasties [2]. Since that time, advances in joint arthroplasty have been incremental; while refined, we continue to use the similar materials and principles. To date, we have not defined the biological basis of osteoarthritis nor developed treatments to slow or prevent the progression of this disease. Currently, the surgical treatment of osteoarthritis is among the costliest medical conditions in the United States [3].

Despite this need, I do not believe a Prizes for Cures program should be conducted by the NIH or other funding agencies. In contrast with the model that, in many countries, funds a laboratory led by a well-known investigator/professor who then unilaterally determines the research direction, the focus of NIH-funded research is the Investigator Initiated Research Program [6]. The NIH rationale is that great ideas leading to scientific transformation and new approaches may come from unexpected places—including from junior investigators unencumbered by the biases of years of scientific research. Rigorous peer-review panels define meritorious proposals and reward scientists with the opportunity to pursue a novel approach. Scientists who compete successfully in this arena advance through the promotion process, achieve scientific independence, become esteemed members of the research community, and influence the next generation of scientists. This is one way that successful scientists are rewarded, which included financial awards related to increased compensation secondary to promotion.

When investigators make a major breakthrough, it is not an accident. Such innovations occur after years of scientific study and development, requiring advanced skills and imagination, a rigorous scientific approach, and the ability to remain resilient in the face of failure. The discovery may cure a disease, as is the case with the recent development of chimeric antigen receptor T-cell therapy from refractory large B-cell lymphoma [5]. Under our intellectual property system, successful and highly innovative scientists can reap financial rewards of a far greater magnitude than could be provided by a Prizes for Cures program. Each year, tens of thousands of patents are awarded by the US Patent Office. Essentially all major academic medical centers in the United States have Technology Transfer Offices that fund and facilitate the development of patents related to academic research. Moreover, most major medical centers have incubator programs to support companies during the early phase of development. Finally, the NIH has

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Wolters Kluwer

Letter to the Editor

a granting program, the Small Business Innovation Research/Small Business Technology Transfer grant mechanism, that supports startup companies utilizing intellectual property in developing products to treat human diseases.

At one time the sequelae of polio affected a tremendous number of patients, and many were treated by orthopaedic surgeons. No longer. Another common operation during my residency was open synovectomy of the hand in patients with rheumatoid arthritis—a procedure rarely, if ever, performed today due to the discovery and commercialization of anti-TNF-alpha inhibitors. Without doubt, the individual who provides the insight and approach to treat osteoarthritis will be amply rewarded. While many talented investigators are pursuing such therapies, currently the National Institute of Arthritis, Musculoskeletal, and Skin Diseases is funding only the top 12% of submitted grant application. As a community committed to musculoskeletal disease, we need to advocate for increased support to cure the difficult diseases that one day will allow our patients to face a better future. This needs to be our primary focus, which enables you investigators to enter the field. A concern is that additional prizes for established investigators will further reduce the funds available to develop scientists that can lead to advances in orthopaedic care.

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Letter to the Editor

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Reply to the Letter to the Editor: Not the Last Word: Prizes for Cures

Joseph Bernstein MD

To the Editor,

I vaguely recall the celebrations for the Apollo lunar landing and the Mets' equally improbable World Series victory in 1969. It was not until the Saudi oil embargo of 1973, however, that a current event grabbed my attention and held on to it.

Of course, as I was only 10 years old, the explosion in oil prices was not personally meaningful; like the latest revelations about Watergate, it was just something else that grownups would grumble about. No, what stuck in my head were the gas lines.

It was while idling on such a line one day that I announced to my parents sitting in the front seat that I planned to invent a pill that could be dissolved in water and convert the liquid to gasoline.

"I sure hope not," my father replied.

My mother asked him why he was so discouraging.

"Well," my father said, "if Joseph were to invent such a pill, the oil companies would have to make him disappear before anybody found out about it."

I have not inherited my father's cynicism—or at least not all of it—but if one of our children were to announce plans for inventing the pill to cure arthritis, I would worry a bit about how the drug companies would take the news. After all, their business models are predicated on suppressing, not curing, disease.

A pill that cures arthritis would be embraced by the pharmaceutical industry with the same enthusiasm with which car manufacturers supposedly embraced the nascent Los Angles railroad in the 1940s. And if you are thinking to yourself, "But there is no Los Angeles railroad?" you can appreciate how unhealthful such an embrace can be.

Because I am not as cynical as my father, I don't believe that an arthritis-cure pill has been invented yet withheld from the market. Still, it is probable that there were projects abandoned and still other projects not started, despite good intentions.

Cures have not been a "specific aim" of our research efforts and serendipity has not been enough to bridge the gap.

As such, and as Dr. O'Keefe implies, an orthopaedic surgeon from 1969 traveling in a time machine 50 years forward to the present day would be completely at home with the contemporary approaches to managing arthritis.

We need to do better for the next generation.

Dr. O'Keefe contends, correctly, that the current system can yield major breakthroughs. Dr. O'Keefe also contends that by allowing inventors to retain intellectual property rights, the NIH indirectly offers prizes as well. He is right about that, too. But in the main, the breakthroughs and the prizes are for treatments that ameliorate diseases and not for discoveries that might eradicate them. We need to do better for the next generation.

Prizes for cures, in addition to the current funding systems, will help us get there.

(RE: Bernstein J. Not the Last Word: Prizes for cures. *Clin Orthop Relat Res*. 2019;477:1786-1789).
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