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Israel has first-rate scientists – but they are few and do not receive support”

The research idea of Roger Kornberg, Nobel Prize Laureate in Chemistry for achievements in mRNA research, was critical to the development of the coronavirus vaccine | He divides his time between research at Stanford and the Hebrew University and warns that low researcher incentives are causing Israel’s brain drain: “The consequences for Israeli institutions are devastating”

Up until a year and a half ago, most people, it is safe to assume, knew little about mRNA, or even heard of it. But today it is common knowledge: The molecule, a major component of genetic replication processes, forms the basis of the Pfizer and Moderna vaccines against Covid-19, the most effective vaccines developed against the disease-turned-pandemic. Roger Kornberg, a structural biology professor at Stanford University, discovered how the information in DNA is copied into mRNA. He had even captured the procedure in full, and was awarded the Nobel Prize in Chemistry in 2006.

Last Wednesday, at his Hebrew University of Jerusalem office, Kornberg told *TheMarker*, “My research helped define the principles of mRNA synthesis, and this was key to the vaccine’s production.” The possible applications for his discovery, many other scientists claim, have tremendous potential – encompassing the development of new vaccines, as well as new drugs, including for cancer.

Research on genetic processes is one of the fields at the basis of personalized medicine, which Kornberg plays a role in advancing. He chairs the international expert committee of the Israel Precision Medicine Partnership, which is founded on the pooling of resources involving the Council for Higher Education’s Planning and Budgeting Committee, the Ministry of Health, the Ministry of Economy’ Digital Israel, and two philanthropic foundations – Yad Hanadiv and the Klarman Family Foundation (Boston). The program is administered by the National Science Foundation and its total budget is NIS 210 million, which are

distributed in four rounds. Next week, the third round’s winning research proposals will be announced. “The quality of the proposals we have received is very high,” Kornberg says.

Does Israel have relative advantages particularly in this area?

“A few years ago, there was some concern about Israel’s lacking strengths in the clinical science field, and the program made a significant contribution to increasing awareness and the scope of activity in the field. The number of clinical trials conducted as a result of the program’s grants has grown, as did financial support from various sources, especially foreign capital invested in Israeli start-ups assisted by this program. In these respects, it has been a major success.”

Precision medicine has a reputation of being a very expensive service that is not accessible to all.

“On the contrary. First of all, precision medicine is a collective name for various things, and the goal is actually to lower costs and find effective treatments that prevent severe and chronic diseases. The better the treatments, the lower the cost to the system.

“It is true that there are forms of personalized medicine that incur high costs, such as certain types of chemotherapy, but the main reason for this are the huge sums charged by the manufacturing companies. On the other hand, many proposals submitted to us and under current discussion will have the opposite effect – leading to a reduction of costs to the users.”

Kornberg divides his life between California, where he has lived and worked as a researcher at Stanford University for more than 40 years, and Israel. Here, he lives with his Israeli wife, Yahli Lorch, who is also a professor of structural biology at Stanford and Jerusalem. “Our eldest son and our daughter live in Israel, and the third son lives in Stanford,” he says. All three also did their undergraduate studies at Stanford. “I have been at Stanford since 1978, and have no reason to change this,” he says, but adds that he really loves Jerusalem. And indeed, after 35 years in which, he says, he spent 8-9 months of each year

in the U.S., the ratio was reversed, and he now spends most of his time in Israel.

Kornberg has an unusual family pedigree: His father, Arthur Kornberg, won the Nobel Prize in Medicine in 1959. In the history of the prestigious award. Kornberg is a board member in various Israeli technology companies in the life sciences, including Protalix, the Israeli biotechnology company; UBQ, which turns waste into a raw material used as a substitute for plastics in production; Gamida-Cell; and Cocrystal Pharma.

American academia's star system

We asked Kornberg about what another American-Israeli Nobel laureate, who is a former lecturer at the Hebrew University, had said. Joshua Angrist, announced as winner of the Nobel Prize in Economics last week, expressed his criticism of the fixed-salary system in Israeli academia, which does not distinguish between the types of research or demand for it, told *TheMarker* that he felt poor when he was a professor in Israel.

Kornberg says he understands him, and explains why this situation is detrimental to Israeli academia and Israeli society: "This is a problem. In the U.S. and elsewhere, there is a star system: Universities do whatever it takes to attract top researchers. They raise funds and offer bonuses and benefits to compete with each other. Unfortunately, Israeli institutions do not do this."

He says he does not know the reason for this: "Either they are unable to operate this way, or are opposed to it, or are prevented by the government from doing so – I do not know what the policy is, but the results, as you know, are a cause for concern. Israel has outstanding economists, who were raised and educated here, but none of them continues to work here.

"Some years ago, I was told that 25% of the professors in American economics faculties grew up in universities in the U.S., and a close second group, with a more-or-less similar percentage, are Israelis. The situation, I assume, has only worsened since then. The consequences for Israeli institutions are devastating. Economics faculties in Israel have suffered greatly from this brain drain. That's unfortunate. So when you

talked with him, Angrist simply explained to you the reason behind this."

It's not just in economics.

"It is true in all fields. In 1978, when I got the post at Stanford, I knew only one Israeli in the Faculty of Science, a mathematician. Today, Israelis are in every faculty. We have three, including me and Michael Levitt (another Nobel Laureate in Chemistry)."

Is it because of the salary, as Angrist indicated?

"It is one reason – salary and working conditions, which are not at the same level and standard as in the U.S. or Europe. Another reason is that the costs in the natural sciences have increased dramatically in recent years, and Israel is having a hard time keeping up. There are remarkably successful, first-rate scientists in Israel, but they are relatively few. Most of Israel's excellent scientists receive less support than their colleagues in the U.S., Britain and Germany."

Would you also include China on the list?

"China too, but China is different. I know China well. Even without the political background and language gap, it is less attractive to scientists in the natural sciences. They have a very hierarchical method of promotions. In the U.S. and Israel, young scientists with motivation and talent can advance at an early career stage; in China, they are subordinate to senior, older scientists for many years, and sometimes permanently."

A former Pentagon official said last week that China had overtaken the U.S. in the field of artificial intelligence. How does that work out?

"China is trying very hard to compete in science and technology, and is certainly advancing, but in computer science and topics like artificial intelligence, it is easy to progress quickly. In biology, chemistry and physics, it will take another generation to become competitive."

Seen from a distance, it seems that the chances of ordinary Americans to enter excellent universities are dwindling. Tuition is skyrocketing, and people must take student loans to be able to get an education. Doesn't

that affect U.S.'s competitiveness vis-à-vis China, and in general?

"I'm not highly familiar with this, but at universities like Harvard and Stanford, students are accepted on the basis of abilities and talent, and are then provided the financial aid they need to study. My children, who studied at Stanford, had friends whose entire tuition, housing and living expenses were funded. But you are right, tuition costs are a huge problem in the U.S."

"The pressure on the system is mounting"

Nine years ago, speaking to a TheMarker correspondent, you described George W. Bush as an anti-scientific president, in stark contrast to Barack Obama. There is now a pro-science administration led by Joe Biden, who replaced Trump, a president with a distinctly anti-scientific stance. Are these pendulations a cause for frustration and concern among scientists?

"Not as it may seem. This is because Congress consistently supports science, and this comes from both parties – the Republican Party too. At worst, when a president like Trump comes and proposes budget cuts, Congress opposes. The system is so large that changes of government do not make much of an impact.

"The problem with science in the U.S. is not political – Bush, Biden or Trump are not so influential. The problem is that science as a field has become so large that it is above and beyond the government's ability to fund. There are so many outstanding investigators in the life sciences across the U.S.; they are all talented and in need of budgets, so the pressure on the system is mounting."

Friends who are scientists and interviewees who are senior scientists say that today, scientists devote much of their time and energy to raising money and research grants. Once upon a time this wasn't the case?

"That is correct. There are numerous scientists competing for funding, and science has become very expensive to perform. Scientists the world over spend a lot of time writing grant applications, and that's unfortunate – but it's the price of success. The field attracts talented people and they need labs."

You describe something really dreamy, but we constantly hear of the shortage of students and researchers in science and technology. Isn't there a contradiction here?

"There is tough competition over these people. People do not necessarily choose a career in science, because they have the opportunity to get rich quickly instead of accumulating knowledge for its own sake. Indeed, people turn away from careers in physics, chemistry and biology, and it is very difficult to influence these trends through governmental actions."

You mentioned Michael Levitt, a Stanford colleague. Did you hear about the poignant controversy he stirred in Israel, when he predicted that only a handful of people would die of the pandemic?

"We worked together in research. This episode is very unfortunate, and I hope he will get through it. He is a talented and well-intentioned person. He based his predictions at a fairly early stage, on data from China, which were probably misleading. He was deeply hurt by the response, because he showed his calculations were correct. I believe it was based on misinformation. He did not know it."