

Megan Sykes was awarded a Barry Prize for Distinguished Intellectual Achievement in 2024. In [this video](#), Barry Honig of Columbia University interviews Dr. Sykes about cutting-edge medical developments that promise major new improvements in public health, and how the politicization of science and the university threaten to slow down medical progress.

### **Barry Honig, Columbia University**

I'm Barry Honig. I'm a professor of molecular biophysics and computational biology at Columbia University. I'm also a member of the American Academy of Sciences and Letters and a board member. We have an annual meeting each year in the Library of Congress, and one of the activities is to award Barry Prizes (not named after me) to people who have demonstrated truly outstanding intellectual achievement. Our academy is devoted to intellectual excellence, and Barry Prize winners embody what we believe in and what we hope will create standards in the future.

Today, I'll be interviewing Dr. Megan Sykes of Columbia University, who was an award winner this past year. We'll be conversing about some issues that pertain to academia today, both in Dr. Sykes's own field and perhaps more generally in these complex times. Dr. Sykes is a professor of medicine, microbiology, immunology, and surgical science at Columbia University Medical Center, which reflects her broad scientific interests. She's also the director of the Center for Translational Immunology and a number of centers involved in transplantation. Dr. Sykes has carried out research in basic immunology and applied her discoveries in clinical settings. She's advanced our ability to modulate the immune system in conditions ranging from blood cancer to type 1 diabetes. Her breakthrough approach to immune tolerance causes a transplanted organ to be accepted by the recipient's immune system as part of itself, therefore avoiding the need for immunosuppression. That's just a brief summary of her accomplishments, but I think justifies and explains why we're so happy that she accepted this award.

There are a number of topics we'd like to discuss, and the first involves the field more generally. Megan, what are some underappreciated ways that work done in your field contributes to human understanding and well-being?

### **Megan Sykes, Columbia University**

Thanks, Barry. It's a pleasure to have this opportunity to speak with you. The pandemic, sad and unfortunate as it was, did bring immunology to the foreground in the mind of many people, and so the appreciation of the importance of the immune system in protecting us from infections became much more apparent. The public in general may not realize how important the immune system is in every other area of our well-being. The most recent field where people are starting to bring this to light is in aging, that the immune system and inflammation are extremely important in driving the aging of nonimmune organs, and so healthy longevity is an area that is going to be part of how immunology grows. You know, as you direct the Center for Translational Immunology – because our tools for understanding the immune system in the human being have expanded so dramatically in the last 20 years or so, and we're realizing now that the same principles apply across different disciplines and disease areas. Transplantation is the main area of my interest, as well as autoimmune disease, but cancer as well, so it's all just a matter of upmodulating or downmodulating the immune response to get the outcome that you want.

I'll say a few words about organ transplantation, because it does save lives. Anybody can have end-stage organ failure from a variety of causes, and transplantation is life-saving when that happens. Many people may not realize what an altruistic act it is to donate a kidney or a part of the liver as a living donor or after death to donate multiple organs to people whose lives they're going to save. That needs to be broadly understood and appreciated so that more people will sign up to be organ donors.

We've made a lot of advances in recent years in transplantation. We've improved the immunosuppressive drugs that we have. We've improved outcomes in general, but rejection of the graft and the complications of the immunosuppressive therapy that people need to avoid rejection cause a lot of problems, infections, malignancies, etc., because you're suppressing that really important immune system. So, immune tolerance is a very important goal, because immune tolerance is basically a manipulation of the immune system so that you no longer need those long-term immunosuppressive drugs. That has huge potential to improve outcomes in organ transplantation.

Finally, organ transplantation has already been the victim of its own success, in a sense, because there simply aren't enough organs to go around from human to human, and, as a result, many people actually die while waiting for organ transplant. We've been able to develop over the years another organ source that is finally coming to fruition in human beings, and that is xenotransplantation, using organs from pigs. It's very exciting to see how that has advanced in the last couple of years, and to be actually getting some of these things into the clinic, because pigs are the right size, and we can genetically modify them as needed for human transplantation and ultimately have as many organs as we need. We've been working hard on tolerance as a goal in xenotransplantation. I'm excited about the potential for the future.

## **Honig**

The possibility of genetic mutations goes right back to basic science and understanding of proteins, etc. So, it's an example of how the entire array of biomedical science can play a role in this.

Moving on, we want good people doing all of this work. What is your sense of changes in standards, and how do we maintain high standards in science, in medicine, and so on?

## **Sykes**

We have great people in the field right now, and great young people at Columbia, and it's been really exciting to mentor them and see them develop their own careers. There are concerns about the future right now in these complex times. For one thing, political interference in academia is a major threat to our intellectual standards. People's political motives entering into the academic arena can really stifle intellectual freedom, inquiry, scientific method. I feel very concerned about the challenging of knowledge, of intellectual learning, that seems to be out there in the mainstream. There's a populist approach to what a fact is. It's not really widely understood that a fact is a fact. Perhaps some of that was a result of the pandemic, because there we were hit with something that we didn't know about, and it was a learning process for the scientific and medical communities. That was very frightening to people, to see, in real time, how the limitations of our knowledge can actually affect their survival and well-being. So maybe that's part of the reason. Maybe social media and the way that disinformation is spread is part of the reason. I see that as a significant threat going forward to the high intellectual standards that we try to maintain in science and medicine.

## **Honig**

Finally, this issue of standards and possible political involvement in science leads to thinking about to what extent does the public understand what goes on in universities, and to what extent do they not understand? With a special focus on medical schools, which are probably even further from the public consciousness than an undergraduate campus. What are your thoughts on that subject?

## **Sykes**

Most people recognize universities in general and medical schools as sources of higher education that will allow people to advance in their careers. That's a very positive and important perception. Over the years, the cost of a university education, particularly a medical education, has gotten really out of control, and that has really limited access for many people. Maybe that is part of where this idea that academia is an elite ivory tower comes from, and maybe it is contributing to some misunderstanding and resentment of the academic mission. Most people really don't understand well the methods of scientific and intellectual inquiry. Perhaps we could do a better job of communicating that to people. But again, it's difficult against a background of misinformation, and helping people to sort through all that to figure out what the best sources of information are is really important.

There's also a need for people to understand the importance of intellectual freedom and diversity of opinion. Letting knowledge build on past knowledge and past errors, and to understand that knowledge is not fixed, it grows and builds on itself. But that can only happen if people are open-minded about things.

I did want to say one more thing about the challenges. There is a lot of pressure on faculty to produce high-impact publications in short periods of time and thereby to perhaps overstate their conclusions or hype them as more generalizable and significant than they might be. Then there's a group think that happens, where people jump on a bandwagon about a particular idea. People will look very narrowly in a particular direction. Of course, there's also scientific misconduct, which gives the whole enterprise a really bad name. So, those are all things that we need to deal with, because they get publicized as well. That needs to be countered with a positive message about how we learn and how advances are made.

## **Honig**

I couldn't agree with you more. There's an interesting case at Columbia, because Columbia is one of the last universities to require a fairly heavy course load in the first two years in literature, humanities, the history of Western and other cultures. I think there is a one-semester course requirement in science. But apparently, it's not a course that teaches the scientific method to gain a sense of how we all reach conclusions and examples of uncertainty where even the consensus might be wrong. We all know of examples of that sort. I don't know if that's going to change, but I certainly believe it would be nice to have such a course required in every university to deal with the world we're living in.

Anyway, thank you so much for participating in this conversation. And we appreciate viewers who may join us in the future. So, thanks, Megan. Good to talk to you.

## **Sykes**

Thank you. It's been a pleasure.