Greer Studies, Teaches How to Improve Medicines

Dr. Aldemaro Romero Jr.
College Talk

"As a child, I was interested in asking questions. Like why different substances work the way they do and why they have some effect on our bodies. I was fascinated by hydrogen-peroxide and how it decomposes when you pour it on the wound. I would ask why it happens, what is the reason?" That's how Dr. Edyta Greer explains how she became interested in science.

A native of Poland, Greer received her master's from Warsaw University and her doctorate from the Graduate Center of the City University of New York. Today she is an associate professor in the Department of Natural Sciences of the Weissman School of Arts and Sciences at Baruch College.

Greer works in an area that is unknown to many but has enormous importance: computational chemistry: "It's a branch of chemistry that utilizes computers and theoretical methods to study different mechanisms, and properties of molecules. I'm very interested in drug design," explains Greer. "We can show the dates of the drug design based on the computer, which allows us to identify the best drug and the dates."

Although most people know that when you combine two or more substances you get a reaction, most do not know that you also need energy. "Energy is a very critical component for the reaction to take place. When you look at oxygen and carbon, these are two stable elements that can exist next to each other, and they won't do anything. In order for them to combine and produce water and carbon dioxide, you have to heat them together. It takes a lot of energy to produce that reaction. The energy required for two chemicals to react is called the 'energy of activation,' and it creates a so-called 'energy barrier' that the chemicals need to overcome to get to the side of product," says Greer.

Even though this process sounds sophisticated, Greer studies some drugs that we are all familiar with, such as ibuprofen. "Ibuprofen is a pain and fever reducer. It's a compound that we take often, and this molecule is chiral, which means that there are two versions of it. They are mirror images of each other. But only one of these molecules fits the enzyme that is responsible for all the effects of pain reducing and fever reducing. We were searching for the answer as to why," says Greer. Answers to questions like this one are important because they allow us to understand how to make medicines more effective.

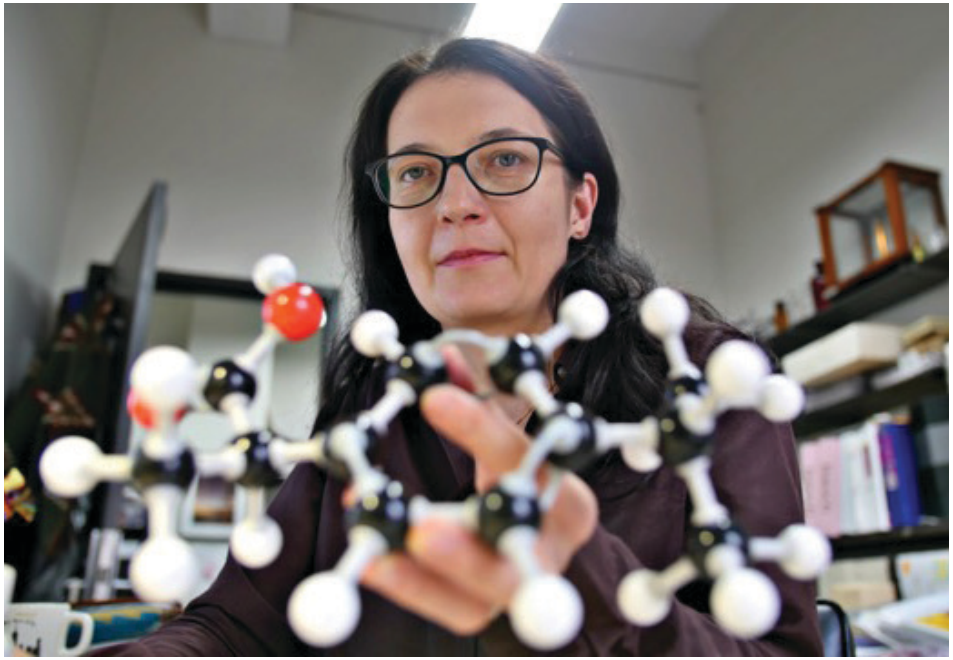

Photo by Gulinoz Javodova

Dr. Greer in her office.

I wanted to ask Greer about Polish scientists like Marie Skłodowska Curie, the first woman to win the Noble prize and the first person to win it twice. Despite this and other examples, most people don't think about the contributions that Polish scientists have made.

When asked about this Greer explains, "It's a difficult question to answer, but I think part of it is that the discoveries were always obscured by difficult and challenging political situations. Maybe these discoveries were not discussed too much at the time they were made. Marie Curie made her discoveries in France, where she was doing her studies abroad. Her contributions are amazing, and she is my personal hero. Polish history is very complex, and perhaps achievements like hers are not talked about to the extent that they deserve to be discussed."

One factor that can contribute to achievements like Marie Curie's could be the quality of Polish universities. "That's true, the education there is very thorough," says Greer. "I got a very solid background when I received my master's degree. I had no problem transitioning to the educational system here. But the two systems are different. Here in the United States you basically become independent when you get your degree and your post-doctorate training. In Poland, at least when I was there, it took a lot longer to become independent, but overall there are very creative people there, and many of them are very successful."

But how about the students? "I think that students here at Baruch College are very serious and very dedicated. They are not afraid to work hard, and that's great. That's why I enjoy doing research with students at Baruch: they want to accomplish things as much as I do. My collaborations with students here have been very successful."

One of the advantages that Dr. Greer and many of her colleagues offer is the opportunity for undergraduate students to work in her lab. "I learned the most when I was in a lab doing my master's project, when I had to figure out a lot of problems on my own. When I was challenged to do things, search the literature, and solve problems, that's when I learned the most. That's the strategy I use here. I know students can learn a lot, but what I love seeing is when students take ownership of the project and start contributing by reading the literature and trying to solve the problem. They get so into it that they keep thinking and bringing in new ideas. I get a lot of satisfaction when I see students getting to the point where they can contribute to the project."

In addition to being a professor at Baruch College, Greer is working on a new project involving DNA. According to Greer, "In DNA there are base pairs, and what we are trying to see is whether there is any tunneling that takes place between hydrogen transfers that take place in DNA. And, if it's a possibility, what type of an effect does it have on aging, cancer, and other human conditions related to mutations. There are other people working on this issue, but I feel that at this point we have enough expertise to take this towards the next project and see what we can contribute to the field."

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