



Chairwoman Marcy Kaptur
Subcommittee on Energy and Water
Hearing on the Department of Energy's Role in Advancing Biomedical Sciences
February 5, 2020

The Subcommittee will come to order. Thank you all for coming, and I want to especially thank our witnesses.

We are here to discuss the topic of the Department of Energy's role in advancing biomedical sciences – a transformational role at the intersection of energy and health. After all, all of us are composed of a complex web of neurotransmitters pulsing energy throughout our tissues, organs, and bones every day.

Indeed, the Department's long history and leadership in supporting basic science has resulted in biomedical innovations and a toolkit of advanced scientific capabilities that can enable future breakthroughs in health research, including artificial neurotransmitters, drug discovery, high-precision imaging to advance precision brain and nerve mapping, diagnostic technologies for cancer detection, and the use of technology to eliminate cancer's bad cells instead of the good ones.

Let us first focus on the core of human function — the brain. For over three decades, Congress has funded increasingly advanced research on human brain function aimed at discovering and then healing medical conditions that eluded prior generations. Now with advancing technology and the advent of supercomputing, science itself is maturing and combining know-how as evidenced by bioengineering.

Our objective today is to probe where future scientific inquiry might be directed to advance our understanding of human health, such as better comprehension of brain function, and then unravel incompletely understood brain impairments with the objective of healing. If I were to ask the question, what does medical science understand and not understand about varying conditions like bipolar, PTSD, and CTE, what might researchers tell us about physical properties and biologic impaired functions in each?

Although DOE pursues research in areas directly pertinent to the Department's main missions of energy, environmental stewardship, and national security, basic research undertaken for one purpose often has unanticipated and major impacts in other areas.

That is why it is critical to support basic science research at the Department. In fiscal year 2020, we increased funding to the Department's Office of Science by 415 million dollars to a record-level 7 billion dollars. This funding is foundational for a new generation of discoveries at the intersection of energy and health. For example, in conducting basic science research for other purposes, Brookhaven National Lab helped pioneer the PET scan technology.

Additionally, while pursuing its mission-driven research, DOE has developed advanced scientific capabilities that can provide unique benefits to the biomedical sciences.

DOE's X-Ray Light Sources and the Nanoscale Science Research Centers provide special imaging capabilities for the biomedical research community.

The X-Ray Light Sources produce x-rays that are billions of times brighter than medical x-rays and have been used by scientists and pharmaceutical companies to develop drugs and treatments for neurological diseases like Alzheimer's, cancers, diabetes, and the development of new vaccines like the Ebola vaccine. In better understanding how drug molecules interact with human cells, hopefully we can start to understand why some pharmacological treatments work for some patients but not for others. If we could more seamlessly use the scientific capacity of DOE to the medical unknowns, what breakthroughs could our nation achieve?

DOE's high-performance computing capabilities can also provide solutions to biomedical applications through simulation and modeling, predictive biology through artificial intelligence, and data analytics. Just imagine the computing power and data analytics needed to map billions of brain cells so we can reveal the brain's neurological and biochemical inner workings.

Through the DOE isotopes programs, the national labs and a network of universities have impressive capacities in producing medical isotopes that are useful in nuclear medicine and radiotherapy.

As we will hear from our witnesses, advances in the science of energy as well as in biomedicine depend increasingly upon integrating many other disciplines with the biological sciences. It was not so long-ago that universities began offering programs in "bioengineering" – two sciences that had remained separated on university campuses for generations.

Given the unique, scientific tools and personnel of the Department of Energy and its national labs, and the potential for future breakthroughs in health-related fields, it seems especially important for the

Department of Energy to increase its coordination and collaborations with the National Institutes of Health and other federal agencies. This will give the best chances of developing new innovations in biomedical sciences to unlock the hidden mysteries of the human brain, retool the human body when it has been broken, save lives, and sustain life on earth.

To our witnesses, we look forward to hearing from you.

I'll turn now to our Ranking Member, Mr. Simpson for opening remarks – who as a respected dentist in his home profession well knows the advances in technology in his specialty.