

**Testimony before the  
House Commerce, Justice, Science Appropriations Subcommittee  
by  
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Chairman Wolf, Ranking Member Fattah, members of the subcommittee my name is Alan Leshner and I am the Chief Executive Officer of the American Association for the Advancement of Science (AAAS) and Executive Publisher of the prestigious, peer-reviewed journal *Science*. Thank you for inviting me to testify before you today on the federal government's role in neuroscience research. I am a neuroscientist by background myself, and I believe we are living in unquestionably the most exciting time in my over 40 year scientific career. Not only are we learning a tremendous amount about how the brain is structured and functions – including to produce our minds – but we are making great progress in understanding and developing treatments for a wide array of brain disorders that have such widespread and devastating effects throughout society.

I am delighted to note that along with the great advances in neuroscience, we also finally have an array of major multi-sector neuroscience initiatives ongoing. This year, the European Commission launched a Human Brain Project, and the U.S. government announced its Brain Research through Advancing Innovative Neurotechnologies (BRAIN) project. They join other recent neuroscience efforts across the world recognizing the great recent progress in brain research and aimed at advancing our understanding of the brain. Exploiting these diverse initiatives to yield scientific, clinical, and economic benefits, however, will require not only political and policy-maker support but also endorsement and extensive involvement by the neuroscience community, which already saw a “Decade of the Brain” come and go about 20 years ago, with little direct result. A reasonable question is: What's different now?

In 1990, U.S. President George H. W. Bush declared the 1990s to be the Decade of the Brain and shortly thereafter the European Decade of Brain Research was announced. Yet relatively little special funding was ever allocated to them. In the absence of substantial dedicated funding, little scientific coordination, and with no real champions of the efforts in the policy-making community, neither the U.S. nor the European brain project gained momentum or generated unified advocacy among scientists.

Circumstances are dramatically different now. Neuroscience research has progressed at an explosive rate and never before has the often-quoted adage of having learned more about the brain in the past decade than in all of recorded history been more apt. Some of this progress has resulted from advances in the technologies that allow neuroscientists to ask wholly new kinds of questions; some from the collaboration among multiple fields that characterizes so much of

modern science. An increasing focus on translational research is yielding new treatment approaches in neurology and psychiatry and greater hope for practitioners and patients.

In 2008, I chaired an Institute of Medicine report on grand challenges facing neuroscience research entitled “From Molecules to Minds.” We identified three fundamental scientific questions and goals to inspire and challenge the scientific research community. The three grand challenges included:

- How does the brain work and produce mental activity like thought and emotion?
- How does the interplay of biology and experience shape our brains and make us who we are?
- How do we keep our brains healthy? How do we protect, restore, or enhance the functioning of our brains as we age?

We are, in fact, on the threshold of being able to answer these kinds of difficult questions, and to do so, the neuroscience community must fully exploit the opportunities provided by the governmental initiatives, even if it requires some behavior change among scientists.

Breakthroughs in many neuroscience sub-disciplines, such as molecular biology, psychology, neurology, chemistry, mathematics, physics, engineering, and computer science have laid the groundwork for a major leap forward by neuroscience as a whole. What is needed today is to harness technological advances on to this foundation in order to bring this burgeoning set of fields to a new level of understanding. For example, advances in neuroimaging technologies through the 1990’s revolutionized our understanding of how the brain functions, and those advances changed our fundamental conceptions of phenomena like mental illness and substance abuse; the new imaging technologies that will be developed through, for example, the U.S. government’s BRAIN initiative will enable much finer grain analysis needed to understand how the brain is organized and generates phenomena like consciousness.

In many ways, the future of neuroscience research will resemble “big science,” like the Human Genome Project, requiring extensive coordination among many scientists and subfields. On the other hand, in spite of increasing interdisciplinary collaboration, neuroscience still remains more typically a “small science” field, characterized by individual investigators working with a small group of students and postdoctoral fellows. But as more and more neuroscientists have been collaborating with colleagues in other life science fields, in physics, chemistry and mathematics, the culture is changing and they are increasingly able to tackle big problems on the scale we are now speaking about.

We are also very fortunate that we now have many neuroscience champions in the policy-making community. As Dr. Holdren has testified, the BRAIN project coordinated by OSTP involves the leaders of many U.S. science funding agencies, as well as some of the most important and influential private philanthropies. It is taking shape under the guidance of a superb group of

scientific advisors and I commend to you the list of suggested topics recently published by the NIH advisory group.

Here in the U.S Congress, there is an active bipartisan Neuroscience Caucus organized by Rep. Cathy McMorris Rodgers and Rep. Earl Blumenauer and includes influential members, such as the subcommittee's Ranking Member Chaka Fattah (D-PA). I can speak from personal experience that Rep. Fattah has been a tireless champion touting the BRAIN initiative wherever he can.

The new interagency brain initiatives have great potential to take advantage of the dramatic advances we have made in the last decade and continue to accelerate progress in all of both basic and clinical neuroscience. They should be embraced and supported as fully as we can.