nature neuroscience

Celebrating a decade of progress

The designation of the 1990s as the 'Decade of the Brain' originated with the United States Congress and President Bush, who in July 1990 called upon the country "to observe that decade with appropriate programs, ceremonies and activities." The neuroscience community and its many supporters responded to that call with a series of events, culminating last month in a symposium, held in Washington, D.C., to celebrate the achievements of the last ten years and to review the prospects for the next century[1].

The Decade of the Brain proclamation was not itself a funding allocation, but rather an exercise in public awareness, intended to create a climate in which neuroscience would prosper—as it has, not just in the US, but worldwide. The US National Institutes of Health remains the largest source of funding, with a 1999 budget for brain disorders that exceeds $3 billion, but many other countries have recently targeted neuroscience for special emphasis; in particular, Japan announced in 1997 a large increase, including the creation of a major new institute, the Brain Science Institute at RIKEN near Tokyo, whose 1999 budget is 11.2 billion yen ($94 million). A recent report published by the UK-based Wellcome Trust[2] estimated that from 1991 to 1994, there were over 35,000 neuroscience papers published each year (of which about half were from the US), and that in most basic disciplines the numbers were increasing at over 10% per year.

The expansion of neuroscience has been driven by two major factors. One has been a growing awareness of the social and economic burden of brain disease, which seems certain to increase in most industrialized countries as their populations age. For example, the current cost to the US economy has been estimated to exceed $400 billion per year, and this is expected to rise sharply beginning in 2011, when the first of the baby-boom generation reaches retirement age. From a more global perspective, the Wellcome report predicts—citing WHO data—that by 2020, clinical depression and cerebrovascular disease will represent the second and fourth largest disease burdens worldwide (as measured by disability-adjusted life years), after ischemic heart disease and road accidents[2].

The second factor, set against these grim statistics, is the increasing confidence of the research community that brain disease is now a tractable problem. Conditions such as depression, schizophrenia, stroke and age-related cognitive decline, once considered inevitable features of the human condition, are now seen as specific diseases whose causes can be identified and which it will some day be possible to prevent or cure. This spirit of optimism is epitomized by the actor Christopher Reeve, whose courage and determination in the face of paralysis have made him an impressively effective advocate for neuroscience research. He received two standing ovations from the audience in Washington, who were clearly moved by his presentation.

The achievements of the last ten years have undoubtedly been considerable. Although it may be an exaggeration to claim—as did the organizers of the Washington meeting—that "the past decade has delivered more advances than all previous years of neuroscience research combined", few would dispute that the pace of discovery is faster than ever. The SFN came up with a list of six most significant advances from a clinical perspective: the cloning of genes that underlie several major brain disorders; the identification of mechanisms underlying neural plasticity; advances in understanding the neuropharmacology of addiction; development of new techniques for functional brain imaging; advances in understanding neurogenesis and neuronal death; and the identification of molecules and mechanisms that underlie normal brain development. To this list, one might also add the explosive increase in the number of cloned brain genes, many of which will undoubtedly represent targets for future therapies that have hardly begun to be explored.

Yet much of this progress, impressive though it is, still represents something of a promissory note from the research community. The obstacles to the development of new clinical treatments are enormous, and not just for technological reasons. The cost of developing a modern drug can run to hundreds of millions of dollars, which all but precludes the trial-and-error approach that characterized the development of some earlier psychiatric treatments. Moreover, the pharmaceutical industry will have no incentive to develop new drugs unless societies can afford to pay for them, and the health care reforms now underway in the US have brought new uncertainties to what is already a high-risk enterprise. Finally, drug development is a slow process; it now takes an average of 15 years to bring a new drug to market. Thus, there will be considerable delay before advances in basic neuroscience have a large-scale impact on the social and economic costs of brain disease.

To maintain the momentum that has been achieved, therefore, the public and government must continue to have faith in the predictions of the research community, which means they must understand the process by which basic science leads to new treatments. The Decade of the Brain initiative has contributed much to that understanding, at least in the US, by educating policy makers, but it is also important that researchers share their discoveries directly with the public. Fortunately, neuroscience is an easy sell; as the organ of perception, memory, emotion and action, the brain is an object of compelling fascination to scientists and lay people alike. As Steven Pinker once quipped, there will never be a Decade of the Pancreas.

1. Neuroscience 2000: a new era of discovery. Symposium organized by the Society for Neuroscience, Washington, D.C., 12–13 April 1999.
2. Seemungal, D., Ginns, S. Dixon, D. & Ewart, W. *Neuroscience: an Audit of Research Activity* (Wellcome Trust, London, 1999).