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# **Appendixes**

# Federal Support for Neuroscience Research\*

## Funding Levels

There has been rapid growth in the field of neuroscience in the United States in the past 10 years. Membership in the Society for Neuroscience has grown from 250 members at its inception in 1971 to 8,000 in 1983.\*\* Graduate and postgraduate programs in neuroscience have expanded by an estimated 200-300 percent during the same period (1). The most recent data suggest a leveling of the growth rate (51).

Neuroscience research is funded by a variety of executive agencies.\*\*\* In each agency, neuroscience funding priorities are related to the mission of the agency, and funds are distributed accordingly for research projects. The National Institutes of Health (NIH) receive the majority of the funds for neuroscience research. The National Institute of Neurological and Communicative Disorders and Stroke (NINCDS), one of the NIH research institutes, receives over half of all Federal neuroscience research dollars. Although there are no authoritative assessments of Federal research support for neuroscience, preliminary estimates of fiscal year 1983 funding levels at each of the granting agencies, as requested from the budget office of each agency, appear in table A-1.

The fiscal year 1983 funding level for neuroscience, including behavioral research, is estimated at \$503.56 million. The NINCDS appropriations history provides some indication of Federal funding trends. t

### NINCDS Appropriations Levels

Fiscal Year	Actual appropriation (in millions)
1975	\$142.0
1976	144.7
1977	155.3
1978	178.4
1979	212.5
1980	242.5
1981	252.6
1982	277.7
1983	295.7

SOURCE: National Institutes of Health Fiscal Year 1984 Draft Justification of Appropriation Estimates for Committee on Appropriations

\* This appendix was written primarily by Miriam Davis, Environmental Sciences Fellow at the Congressional Research Service

\*\* The rate of growth is somewhat overestimated by these figures, because it took several years for awareness about the society to spread, and because more scientists have recently come to define their activity as neuroscience

\*\*\* See table A-1 for a list of agencies that fund neuroscience research.

t These figures differ from those in table A-1 because they include administrative costs and other costs not covered in the table.

Actual NINCDS appropriations increased by 108 percent between fiscal years 1975 and 1983, but this represents a real increase of only 14 percent in constant 1975 dollars (52). Further, appropriations have fallen short of earlier expectations: in 1979, when the budget needs of NINCDS were projected into the 1980's, they were targeted at \$450 million in fiscal year 1983 (53), a value considerably greater than the actual appropriation of \$295 million.

The Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) is the other major agency responsible for support of neuroscience. Three institutes support research and other activities related to mental health, drug abuse, and alcoholism and alcohol abuse. More than 75 percent of ADAMHA neuroscience funding is channeled through the National Institute of Mental Health (NIMH). NIMH appropriations between 1975 and 1983 increased by 64 percent overall, and funding for basic and clinical neuroscience increased by 83 percent. In constant dollars, however, there was a 7-percent decrease in overall NIMH funding. Funding for neuroscience research increased slightly, taking up an increased fraction of the total NIMH budget.

Competition for funds is keen among research scientists. In fiscal year 1982, 524 of the 1,483 approved grant applications to NINCDS were actually funded. An additional 298 grant applications were disapproved, so that 29.4 percent of all grants, or 35.3 percent of approved grants, were funded (54). Currently, the Neuroscience Program at NSF funds 20 percent of grant applications, whereas 10 years ago, 40 percent of similar applications were funded; further, the average dollar amount for grants awarded by NSF in neuroscience has dropped steadily over the past 5 years. In 1982, NIMH funded 25 percent of 1,443 total research applications in basic and clinical neuroscience. A comparable decline has been observed at most of the other NIH institutes.

## Coordination

To ensure that research investigators applying for extramural funds do not receive grants from different agencies for the same research project, investigators are required to list existing and pending sources of funds on all grant applications. Computer links between NSF and NIH assure that program officers at each agency are aware of this information before

Table A-I.—Estimated Funding Levels for Federal Neuroscience R&D Fiscal Year 1983 (miiiions of doiars)

Agency	Extramural	Intramural	Subject areas
<b>NIH:</b>			
NiNCDS .....	\$189.4	\$36.3	Neuroiogical disorders and stroke
NEI .....	47.2	6.1	Vision and eye disorders: basic and clinical research
NIB .....	10.6	2.6	Dementia and basic neuroscience
NIGHS .....		2.8	Basic neuroscience
NIEHS .....	0.3	0.78	Behavioral and neurological toxicology
Total .....	\$247.5	\$48.58	
<b>ADAMHA:</b>			
NIMH .....	\$ 16.5	\$22.0	Basic neuroscience
	47.6	21.4	Ciinical neuroscience
NIDA .....	14.0	.	Neuroscience
NIAAA .....	3.0	—	Biological basis of alcoholism
Total .....	\$ 81.1	\$43.4	
<b>DOD:</b>			
Army Medical R&D Command .....	\$ 6.5		Chemical defense
Walter Reed Institute .....	—	\$ 2 <	Basic neuroscience
institute of Chemical Defense .....	7.2	—	Chemical defense
Aviation Research Lab(Ft. Racker) .....	—	0.4	Vision research
AFOSR .....	5.7	2.5	Neurophysiogy; vision research; chemical defense
ONR .....	7.4	—	Chemical defense; learning and memory; neuro-physiogy; behavior
U.S. Army Research Office .....	1.1	1.0	
Total .....	\$20.7	\$ 13.1	
NSF: .....	21.4	—	Basic neuroscience and behavior
<b>FDA:</b>			
NCTR .....	0.06	0.71	Behavioral toxicology
<b>CDC:</b>			
NIOSH .....	0.315	0.502	Neurotoxicology
NASA: .....	1.0	1.0	Vestibuiar physiology
VA: .....	21.4	—	Aging; neurology and neurobiology;drug dependence; behavioral science; spinal cord disorders
EPA: .....	1.0	1.79	Neurotoxicolocw
Total .....	\$394.48	\$109.06	
		\$503.56	

KEY: NIH—National institutes of Health (part of the Public Health Service of the Department of Health and Human Services)  
 NiNCDS—National Institute of Neurological and Communicative Disorders and Stroke  
 NEI —National Eye Institute  
 NIA —National institute on Aging  
 NIGMS—National institute of General Medical Science  
 NIEHS—National institute of Environmental Health Sciences  
 ADAMHA—Alcohol, Drug Abuse and Mental Health Administration  
 NIMH—National institute of Mental Health  
 NIDA—National Institute on Drug Abuse  
 NIAAA—National Institute on Alcohol Abuse and Alcoholism

DOD—Department of Defense  
 AFOSR—Air Force Office of Scientific Research  
 ONR—Office of Naval Research  
 NSF—National Science Foundation  
 NASA—National Aeronautics and Space Administration  
 VA—Veterans Administration  
 EPA—Environmental Protection Agency  
 CDC—Centers for Disease Control  
 NIOSH—National institute for Occupational Safety and Health  
 FDA—Food and Drug Administration  
 NCTR—National Center for Toxicological Research

SOURCE: Individual agency budget offices.

grants are awarded. The Interagency Working Group in Neuroscience was formed to facilitate information exchange among extramural grantees. The working group consists of representatives from many of the granting agencies that sponsor neuroscience research. The meetings are voluntary and the group is not separately funded. Research in neurobehavioral tox-

icology at the National Institute of Environmental Health Sciences (! WEHS), the National Center for Toxicological Research (NCTR), and the National Institute for Occupational Safety and Health (NIOSH), is coordinated under the National Toxicology Program, which was created in 1978 to coordinate and provide information about potentially toxic chemicals.

### ***Funding cycles and funding stability***

Most Federal agencies supporting neuroscience research are funded by annual appropriations by Congress. Selected institutes and programs at NIH and ADAMHA are subject to periodic reauthorization as well.

In recent years, some members of Congress have expressed concern over problems with the annual funding cycle and about establishing the budget stability needed for long-term research and development (R&D). Discussions also have focused on the difficulty of assessing complex R&D programs annually. The General Accounting Office (GAO) has suggested that “instituting a multiyear R&D authorization process would be an important first step in improving R&D planning, budgeting, and oversight” (55). Others have expressed concern that a loss of oversight and accountability could result.

### ***Policy questions regarding Federal support for neuroscience***

Questions policymakers may face with respect to Federal support for neuroscience research include the following:

1. Is the level of funding adequate to support growth in the neuroscience field? Are current levels of support for research matched by support for training those to do the research?
2. What is the impact of a decrease in the percentage of grants that are funded? How many laboratories are closed due to lack of funds? What is the optimum number of neuroscience laboratories? What is the optimum approval and funding rate for research grants in neuroscience?
3. Is the degree of coordination among Federal agencies supporting neuroscience adequate to assure a productive and efficient use of funds? Are present mechanisms for coordination working? What are the advantages and disadvantages of funding through multiple Federal agencies?
4. Does the authorization/appropriation cycle for R&D funds hamper research productivity? Is it too cumbersome for Congress?
5. What is the level of support for basic neuroscience research by private industry? Is this growing or declining as a fraction of Federal support? Is private industry supporting certain sectors more than others (e.g., training programs, or research related to pharmacological applications)?