

Association of Neuroscience Departments and Programs

The 1998 ANDP Survey of Neuroscience Graduate, Postdoctoral, & Undergraduate Programs

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Introduction

The Association of Neuroscience Departments and Programs (ANDP) carries out periodic surveys of graduate and postdoctoral training in North America in order to obtain a current 'snapshot' of training activities and to identify developing trends affecting neuroscience education broadly. Previous surveys, conducted in 1986 by Dr. Michael Zigmond, University of Pittsburgh and in 1991, by Dr. Linda Spear, SUNY-Binghamton, have provided important data on the status of neuroscience graduate training in the U.S. that established the background and format for the current survey.¹

Methods

This report provides information on graduate programs in the U.S. obtained from a survey carried out by Lesly Huffman and Dr. Robert Fellows between June and December, 1998. The survey questionnaire was posted on the ANDP web site (www.andp.org/survey), and 189 doctoral graduate programs with membership in ANDP were asked to complete and submit data electronically or in hard copy. Completed questionnaires were received for 90 neuroscience departments and programs, a response rate of 48%. Several programs too new to have historical data were not included in the analysis. These reflect the continuing increase in neuroscience departments and programs. Results were entered into an Access database for subsequent analysis.

Results

1. Program Characteristics
2. Graduate Education
3. Postdoctoral Training
4. Faculty
5. Diversity
6. Financial Support
7. Conclusions

(1) Zigmond, M.J. and Spear, L.P. Neuroscience training in the USA and Canada: observations and suggestions, TINS 15:379-383, 1992.

Participating Institutions

State	Institution
AL	University of Alabama Birmingham
AZ	University of Arizona
CA	Stanford University
CA	University of California Los Angeles
CA	University of California Riverside
CA	University of California Santa Barbara
CO	University of Colorado Health Science Ctr.
CT	University of Connecticut
DE	University of Delaware
FL	Florida State University
FL	University of Florida
FL	University of Miami School of Medicine
GA	Georgia State University
IA	Iowa State University
IA	University of Iowa
IL	Finch University of Health Sciences
IL	Northwestern University
IL	University of Chicago
IL	University of Illinois at Chicago
IL	University of Illinois
IL	Southern Illinois Univ. Sch. of Med.
IN	Indiana University
IN	Purdue University
KS	University of Kansas Medical Center
LA	Louisiana State University
LA	Tulane University
MA	Boston University School of Medicine
MA	Brandeis University
MA	Harvard Medical School
MA	Tufts University School of Medicine
MA	University of Massachusetts
MD	Johns Hopkins University
MD	Uniformed Services Univ. of Health Sciences.
MD	University of Maryland Baltimore
MI	Michigan State University
MI	University of Michigan
MI	Wayne State University School of Medicine
MN	University of Minnesota
MO	Saint Louis University
MO	Washington University
MT	Montana State University
NC	Wake Forest University School of Medicine
NC	University of North Carolina
NJ	RWJMS - UMDNJ

State	Institution
NJ	Rutgers University
NM	University of New Mexico
NY	Albany Medical College
NY	Albert Einstein College of Medicine
NY	Binghamton University
NY	Columbia University
NY	Cornell Medical College
NY	Cornell University
NY	Mt. Sinai School of Medicine
NY	State University of New York Stony Brook
OH	Case Western Reserve University
OH	Miami University
OH	Northeastern Ohio University
OH	Ohio State University
OH	Ohio University
OH	Medical College of Ohio
OK	University of Oklahoma Health Sci. Ctr.
OR	Oregon Health Sciences University
PA	Allegheny University of the Health Sci.
PA	University of Pennsylvania
PA	University of Pittsburgh
RI	Brown University
SC	University of South Carolina
TN	Vanderbilt University
TX	Baylor College of Medicine
TX	University of Texas Health Science Ctr.
TX	University of Texas Medical Branch
TX	University of Texas at Austin
TX	University of Texas, San Antonio
UT	University of Utah
VA	University of Virginia
WA	University of Washington
WA	Washington State University
WI	Medical College of Wisconsin
WI	University of Wisconsin, Madison
WI	University of Wisconsin, Milwaukee

1. Program Characteristics

Table 1a - Institutional Affiliation

The locus of graduate education in the neurosciences has not changed over the course of the three ANDP surveys. Programs based in public institutions still exceed those in private institutions by 2 to 1, and more are affiliated with medical schools than with schools of arts and sciences. 1 In this report, the term program refers to both neuroscience departments and neuroscience programs.

Survey Year	86	91	98*
	Percent of Total		
Public	62	68	69
Private	32	32	31
Medical School	-	38	43
Arts & Sciences	-	30	30
Both (MS & AS)	-	17	21
Other	-	15	7

* Survey question 2

Table 1b - Degree Granted

One aspect that has changed significantly is the number of programs, the majority, now awarding degrees in neuroscience. In previous surveys most degrees were awarded in other disciplines.

Survey Year	86	91	98*
	Percent of Total		
Ph.D.-Neuroscience	24	28	66
Ph.D.-Other discipline	74	54	30
Other	5	14	4

* Survey question 3

Table 1c - Undergraduate Activities

The role of graduate programs in undergraduate neuroscience activities, demonstrated in the previous survey, continues to involve undergraduate teaching (39%) and provide opportunities for undergraduate research (62%). The percent of programs that report formal undergraduate majors in neuroscience is unchanged.

Survey Year	86	91	98*
	Percent of Total		
Formal Program	-	23	24
Teaching	9	48	39
Research	-	68	62

* Survey question 5

Table 1d - Postgraduate Activities

Involvement in postdoctoral training remains high while nearly two thirds of reporting programs engage in MD/PhD training, up 32% from 1991. Few report activities related to the training of clinicians through graduate medical education (GME) or continuing medical education (CME).

Survey Year	86	91	98*
	Percent of Total		
Postdoctoral Training	-	82	63
M.D./Ph.D. Training	-	47	62
GME	-	18	10
CME	-	11	6

* Survey question 5

2. Graduate Education

Table 2a – Recruitment

The number of applications per program continues to increase, up 45% from 1991 and 154% from 1986. These data do not distinguish between increases in the number of applicants and increases in the number of applications per applicant. Offers of admission also continue to increase, up 20% from 1991 and 100% from 1986.

Although the number of students matriculating per program increased almost 40% from 1986 to 1991, there was little change between 1991 and 1998, when entering students averaged 5.2 per program.

Survey Year	86	91	98*
	Average per program		
Number of students applied	24	42	61
Number of students admitted	6	10	12
Number of students entered	3.6	5	5.2

* Survey question 15

Table 2b - Entering Student Characteristics

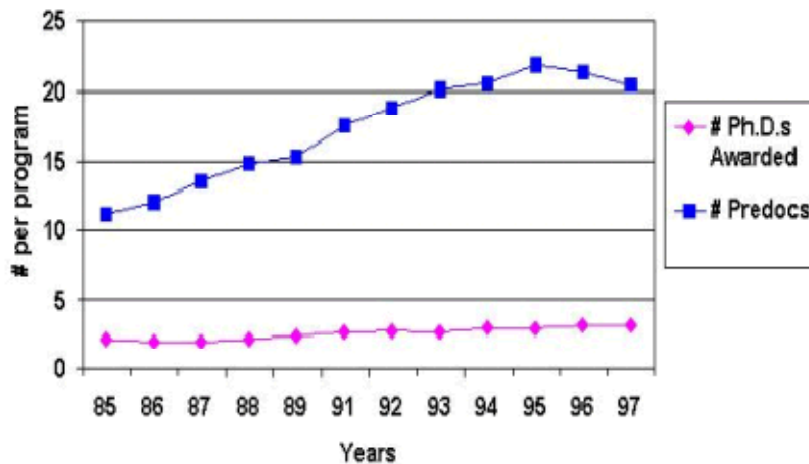
Entering students have academic credentials similar to those from previous surveys. Both GPAs and GRE scores are essentially unchanged. The percent of entering students with prior research experience remains high.

Survey Year	86	91	98*
Average GRE Scores			
Quantitative	624	630	658
Verbal	590	600	577
Analytical	624	635	650
Average GPA	3.4	3.4	3.5
Prior research experience (%)	-	81	78

* Survey question 16

Figure 2c - Total Predoctoral Students and PhDs Conferred per Program

Over the decade from 1985 to 1995, the average number of graduate students per program increased steadily, reached a peak of 22 in 1995 and declined to 20 per program in the last year surveyed. The 74% increase in graduate students per program was not accompanied by a similar increase in PhD degrees awarded, which rose from 2.6 per program in 1986 to 3.2 per program in 1997, a gain of 19%. Part of this difference can be attributed to an increase in time to degree (Figure 2e).



Survey question 13

Table 2d - Placement of New Ph.D.s

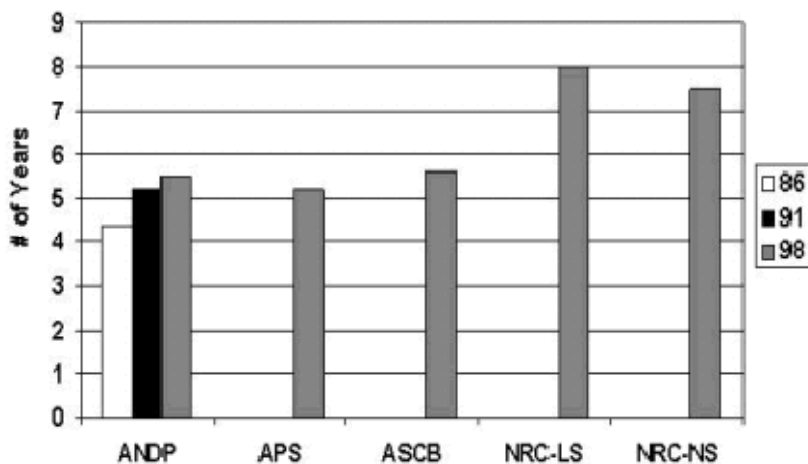
In 1998, the majority of graduates were engaged in postdoctoral training, up 11% from 1991. The next largest group was enrolled in medical school. Most graduates take positions in scientific fields, with only 3.4% employed out of science and 1.3% unemployed.

Survey Year	91	98*
	Percent of Total	
Postdoctoral position	60	70
Medical School	13	15
Faculty position	6	5
Research Institute	12	1
Other	6	4.5
Employed outside the field	1.6	3.4
Currently unemployed	0.6	1.3

* Survey question 18

Figure 2e - Years to Ph.D. Degree

The National Research Council (NRC) reported that the median time-to-degree was 8 years for life-science PhDs (NRC-LS), and 7.5 years for neuroscience PhDs (NRC-NS)². Although the time to obtain the Ph.D. degree in neuroscience lengthened between 1986 and 1998, the ANDP survey data indicates the average for neuroscience in 1998 was 5.5 years, within the 5-6 year recommendation of the NRC. A similar difference from NRC data has been reported by the American Society of Cell Biology (ASCB), 5.6 years³ and the American Physiological Society (APS), 5.2 years,⁴ for their disciplines.



Survey question 18

(2) Trends in the Early Careers of Life Scientists, National Research Council, National Academy Press, 1998.

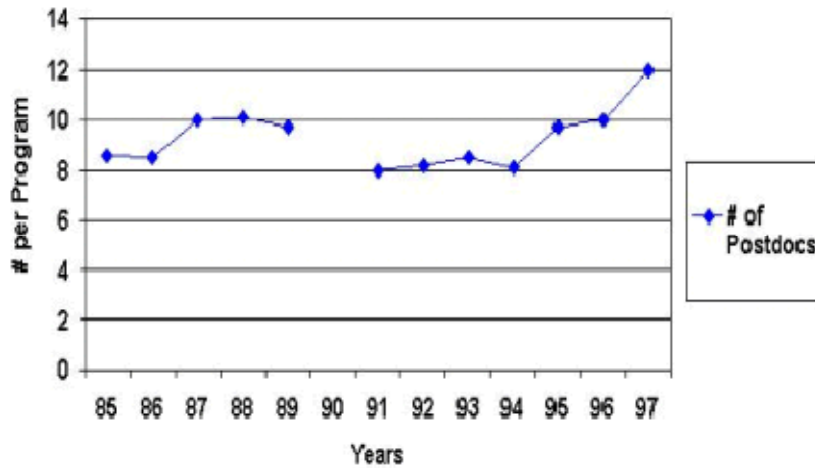
(3) Marincola, E. and Solomon, F. The career structure in biomedical research: implications for training and trainees, *Molecular Biology of the Cell*, 9:3003-3006, 1998.

(4) Matyas, M.L., and Frank, M. The employment of recent doctoral graduates in physiology. *The Physiologist*, 41:153-160, 1998.

3. Postdoctoral Training

Figure 3a - Postdoctoral Trainees per Program

The number of postdoctoral trainees remained in the range of 8-10 per program from 1986 to 1997, rising to 12 per program in 1998. Whether this is a significant trend remains to be determined.



Survey question 21

Table 3b - Average Number of Years in Postdoctoral Trainee Position

The average time spent in a postdoctoral trainee position has not changed since the 1991 survey. Information on the number of postdoctoral trainee positions taken by each individual was not obtained.

Survey Year	91	98*
Number of Years	2.3	2.3

* Survey question 24

Table 3c - Professional Degree of Current Postdoctoral Trainees

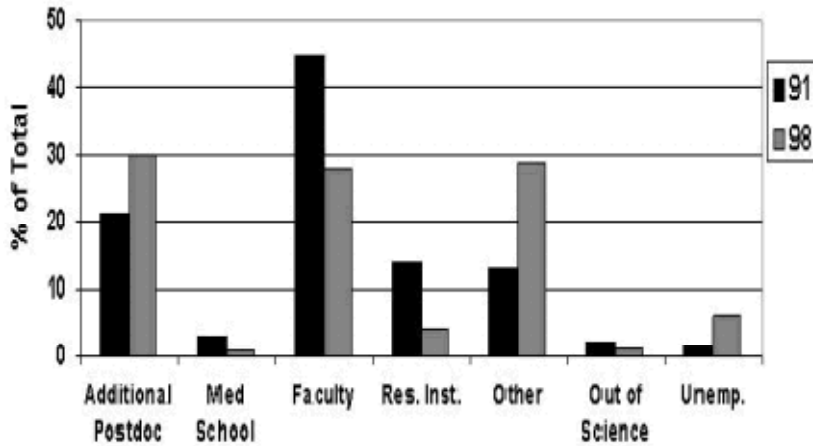
Most individuals currently in training have the PhD degree (88% of total postdoctoral trainees). The increase in MD and MD/PhD postdoctoral trainees shown in 1986 and 1991 was reversed in 1998. The greatest decrease is seen for postdoctoral trainees with the MD degree.

Survey Year	86	91	98*
	Percent of Total		
Ph.D.	78	63	88
M.D.	18	25	5
M.D./Ph.D.	4	12	6

* Survey question 21

Figure 3d - Placement from Current Postdoctoral Trainee Positions

Data for the fiscal year 1997-1998 show a substantial increase in the percent of postdoctoral trainees going into industrial and biotechnology positions (“other” category), doubling from 14% in 1991 to 29% in 1998. This is offset by a decrease of 30% in those going into faculty (university and 2-4 year college) positions (45% to 28%), and by a decrease in those accepting research institute positions. There is an increase in the percent going to another postdoctoral appointment but only 6% are unemployed or working out of science.



Survey question 24

4. Faculty

Table 4a - Distribution of Faculty by Rank

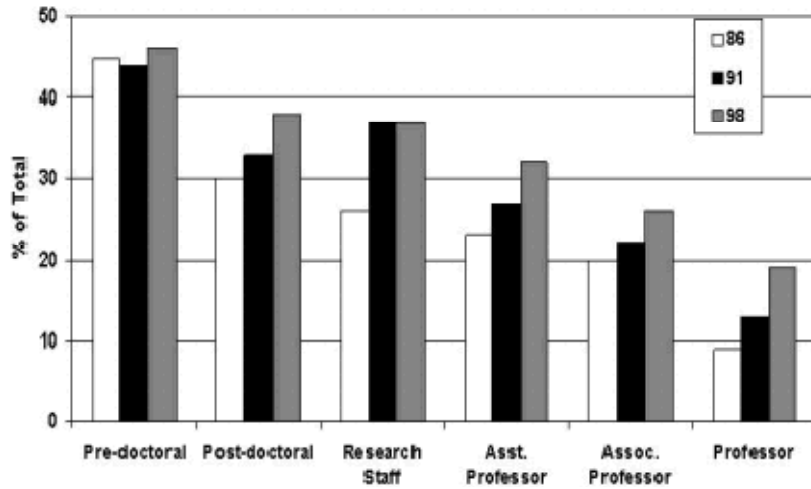
The distribution of tenure track faculty across ranks was similar to that reported in previous surveys, with a ratio approximating 1:1:2. Of 3028 total faculty included in the current survey, 86% were tenured or in tenure-track positions. This is similar to 88% in the 1991 survey and 90% in the 1986 survey.

Survey Year	86	91	98*
	Percent of Total		
Assistant Professor	23	26	24
Associate Professor	28	28	25
Full Professor	49	46	51

* Survey question 12

Figure 4b - Percentage of Women by Rank

Women continue to make gains at all career levels except in research staff positions.



Survey question 12

5. Diversity

Table 5a - Minority Representation

The percent of U.S. minorities (Table 5b) has doubled at the predoctoral level and tripled at the postdoctoral level since the 1991 survey. While minority representation at the faculty level also has increased, it remains below the level in the general population.

Survey Year	86	91	98*
	Percent of Total		
Predocutorial	10	8.8	18
Postdoctoral	22	5.9	21
Faculty	4.6	5.7	7.1

* Survey questions 12, 17, 22

Table 5b - Minority Distribution

Within the U.S. minority population, asian-americans represent the largest group at all levels. They are followed by hispanic-americans and african-americans, respectively. There is a decrease since 1991 in hispanic-american representation at the predoctoral and postdoctoral levels and an increase in african-americans at the postdoctoral level. Data on native-americans was not obtained in 1991.

Survey Years	91	98*	91	98*	91	98*
	Percent of Total Minority					
	Predoc		Postdoc		Faculty	
Asian-American	38	42	53	50	64	61
Hispanic	32	25	25	10	22	20
African-American	22	20	12	32	11	7
Native-American	-	13	-	4	-	5

* Survey questions 12, 17, 22

TABLE 5c - Non-Citizen Representation

In the current survey, non-US citizens made up one-fifth of graduate students, unchanged from 1991, and half of postdoctoral trainees. However, the percent of non-citizens in faculty positions remains low.

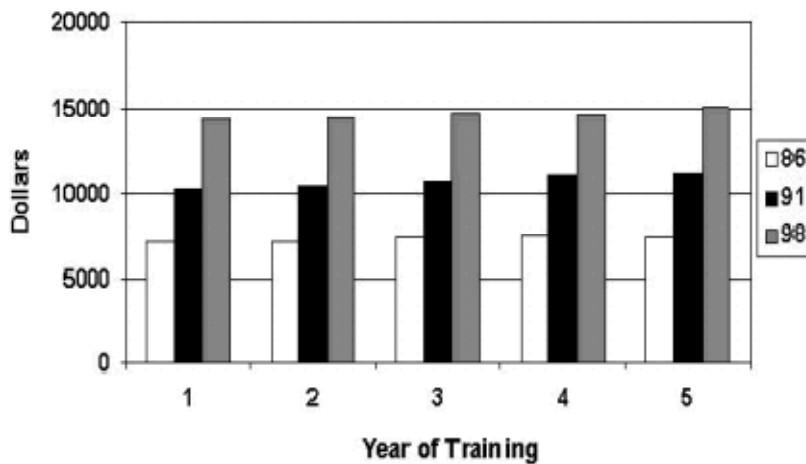
Survey Year	91	98*
	Percent of Total	
Predoc	20	19
Postdoctoral	40	49
Faculty	7.3	2.9

* Survey questions 12, 17, 22

6. Financial Support

Figure 6a - Predoctoral Stipend Levels

Nearly all matriculated predoctoral students received stipend support in 1998 (97%, compared to 93.3% in 1991). Even when corrected for inflation¹, the 1998 stipend was 19% greater than the 1991 stipend which, in turn, was 20% greater than the 1986 stipend. It is worth noting that the comparable NRSA predoctoral stipends were \$6552 in 1985, \$8800 in 1991, and \$11,496 in 1998. Thus, the actual stipends paid to students have exceeded the NRSA levels in each of the three surveys. An increase in the amount of support with increasing years of training is low, averaging \$14,361 in the first-year of training compared to \$15,057 in the fifth year. The first-year predoctoral stipend has increased 40% from the 1991 level of \$10,256 and 102% from the 1986 level of \$7115.

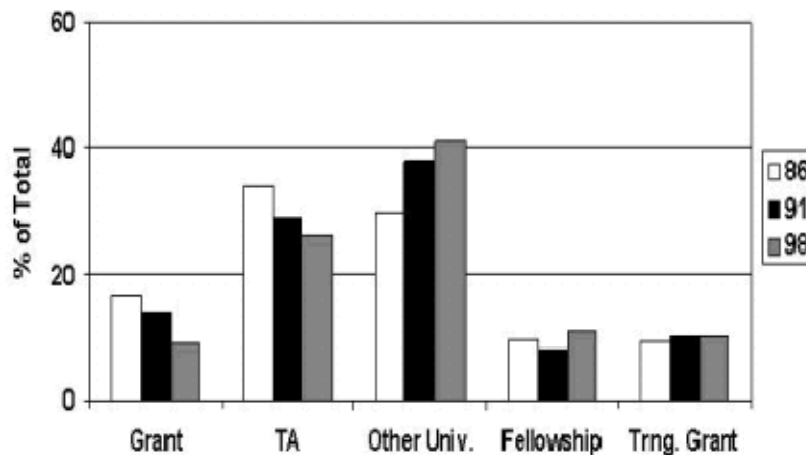


Survey question 27

¹Bureau of Labor Statistics Consumer Price Index. Home page. <http://stats.bls.gov/cpihome.htm>. February 2000.

Figure 6b - Stipend Sources - First Year Graduate Students

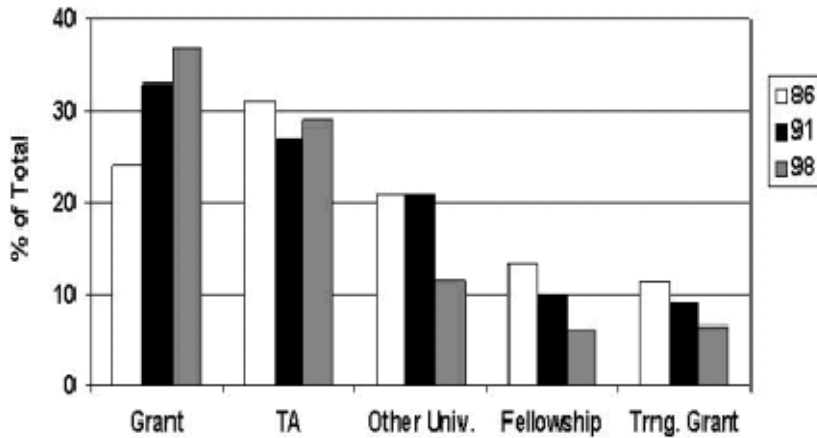
There has been a steady decline in the support of first-year graduate students from research grants and teaching assistantships (TAs) from 1986 to 1998. Support from other university funds has increased, providing 41% of the total in 1998. Training grants and individual fellowships from all sources have shown little change over the three surveys.



Survey question 28

Figure 6c - Stipend Sources - Advanced Graduate Students

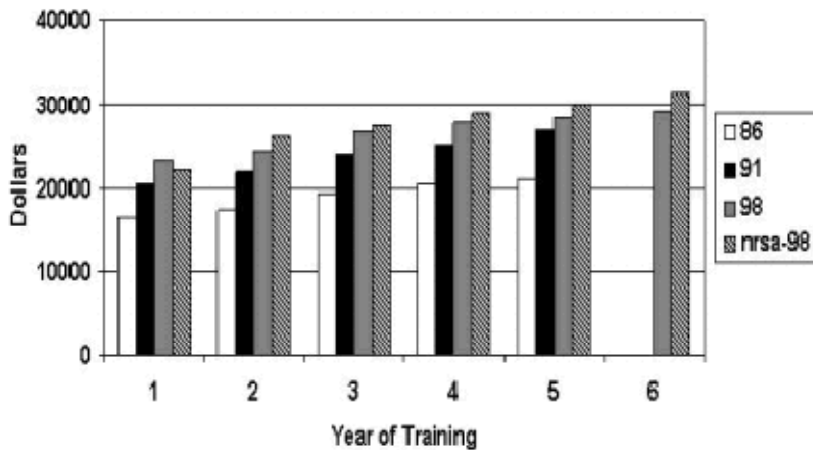
In 1998, research grants represented the primary source of support for advanced graduate students, accounting for 37% of the total (up from 33% in 1991 and 24% in 1986). This is followed by TAs (29%, similar to previous surveys) and other university funds (12%, down from previous surveys). There has been a steady decline in fellowship and training grant support to 6% and 6.4%, respectively in 1998.



Survey question 28

Figure 6d - Postdoctoral Trainee Stipend Levels

The average postdoctoral trainee stipend increased from \$23,227 in the first-year to \$29,169 in the sixth year. While the change in stipend kept pace with inflation from 1986 to 1991, the increase of 14% from 1991 to 1998 was well below the inflation rate of 22.8%¹. Except for first-year trainees, stipends lag slightly behind NRSA levels.

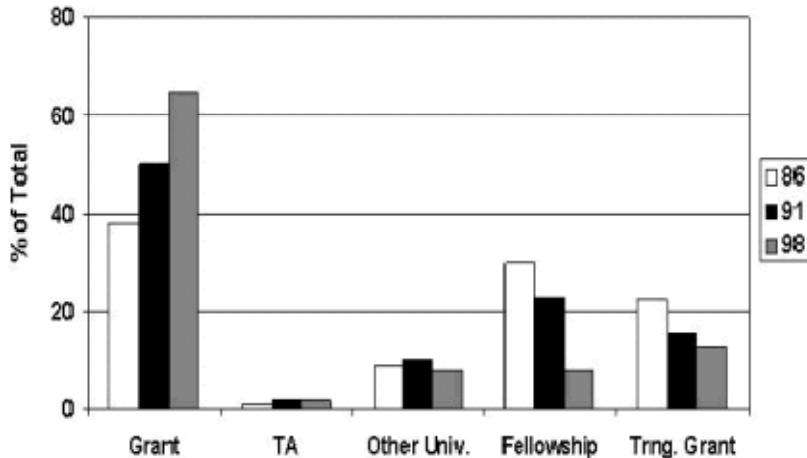


Survey question 27

¹Bureau of Labor Statistics Consumer Price Index. Home page. <http://stats.bls.gov/cpihome.htm>. February 2000.

Figure 6e - Stipend Sources - Postdoctoral Trainees

Research grants were the major source of postdoctoral support, continuing a trend from previous surveys. In 1998, they provided 65% of the total support, up from 50% in 1991 and 38% in 1986. Teaching assistantships and other university funds provided a small percent of the total support. Training grants and fellowships, the source of 40% of the total in the previous survey, now make up only 24% and continue a downward trend.



Survey question 28

7. Conclusions

Most neuroscience training is now carried out in neuroscience departments and in neuroscience interdisciplinary programs rather than in departments offering degrees in other disciplines.

The number of applications per program has increased significantly while the number of matriculants per program is essentially unchanged. This may reflect increased shopping around by students as well as a greater number of applicants.

The average number of students per program, which increased steadily from 1986 to 1995, appears to have stabilized at ~20. The increase undoubtedly reflects increased time to degree as well as an increase in students admitted.

PhDs awarded per program has increased very little since 1991, but the time to degree has increased from 4.4 to 5.5 years. There is an annual drop-out rate of 1.4 students/program, on average after 2.2 years of graduate study.

Almost all PhD graduates were employed in scientific positions, with only 3.4% employed out of science and 1.3% unemployed. Most new graduates pursued postdoctoral training. This increased 17% between 1991 and 1998.

Women and minorities show gains but remain underrepresented overall.

Almost all predoctoral students receive stipend support, primarily from university funds for first-year students and research grant funds for advanced students. The increase in support of postdoctoral trainees from research grants is accompanied by a decrease in support from fellowships and training grants.

