

The Charles A. Dana Foundation

DAVID MAHONEY, CHAIRMAN

January 23, 1997

Ms. Melanne Verveer
Deputy Chief of Staff to the First Lady
Special Assistant to the President
1600 Pennsylvania Avenue, West Wing
Washington, D.C. 20500

Dear Ms. Verveer:

Recently, David Mahoney, Chairman of the Charles A. Dana Foundation, wrote to Mrs. Clinton offering his assistance in the development and implementation of a White House Conference on the Brain. I attach a copy of that letter for your reference.

Your office suggested that it might be useful to send you some additional background about the Foundation and its activities so that you would be fully briefed on who we are and how our collaboration might be beneficial to Mrs. Clinton's efforts in this area.

The information may be easier to digest presented in a report format.

What is the Charles A. Dana Foundation?

The Charles A Dana Foundation, Inc. was established as a private philanthropic foundation in 1950 by philanthropist Charles A. Dana for the support of projects in health and education. Since that time, the Foundation has appropriated more than \$225 million dollars for philanthropic purposes. In addition to grant-making to institutions, the Foundation recognizes innovative ideas by individuals through the Charles A. Dana Awards for Pioneering Achievements in Health and Education.

Today, the Foundation directs its grant making activities in specific areas of health and education.

Health: The Foundation, in addition to its long-standing commitment to the Dana-Farber Cancer Center, focuses its health grants on the support of neuroscience. The foundation currently supports projects that contribute to the greater understanding of brain function through new advances in technology, and to the prevention, diagnosis and treatment of disease and disorders affecting children and teens, mature adults, and seniors.

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In addition, the Dana Foundation has established a grantee organization, the Dana Alliance for Brain Initiatives, to promote public awareness of the personal and societal benefits of brain research. (More detail on this organization follows below.)

Education:

Today, the Dana Foundation's support to education focuses on the national dissemination and scale-up of innovative programs whose originators have received Dana awards. In the past year, the Foundation has supported a number of programs where its interests in neuroscience and education intersect. These are recent examples:

Linking Neuroscience and Education to Improve Parenting of Young Children - Parents as Teachers National Center, Inc.

The principal goal of this multi-year project is to translate research findings on early brain development into an information delivery system that results in improved parenting practices, prenatally to age 3. The project builds on the work of the Center's founder, Mildred M. Winter, and brings to the Parents as Teachers program the experience of Washington University neuroscientists, psychologists, and child development specialists.

Bridging the Gap Between Neuroscience and Education

This 1996 workshop, co-sponsored by the Education Commission of the States and the Dana Foundation, brought together neuroscientists, cognitive psychologists, education researchers and practitioners, and policy makers to explore the possible relevance to schools of recent developments in neuroscience and cognitive psychology. From this conference, a series of one-year grants have been awarded, as follows:

Harvard University - Study on Attention Deficit Hyperactivity Disorder (ADHD)

This grant supports the integration of available information on ADHD in order to create a battery of psychological and biological procedures that would differentiate among children with ADHD that would benefit from ritalin therapy and those that would not.

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University of North Carolina - Study of Fragile X Syndrome

This grant supports the development of a research plan integrating educational, cognitive, neuropsychological and neuroscience perspectives on Fragile X Syndrome, the most common inherited cause of mental retardation.

Washington University - Study on Pervasive Development Disorders (PDD)

Under this grant, the University will study children with PDD, begin to develop a clinical instrument capable of diagnosing PDD in children, and develop classroom strategies that will prevent the social deficit from being compounded by the reactions of other children.

ZERO TO THREE

This grants supports the creation of a multi-year, multi-site training initiative that translates current findings emanating from neuroscience for use by practitioners who work with pregnant women and families with young children.

What is the Dana Alliance for Brain Initiatives?

The Dana Alliance for Brain Initiatives, as a grantee organization of the Dana Foundation, acts as its education outreach arm, developing and implementing strategies which increase public understanding about the brain and brain research. It does this through an active schedule of public forums, PBS television productions, radio programs broadcast through the NPR network, and the distribution of resource information to both the public and scientific community. Its report, *Delivering Results: A Progress Report on Brain Research*, now published annually, is considered the single most useful summary in lay terms of the advances that are made in neuroscience.

In 1996, the Alliance launched Brain Awareness Week, a public information and education campaign to advance public understanding about the brain and brain research. Now in its second year, Brain Awareness Week (March 17-23, 1997) unites over 280 universities, government agencies, teaching hospitals and research centers, patient services groups, and membership organizations in programming efforts throughout the country to reach students, educators, and the general public through educational activities, seminars, and conferences. (A list of 1997 Brain Awareness partners is enclosed.)

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The Dana Alliance has embarked on several activities to expand public understanding of brain development in early childhood and its impact on how children learn. In 1995, it hosted a public forum at the Salk Institute in La Jolla, California on brain health and fitness which emphasized the important "connections" that are made in early childhood development. That same year, the Alliance produced and distributed via the NPR network a one-hour radio program, *The Developing Brain*, narrated by CNN anchor Judy Woodruff. The program featured leading neuroscientists and clinicians speaking about language and speech development, the importance of nurturing and other environmental stimuli on development, and the way children learn. A special dinner for government representatives and key members of the patient- and advocacy communities was co-sponsored in September 1995 by the Dana Alliance and the Woodrow Wilson International Center to discuss neuroscience and early childhood. Rosalyn Carter, Nobel-laureate Torsten Wiesel, then Society for Neuroscience president Dr. Carla Shatz were key speakers. Diane Sawyer, whose *Prime Time Live* program on early childhood development was an articulate message to the public on the subject, served as the host.

This spring, the Alliance will film a PBS program on the developing brain as part of its *Your Brain* series. Hosted by Mike Wallace, the program will look at what neuroscience tells us about how children develop and will discuss the policy implications of this information. The program will air in Fall 1998. As you can see from this brief history, the Foundation is heavily engaged in neuroscience, early childhood development and education, and in the implementation of public programs to expand public understanding in these areas.

We would like to reiterate our interest, as expressed by Mr. Mahoney, in working in any way that is appropriate to aid Mrs. Clinton in her efforts to bring information about these critical issues to a broader public.

Some additional background information is enclosed which I hope may be useful. I would like to draw your attention to the tape, *The Developing Brain*, which I believe goes in some respects to the heart of Mrs. Clinton's concerns.

The Foundation is headquartered in New York City. I coordinate many of the public awareness efforts from Bethesda, MD. I would be happy to answer any

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further questions you may have and would hope to speak with your office in the near future.

Please feel free to contact me at 301-986-6964. My mailing address, should you need it, is Francis Harper, Dana Alliance for Brain Initiatives, 6917 Arlington Road, Suite 202, Bethesda, MD 20814.

Thank you very much.

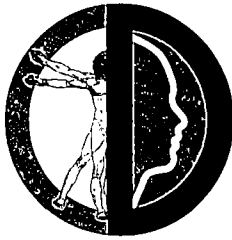
Yours sincerely,

A handwritten signature in black ink, appearing to read "Francis Harper", followed by a horizontal line.

Francis Harper

FH/mps

Attachments



EARLY CHILDHOOD DEVELOPMENT

Brain Awareness Week

March 17-23, 1997

Campaign Chairman

David Mahoney
The Charles A. Dana Foundation

Advisory Committee

W. Maxwell Cowan, M.D., Ph.D.
Howard Hughes Medical Institute

Michael Faenza, M.S.S.W.
National Mental Health Association

John Feather, Ph.D.
AARP Andrus Foundation

Laurie M. Flynn
National Alliance for the Mentally Ill

Murray Goldstein, D.O., M.P.H.
United Cerebral Palsy Research
and Education Foundation

Zach W. Hall, Ph.D.
National Institute of Neurological
Disorders and Stroke

Richard J. Hodes, M.D.
National Institute on Aging

Steven E. Hyman, M.D.
National Institute of Mental Health

Alan I. Leshner, Ph.D.
National Institute on Drug Abuse

Bruce S. McEwen, Ph.D.
Society for Neuroscience

Edward F. Truschke
Alzheimer's Association

Arthur Ullian
The National Campaign to End
Neurological Disorders

Joan Vernikos, Ph.D.
National Aeronautics and
Space Administration

Kenneth M. Viste, Jr., M.D.
American Academy of Neurology

James D. Watson, Ph.D.
Cold Spring Harbor Laboratory

Nancy S. Wexler, Ph.D.
Hereditary Disease Foundation

The Dana Alliance for Brain Initiatives
745 Fifth Avenue, Suite 700
New York, NY 10151
(212) 223-4040
fax (212) 593-7623

Campaign Clearinghouse
(301) 657-9197
fax (301) 907-0990

email: fharper@danany.dana.org

B.A.W. Homepage
www.dana.org/brainweek

March 6, 1997

Ms. Melanne Verneer

Dep. Asst. to the President

Office of the First Lady

17th & Pennsylvania Avenue, NW, Rm. 100

Washington, DC 20500

Dear Ms. Verneer:

We hope that your schedule will permit you to join us on Wednesday, March 19 when the Dana Alliance for Brain Initiatives will present a major program, *Delivering Results: A Progress Report on Brain Research*. It will take place between 9:30 - 11:30 a.m. in 562 Dirksen Senate Office Building. Following the briefing will be a luncheon at which Members of Congress will speak on how biomedical research fares in today's public policy arena. The luncheon will be held in the Russell Caucus Room.

The program will be the centerpiece of Brain Awareness Week, a national public information campaign uniting organizations across the country in educational activities to promote greater awareness of the brain and brain research.

The Alliance launched Brain Awareness Week last year as a means to unite the outreach efforts of government agencies, scientific research institutes, universities, hospitals, patient groups, and service organizations. This year, Brain Awareness Week (March 17 - 23) already numbers over 300 "partners," including 14 government agencies and 71 universities/teaching hospitals. In its second year, the Week will be catalyst for literally hundreds of educational programs in classrooms, community centers, hospitals and research labs across the country.

Brain Research for the Life of Your Mind

Built around the publication of our third progress report, *Update 1997: Pushing the Frontiers*, this event will underscore the important progress that is being made in understanding the brain and the cause and treatment of many brain diseases and disorders. The program should attract approximately 200 people including scientists, representatives of patient groups and service organizations, staff of Congressional offices and federal agencies, and the media.

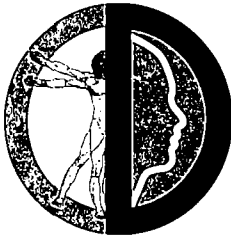
I enclose agendas for the program and a current list of our partners in this endeavor. Please call me or Karen Graham at 301/951-9177 (fax 301/907-0990) with any questions and to RSVP about your attendance at the morning program and/or the luncheon.

Sincerely,

A handwritten signature in black ink, appearing to read "Francis Harper", with a horizontal line extending from the end of the signature.

Francis Harper

encl.



Brain Awareness Week

March 17-23, 1997

Campaign Chairman

David Mahoney
The Charles A. Dana Foundation

Advisory Committee

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Cold Spring Harbor Laboratory

Nancy S. Wexler, Ph.D.
Hereditary Disease Foundation

The Dana Alliance for Brain Initiatives
745 Fifth Avenue, Suite 700
New York, NY 10151
(212) 223-4040
fax (212) 593-7623

Campaign Clearinghouse
(301) 657-9197
fax (301) 907-0990
email: fharper@danany.dana.org

B.A.W. Homepage
www.dana.org/brainweek

David J. Mahoney, Chairman Dana Alliance for Brain Initiatives

cordially invites you to attend a special luncheon
on the occasion of Brain Awareness Week

“How Does Brain Research Fare in Today’s Public Policy Arena”

with remarks by:

The Honorable Arlen Specter (R-PA)

Chairman, Senate Appropriations Subcommittee on Labor, HHS,
Education, and Related Agencies

The Honorable George W. Gekas (R-PA, 17th)

Co-Chairman, Congressional Biomedical Research Caucus

The Honorable Nancy Pelosi (D-CA, 8th)

Co-Chairman, Congressional Biomedical Research Caucus

The Honorable John Edward Porter (R-IL, 10th)

Chairman, House Appropriations Subcommittee on Labor, HHS,
Education, and Related Agencies

with two award presentations:

The Jacob Javits Award

presented by the ALS Society to Senator Arlen Specter

The 1997 Decade of the Brain Award

presented by the Society for Neuroscience to Senator Tom Harkin

Wednesday, March 19, 1997

12:00 - 2:00 PM

R.s.v.p.

Liz Quinn

301-657-9197

Caucus Room, Rm. 325

Russell Senate Office Building

Delaware & Constitution Aves. NE

Washington, D.C.

Brain Research for the Life of Your Mind



Brain Awareness Week

March 17-23, 1997

Campaign Chairman

David Mahoney
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B.A.W. Homepage
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In observance of Brain Awareness Week
you are cordially invited to attend

Delivering Results:

A Progress Report on Brain Research

a special program presented by the Dana Alliance for Brain Initiatives
and hosted by

Senator Ted Stevens, Chairman, Senate Appropriations Committee

featuring presentations on the advances, opportunities and challenges
of brain research by leading neuroscientists:

Leon N. Cooper, Ph.D. - Professor and Director, Department of
Physics and Neuroscience, Brown University

Joseph Thomas Coyle, M.D. - Chairman, Department of
Psychiatry, Harvard Medical School

Martha Bridge Denckla, M.D. - Professor of Neurology,
Pediatrics, and Psychiatry, The Johns Hopkins University

Gary Gottlieb, M.D., M.B.A. - Director and CEO, Friends
Hospital, Philadelphia, PA

Michael S. Gazzaniga, Ph.D. - Department of Cognitive
Neuroscience, Dartmouth College

Guest moderator:

Ms. Judy Woodruff

Anchor, Cable News Network

Wednesday, March 19, 1997

9:30 am - 11:30 am

R.s.v.p.

Liz Quinn

301-657-9197

Room 562

**Dirksen Senate Office Building
1st St. & Constitution Ave, NE
Washington, DC**

Brain Research for the Life of Your Mind

Brain Awareness Week 1997

Brain Awareness Week is a public information campaign created in 1996 by the Dana Alliance for Brain Initiatives to focus public attention on the importance of the brain and brain research. The campaign unites the interests and activities of federal agencies, patient service and advocacy groups, outreach organizations, professional groups, teaching hospitals and universities and private research centers. The 1997 campaign will take place March 17-23, 1997.

Government Agency Partners

Consumer Product Safety Commission
U.S. Department of Veterans Affairs
Library of Congress, Office of Scholarly Programs
National Aeronautics and Space Administration
National Cancer Institute
National Eye Institute
National Human Genome Research Institute
National Institute of Child Health and Human Development
National Institute of Mental Health
National Institute of Neurological Disorders and Stroke
National Institute of Nursing Research
National Institute on Aging
National Institute on Alcohol Abuse and Alcoholism
National Institute on Deafness and Other Communication Disorders
National Institute on Drug Abuse

Outreach Partners

AARP
AARP Andrus Foundation
Abraham A. Low Institute
Academy of Neurologic Communication Disorders and Sciences
Acoustic Neuroma Association
Acoustic Neuroma Association of Canada
"Addiction and the Brain, Beyond Saying No" -
 a Science Education Drug Abuse Partnership Award project funded by NIDA.
Alliance for Aging Research
Alliance of Genetic Support Groups
ALS Association (The)
Alzheimer Care and Research Center Foundation
Alzheimer's Association

Alzheimer's Disease Education and Referral Center
 Alzheimer's Research Alliance of Oregon
 American Academy of Anti-Aging Medicine
 American Association for the Study of Headache
 American Brain Tumor Association
 American Chronic Pain Association
 American Council for Headache Education
 American Day Behavioral Health System
 American Epilepsy Society
 American Federation for Aging Research
 American Methadone Treatment Association
 American Pain Society
 American Paralysis Association
 American Parkinson Disease Association
 American Sleep Disorders Association
 American Syringomyelia Alliance Project, Inc.
 Anorexia Nervosa and Related Eating Disorders, Inc.
 Anxiety Disorders Association of America
 Brain Injury Association, Inc.
 Brain Injury Services
 Brain Trauma Foundation
 Brain Tumor Foundation for Children, Inc.
 Brain Tumor Foundation of Canada
 Brain Tumor Society (The)
 Center for Mental Health, Inc. (The)
 Center for the Advancement of Health
 Child Neurology Society
 Childhood Brain Tumor Foundation
 Children with Attention Deficit Disorders
 Children's Brain Diseases Foundation
 Children's Brain Tumor Foundation
 Cochlear Implant Club International
 Committees of Correspondence, Inc. -
 Drug Prevention Resources
 Community Access
 Coordinated Campaign for Learning Disabilities (CCLD)
 Dana Alliance for Brain Initiatives (The)
 Daniel Heumann Fund for Spinal Cord Research
 Dean Foundation for Health, Research and Education
 Depression and Related Affective Disorders Association (DRADA)
 Depressive and Manic-Depressive Association
 Dystonia Medical Research Foundation
 Epilepsy Foundation of America
 Erikson Institute
 Family Caregiver Alliance

Florida Easter Seals Society, Keys Region
 Foundation for Spinal Cord Injury Prevention
 Freedom from Fear
 French Foundation for Alzheimer Research
 Guillain-Barre Syndrome Foundation International
 Harrison School District #2, Colorado Springs
 Help Them Walk Again Foundation
 Hereditary Disease Foundation
 Hydrocephalus Association
 Hyperacusis Network (The)
 International Association for the Study of Pain
 International Brain Injury Association
 International Joseph Diseases Foundation
 International Rett Syndrome Association
 International Tremor Foundation
 International Ventilator Users Network
 Late Onset Tay-Sachs Foundation
 Learning Disabilities Association of America
 Les Turner ALS Foundation
 Lowe Syndrome Association
 "Making Connections, Making Choices/Brain Power"-
 a Science Education Partnership Award project funded by NIH
 Manic Depressive Illness Foundation
 Mental Health Association of Prince George's County, Maryland
 Mental Health Association of Union County, Ohio
 Michigan Dyslexia Institute, Inc.
 Moving Forward
 Multiple Sclerosis Association of America
 Myasthenia Gravis Foundation of America, Inc.
 Myoclonus Research Foundation
 Narcolepsy & Sleep Disorders
 National Alliance for Autism Research
 National Alliance for Research on Schizophrenia & Depression
 National Alliance for the Mentally Ill
 National Anxiety Disorders Screening Day
 National Anxiety Foundation
 National Brain Tumor Foundation
 National Campaign to End Neurological Disorders
 National Center for Post-Traumatic Stress Disorder
 National Center for Youth with Disabilities
 National Center on Deafness
 National Coalition for Research in Neurological Disorders (NCR)
 National Committee to Preserve Social Security and Medicare
 National Council of Senior Citizens
 National Council on Spinal Cord Injury

National Depression Screening Project
 National Depressive and Manic Depressive Association
 National Down Syndrome Society
 National Dyslexia Research Foundation
 National Easter Seal Society
 National Eating Disorders Screening Program
 National Families in Action
 National Foundation for Depressive Illness, Inc.
 National Hispanic Council on Aging (NHCoA)
 National Mental Health Association
 National Mental Illness Screening Project
 National Mucopolysaccharidoses (MPS) Society, Inc. (The)
 National Multiple Sclerosis Society
 National Neurofibromatosis Foundation
 National Organization for Rare Disorders
 National Parkinson Foundation (NPF)
 National Reye's Syndrome Foundation
 National Sleep Foundation
 National Spasmodic Dysphonia Association
 National Spinal Cord Injury Hotline
 National Stroke Association
 National Tuberous Sclerosis Association
 Neurofibromatosis, Inc.
 New Jersey Center for Outreach and Services for the Autism Community, Inc.
 (COSAC)
 North American Brain Tumor Coalition:
 American Brain Tumor Association
 Brain Tumor Foundation for Children, Inc.
 Brain Tumor Foundation of Canada
 Brain Tumor Society (The)
 Children's Brain Tumor Foundation
 National Brain Tumor Foundation
 Pediatric Brain Tumor Foundation of the United States
 Preuss Foundation
 Obsessive-Compulsive Foundation, Inc.
 Operation PAR, Inc.
 Orton Dyslexia Society
 Paralyzed Veterans of America
 Parkinson's Action Network
 Parkinson's Disease Foundation
 Parkinson's Institute
 Pediatric Brain Tumor Foundation of the United States
 Perspectives Network, Inc.
 Philadelphia Chapter of the Society for Neuroscience
 Pilot International and Pilot International Foundation

Postpartum Depression Connection, Inc.
Purine Research Society
Recovery, Inc.
Research!America
Restless Legs Syndrome Foundation
Shy Drager Syndrome Group
Sleep Research Society
Society for Progressive Supranuclear Palsy, Inc.
Sturge-Weber Foundation (The)
Stuttering Foundation of America
THINK FIRST Foundation
Tourette Syndrome Association
Traumatic Brain Injury Project
Treatment and Research Advancements Association for Personality Disorder
Trigeminal Neuralgia Association
United Cerebral Palsy Associations
United Parkinson Foundation
Vestibular Disorders Association
Vital Active Life After Trauma, Inc.
Von Hippel-Lindau Syndrome Family Alliance
Well Spouse Foundation
Williams Syndrome Association, Inc.
Zero to Three: the National Center for Infants, Toddlers and Families

Medical/Research Organizations

Autism Research Institute
Center for Child and Families Studies
Cold Spring Harbor Laboratory
Forbes Norris ALS Research Center
Howard Hughes Medical Institute
Kennedy Krieger Institute
March of Dimes Birth Defects Foundation
Memorial Sloan-Kettering Cancer Center
Miami Project to Cure Paralysis
National Center on Addiction and Substance Abuse at Columbia University
New York State Institute for Basic Research in Developmental Disabilities
Preuss Foundation
Salk Institute for Biological Studies
Scripps Research Institute
United Cerebral Palsy Research and Education Foundation
VZV Research Foundation

Professional Organizations

American Academy of Addiction Psychiatry
American Academy of Child and Adolescent Psychiatry
American Academy of Neurology
American Association for Anatomists
American Association for Geriatric Psychiatry
American Association of Electrodiagnostic Medicine
American Association of Neurological Surgeons
American Association of Neuroscience Nurses
American College of Mental Health Administration
American College of Neuropsychopharmacology
American Health Foundation
American Neurological Association
American Occupational Therapy Association (The)
American Physiological Society
American Psychiatric Nurses Association
American Psychological Society
American Public Health Association
American Society for Adolescent Psychiatry
American Society of Addiction Medicine
American Society of Clinical Psychopharmacology, Inc.
American Society of Electroneurodiagnostic Technologies
Americans for Medical Progress
Association for Applied Psychophysiology and Biofeedback
Association for Research in Vision and Ophthalmology
Association of American Medical Colleges
Biofeedback Society of Maryland, Virginia & the District of Columbia
Congress of Neurological Surgeons
Gerontological Society of America (The)
International Association of Psychosocial Rehabilitation Services
National Association of Protection and Advocacy Systems
National Association of Psychiatric Health Systems
National Association of Psychiatric Treatment Centers for Children
National Association of State Mental Health Program Directors
National Community Mental Healthcare Council
National Treatment Consortium
Society for Light Treatment and Biological Rhythms
Society for the Advancement of Women's Health Research
Society for Neuroscience

Hospital/University Partners

One or more departments or research centers within the following teaching hospitals and universities have joined the 1997 Brain Awareness Week campaign as partners. Such departments include cellular biology, neurology, neuroscience, neurosurgery, and psychiatry.

Allegheny University of the Health Sciences
Allegheny Valley Hospital
Barnes-Jewish Hospital, Stroke Management and Rehabilitation Team (SMART)
Baylor College of Medicine
Beaver College
Bowman Gray School of Medicine
Brandeis University
Brigham and Women's Hospital
Brown University
Case Western Reserve University
Charles A. Dana Center for Mathematics and Science Education
College of Physicians and Surgeons of Columbia University
College on Problems of Drug Dependence, Inc.
Columbia University
Columbia-Presbyterian Medical Center
Cornell University Medical Center
Council of Graduate Programs in Communication Sciences and Disorders
Dartmouth College
Deke Slayton Center for Brain Cancer Studies
Duke University Medical Center
Felician College
Florida A&M University
Friends Hospital
George Washington University Medical Center
Harvard Medical School
Johns Hopkins University School of Medicine
Kresge Hearing Research Laboratory of the South
Louisiana State University Medical Center
Massachusetts General Hospital
Massachusetts Institute of Technology
Mayo Clinic
Medical Careers Institute
Mount Sinai School of Medicine
National Rehabilitation Hospital
New Mexico Institute of Neuroimaging
New York University Medical Center
Northwest Hospital Gamma Knife Center
Oberlin College
Oregon Health Sciences University
Rockefeller University

St. John's Hospital, Springfield, IL
Southern Illinois University School of Medicine
State University of New York at Buffalo
Syracuse University -- Center for Human Policy
Temple University School of Medicine
UMDNJ-Robert Wood Johnson Medical School
University Hospitals of Cleveland
University of Arkansas
University of California, Irvine
University of California, San Diego
University of California, San Francisco
University of Illinois, Urbana-Champaign
University of Iowa Hospital and Clinics
University of Maryland Dental School
University of Massachusetts Medical Center
University of Miami Brain Endowment Bank
University of Miami, Jackson Memorial Medical Center
University of Michigan Medical Center
University of Oklahoma Health Science Center
University of Osteopathic Medicine and Health Sciences
University of Oxford, Great Britain
University of Pennsylvania School of Medicine
University of Pittsburgh School of Medicine
University of Southern California School of Medicine
University of Texas, Houston Health Science Center
University of Texas, Southwestern Medical Center
University of Washington
University of Wisconsin, Madison
VA Medical Center, New Orleans
Vanderbilt University School of Medicine
Washington University School of Medicine
Yale University School of Medicine

Affiliates

BEEMNET, Inc.
Bristol-Myers Squibb Company
Glenmede Corporation (The)
Life Resuscitation Technologies
Lilly Neuroscience
Policy Directions, Inc.
McCormick Tribune Foundation
WJLA-TV, Washington

NOTE: This list includes partners who are part of the Brain Awareness Week 1997 campaign as of February 12, 1997. Inclusion as a partner in the Brain Awareness Week campaign does not reflect endorsement of the views or activities of that partner by the Dana Alliance for Brain Initiatives or the Charles A. Dana Foundation.

Draft
EXECUTIVE SUMMARY

Rethinking the Brain
New Insights into Early Development

Conference Report
*Brain Development in Young Children:
New Frontiers for Research, Policy and Practice*

Organized by the Families and Work Institute
June 1996

Funded by
Carnegie Corporation of New York
The Charles A. Dana Foundation, Inc.
The Harris Foundation
Robert R. McCormick Tribune Foundation

A father comforts a crying newborn. A mother plays peekaboo with her ten-month-old. A child care provider reads to a toddler. And in a matter of seconds, hundreds of cells in these children's growing brains respond. Some brain cells are "turned on," activated by this particular experience. Some existing connections among brain cells are strengthened, and at the same time, new connections are formed, adding a bit more definition and complexity to the intricate circuitry that will remain largely in place for the rest of these children's lives.

EARLY CHILDHOOD
DEVELOPMENT

We didn't always know it worked this way. Until recently, it was not widely believed that the brains of creatures as helpless as human infants could be so active and so complex. Nor did we realize how flexible the brain is. Only 15 years ago, neuroscientists assumed that by the time babies are born, the structure of their brains was genetically determined. They did not recognize that the experiences that fill a baby's first days, months and years have such a decisive impact on the architecture of their brains, or on nature and extent of their adult capacities. Today, thanks in part to decades of research on brain chemistry and sophisticated new technologies, neuroscientists are providing evidence for assertions that would have been greeted with polite skepticism ten or twenty years ago.

In June 1996, a two-day conference was convened at the University of Chicago by the Families and Work Institute to discuss new knowledge about early brain development and its implications for children in the United States. Entitled "Brain Development in Young Children: New Frontiers for Research, Policy and Practice," the conference sprang from the conviction that not just parents and families, but the nation as a whole has a vital stake in its youngest citizens' healthy development and learning. The conference brought together professionals from the neurosciences, medicine, education, human services, the media, business, and public policy to look at what we know about the brain and how that knowledge can and should inform efforts to improve results for children and their families. The proceedings and a range of background materials provided by participants served as the basis for the conference report, which is summarized here.

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I. Breakthroughs in Neuroscience— Why Now?

Every field of endeavor has peak moments of discovery and opportunity, when past knowledge converges with new needs, new insights, and new technologies to produce stunning advances. For neuroscience, this is one such moment. Certainly, the development of new research tools has been a crucial factor. New brain imaging technologies have made it possible to investigate—and get a glimpse of—how the brain develops and how it works.

But technological advances never occur in a vacuum. Brain research has been stimulated, in part, by growing concern about the status of children in America—not only their academic achievement, but also their health, safety, and overall well-being. Two decades of research on healthy child development and the evaluation of many early intervention and school

reform initiatives, have confirmed the importance of the first three years of life. Given these findings, there is growing consensus, among decision makers in many fields, that efforts to recast policy and reconsider the best use of public resources must begin at the beginning—that is, with clearheaded thinking about young children’s brains.

II. What Have We Learned?

The research presented at the June 1996 conference and the literature points to five key lessons that have the potential to reframe research, policy, and practice in diverse fields:

1. Human development hinges on the interplay between nature and nurture.

Much of our thinking about the brain has been dominated by old assumptions—that the genes we are born with determine how our brains develop, and that in turn how our brains develop determines how we interact with the world. Recent brain research challenges these assumptions. Neuroscientists have found that throughout the entire process of development, beginning even before birth, the brain is affected by environmental conditions, including the kind of nourishment, care, surroundings, and stimulation an individual receives. The impact of the environment is dramatic and specific, not merely influencing the general direction of development, but actually affecting how the intricate circuitry of the human brain is “wired.” And because every individual is exposed to different experiences, no two brains are wired the same way.

The developing brain produces many times more neurons (brain cells) and more synapses (connections among brain cells) than it will eventually need. Most of the extra neurons are shed by the time a baby is born; but the number of synapses increases markedly in the first four years, and then holds steady throughout the first decade of life. In this way, a child’s brain becomes super-dense, with twice as many synapses than it will eventually need. Brain development is, then, a process of pruning: those synapses that are formed and reinforced by virtue of early experience tend to become permanent; the synapses that are not used tend to be eliminated. In this way, as babies and toddlers gain more experience, positive or negative, the brain’s wiring becomes more defined. This process requires considerable energy; for most of the first decade of life, children’s brains are more than twice as active as those of adults.

The impact of the environment is dramatic and specific, not merely influencing the general direction of development, but actually affecting how the intricate circuitry of the human brain is “wired.”

New knowledge about brain function should end the “nature or nurture” debate once and for all. A great deal of new research leads to this conclusion: how humans develop and learn depends critically and continually on the interplay between nature (an individual’s genetic endowment) and nurture (the nutrition, surroundings, care, stimulation, and teaching that are provided or withheld). The roles of nature and nurture in determining intelligence should not be weighted quantitatively; genetic and environmental factors have a more dynamic, qualitative interplay that cannot be reduced to a simple equation. And both are crucial.

2. Early care has a decisive and long-lasting impact on how people develop, their ability to learn, and their capacity to regulate their own emotions.

Parents and other caregivers have long known that babies thrive when they receive warm, responsive early care; now we are beginning to understand the biological mechanisms that underlie this common knowledge. Warm, responsive caregiving not only meets babies’ basic, day-to-day needs for nourishment and warmth, but also responds to their preferences, moods, and rhythms. Recent brain research suggests that this kind of caregiving is not only comforting for an infant; it plays a vital role in healthy development. The ways that parents, families, and other caregivers relate and respond to their young children, and the ways that they mediate their children’s contact with the environment, directly affect the formation of neural pathways.

In particular, a child’s capacity to control emotions appears to hinge, to a significant extent, on biological systems shaped by his or her early experiences and attachments. There is no single “right” way to create this capacity; warm, responsive care can take many forms. But children who are emotionally neglected or abandoned very early in life often have difficulty with such brain-mediated functions as empathy, attachment, and emotional expression.

Neuroscientists are finding that a strong, secure attachment to a nurturing caregiver can have a protective biological function, helping a growing child withstand (and, indeed, learn from) the ordinary stresses of daily life. These are the implications of studies that have gauged children’s reactions to stress by measuring the levels of a steroid hormone called cortisol in their saliva. Researchers have known for some time that adverse or traumatic events, whether physical or psychological, can elevate an individual’s cortisol level. In turn, cortisol affects metabolism, the immune system, and the brain. One way it alters the brain is by making it vulnerable to processes that destroy neurons and, just as importantly, by reducing the number of synapses in certain parts of the brain. In this way, stressful or traumatic experiences can directly undermine neurological development and impair brain function. In

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fact, children who have chronically high levels of cortisol have been shown to experience more developmental delays—cognitive, motor, and social—than other children.

But new research shows that babies who receive warm, responsive care in the first year of life are less likely to respond later to minor stress by producing cortisol than other children. And when they do react to stress by producing cortisol, they can turn off the response more quickly and efficiently. This protective effect has been shown to carry forward to later childhood.

3. The human brain has a remarkable capacity to change, but timing is crucial.

There is mounting evidence of the brain's neuroplasticity. This means that the brain has the capacity to change in important ways in response to experience. We now have scientific evidence that the brain is not a static entity, and that an individual's capacities are not fixed at birth. The brain itself can be altered—or helped to compensate for problems—with appropriately timed, intensive intervention. In the first decade of life, and particularly in the first few years, the brain's ability to change and compensate is especially remarkable.

Because the brain has the capacity to change, parents and other family members, friends, child care providers, teachers, doctors, and human service providers have ample opportunities to promote and support children's healthy growth and development. But timing is crucial. While learning continues throughout the life cycle, there are optimal periods of opportunity—"prime times" during which the brain is particularly efficient at specific types of learning. For example, the brain is best able to acquire language skills during the first decade of life, when synapse density and metabolic activity in the part of the brain that processes language are very high. In the neurobiological literature, these times are called "critical periods."

4. The brain's plasticity also means that there are times when negative experiences or the absence of appropriate stimulation are more likely to have serious and sustained effects.

New knowledge about the vulnerability of the developing brain to environmental factors suggests that early exposure to nicotine, alcohol, and drugs (in utero and in the postnatal environment) may have more harmful and long-lasting effects on young children than was previously suspected.

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Estimates of the percentage of women who smoke cigarettes during pregnancy range from 16 to 25 percent. Some cut down rather than stopping altogether when they are planning to conceive, or when they learn that they are expecting a child. And very often, their children show no apparent adverse effects. But a number of studies indicate that maternal smoking during pregnancy can, in some cases, affect brain development, inhibiting neuron growth. It can also have an impact on the brain's biochemistry and can alter DNA and RNA synthesis in the brain. Given these effects, one would expect children exposed to nicotine before birth to be at higher risk of developmental delays or impairments. And in fact, the research suggests that the children of mothers who smoke during pregnancy have somewhat higher rates of neurobehavioral difficulties, including inattention, impulsivity, and hyperactivity. One study suggests that children whose mothers were heavy smokers during pregnancy are eight times more likely than the children of non-smokers to develop conduct disorders later in life.

Animal studies have also helped to document the negative effects of various substances on fetal development. When rats are exposed to alcohol before birth, for example, certain neurons in the cortex (the part of the brain responsible for complex cognitive functions like language and spatial orientation) fail to grow to expected sizes and have fewer dendrites—parts of brain cells that are needed to form synapses. The neurons adjacent to the brain's ventricles have also been found to be abnormal.

Exposure to cocaine in utero can also be perilous. Early in gestation, it can disrupt the migration of neurons up the wall of the cortex—a process whose sequence and timing must adhere to a very precise schedule if normal development is to occur. Often cells that go astray will die before any harm is done. But if cells end up in the wrong place at the wrong time and form inappropriate synapses, the result may be a neurological disorder such as severe infantile epilepsy, autism, or schizophrenia. Later in the prenatal period, exposure to cocaine can interfere with the production of synapses. To an even greater degree than nicotine, it may affect the brain's biochemistry. Many children exposed to cocaine in utero have been found to have difficulty with arousal, attention, and reactivity to stress.

After birth, exposure to adverse environmental conditions can also have harmful effects on brain development. Early experiences of trauma or ongoing abuse, whether in utero or after birth, can interfere with development of the subcortical and limbic areas of the brain, resulting in extreme anxiety, depression, and/or the inability to form healthy attachments to others. Adverse experiences throughout childhood can also impair cognitive abilities, resulting in processing and problem-solving styles that predispose an individual to respond with aggression or violence to stressful or frustrating situations.

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A number of researchers have focused their attention on specific circumstances that may interfere with warm, responsive caregiving during critical periods, including maternal depression. While not all babies of depressed mothers show negative effects, maternal depression can impede healthy brain development, particularly in the part of the brain associated with the expression and regulation of emotions. Post-partum depression that lasts only a few months does not appear to have a lasting impact; but babies who are from six to eighteen months old when their mothers suffer from depression appear to be at greater risk. When mothers are treated for or recover from depression, their children's brain activity and behavior can improve significantly.

Many of the risk factors described above occur together, jeopardizing the healthy development of young children and making research endeavors more challenging. Research shows that many of these risk factors are associated with or exacerbated by poverty. Today, fully a quarter of American children under the age of six are growing up in poverty. Economic deprivation affects their nutrition, access to medical care, the safety and predictability of their physical environment, the level of family stress, and the quality and continuity of their day-to-day care.

5. Evidence amassed by neuroscientists and child development experts over the last decade point to the wisdom and efficacy of prevention and early intervention.

There are, to be sure, some genetic disorders or neurological events (such as a massive stroke) whose consequences are difficult if not impossible to reverse, given current knowledge and methods. But study after study shows that intensive, well designed, timely intervention can improve the prospects—and the quality of life—of many children who are considered to be at risk of cognitive, social, or emotional impairment. In some cases, effective intervention efforts can even ameliorate conditions once thought to be virtually untreatable, such as autism or mental retardation.

A number of well documented studies of programs designed to help infants and toddlers and their families suggest that well conceived, well implemented programs can brighten children's futures. The efficacy of early intervention has been demonstrated and replicated in diverse communities across the nation. Children from families with the least formal education appear to derive the greatest cognitive benefits from intervention programs. Moreover, the impact of early intervention appears to be long-lasting, particularly when there is follow-up during the elementary school years.

Intensive, developmental care also improves the prospects of preterm infants, who come into the world with brains that have had less time to

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mature in the protected intrauterine environment, and are therefore even more vulnerable to the environment. Traditionally, these babies have spent their first weeks in incubators or isolettes, with bright lights, beeping monitors, and little human contact. Research has shown that responsive care in a more soothing environment can significantly increase preterm infants' chances for physical and mental health, while substantially reducing hospital stays and costs.

New insights into the brain's early development and functioning have allowed some researchers to address neurological impairments with greater precision. Case in point: with the aid of brain imaging studies, researchers have been able to study and detect auditory processing problems in babies six to nine months old before language impairment becomes evident. Once a problem has been pinpointed, specific, individualized interventions can be introduced at a time when the brain's plasticity is particularly marked.

III. Where Do We Go From Here?

In most spheres of knowledge, what we don't know far exceeds what we do know. Brain research is no exception. Coming years promise to yield new discoveries about how the brain develops and how children's capacities grow and mature. Neuroscientists are likely to shift their attention from general questions about how brain circuitry is formed to more specific investigations of the functions of specific regions of the brain—including how, and how much, they are influenced by the environment.

However, there appeared to be considerable agreement among speakers at the conference that the knowledge base is ample enough to allow us to act now. A framework for action, speakers agreed, might be designed around key assertions presented in the conference report, including the importance of the interplay between nature and nurture; the importance of strong, secure early attachments; the extent and rapidity of early development; the brain's remarkable plasticity; and the wisdom and efficacy prevention and high-quality, well designed early intervention. Three key principles of societal response emerged in the discussions:

First do no harm. New insights into the brain suggest that the principle that guides medical practice should be applied just as rigorously to all policies and practices that affect children: first do no harm. That means allowing parents to fulfill their all-important role in providing and arranging for sensitive, predictable care for their children. Policies or practices that prevent parents from forming strong, secure attachments with their infants

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in the first months of life need urgent attention and reform. At the same time, parents need more information about how the kind of care they provide affects their children's capacities. First do no harm also means mounting intensive efforts to improve the quality of child care and early education, so that parents can be sure that when they are at work, their young children's learning and emotional development are being fostered.

Prevention is best, but when a child needs help, intervene quickly and intensively. Knowing that early experience has such a strong influence on brain development, parents may worry that every unpleasant sensation or upsetting experience will become a neurological nightmare. They may rest assured that in most cases, a history of consistent and responsive care cushions children from the occasional bumps and bruises that are inevitable in everyday life. In most cases, children can recover even from serious stress or trauma. And if they are given timely, intensive, sustained help, they can overcome a wide range of developmental problems. More detailed knowledge about specific aspects of brain development and functioning will allow the design of interventions that more closely match children's needs.

Promote the healthy development and learning of every child. If we miss early opportunities to promote healthy development and learning, later remediation may be more difficult and expensive, and may be less effective given the knowledge, methods and settings that are currently available. However, this theme was sounded repeatedly: risk is not destiny. Numerous cases were cited of individuals who have thrived despite adverse conditions. The medical, psychological, and educational literatures contain sufficient examples of people who develop or recover significant capacities after critical periods have passed to sustain hope for every individual. Ongoing efforts to enhance the cognitive, emotional, and social development of youth and adults in every phase of the life cycle must be supported.

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Implications for Policy and Practice

New insights into early development confront policy makers and practitioners in many fields with thorny questions and difficult choices. As we move into the next century, our children need and deserve policies and practices that reflect the importance of the early years, and that embody the principles that emerged from the brain conference. In particular, new knowledge about early development adds weight and urgency to the following policy goals:

Improve health and protection by providing health care coverage for new and expectant parents and their young children. Expectant mothers must have access to the care, knowledge, and tools they need to protect their babies. The prenatal period is a period of active brain development. And yet, about one in four pregnant women receives little or no prenatal care. In

addition to prenatal care, pregnant women need safe homes, adequate nutrition, and buffering from extreme stress. With adequate health care and parenting supports, there is a great deal that expectant mothers and fathers can do to promote the healthy development of their children, and to avoid serious risks. The first three years of life are also filled with important health and safety risks, but some three million children in this age span are uninsured or underinsured. Basic medical care, including preventive health screenings, well-baby care, and timely immunization, is cost-effective and provides a sturdy foundation for a lifetime of good health.

Promote responsible parenthood by expanding proven approaches.

All parents can benefit from solid information and support as they raise their children; some need more intensive assistance. There is substantial research evidence that certain parent education/family support programs promote the healthy development of children, improve the well-being of parents, and are cost-effective.

Safeguard children in child care from harm and promote their learning and development.

Researchers have found that most child care settings are of mediocre to poor quality, and the nation's youngest children are the most likely to be in unsafe, substandard child care. More than one third are in situations that can be detrimental to their development. Most of the rest are in settings where minimal learning is taking place. We can do better. Studies show that it is possible to improve quality, creating settings in which children can thrive and learn.

Enable communities to have the flexibility and the resources they need to mobilize on behalf of young children and their families.

Efforts are now underway across the nation to mobilize communities on behalf of young children and their families. Many localities are bringing together decision makers to create a vision of the kind of community they want to be part of, to develop goals and sustainable strategies for achieving that vision, to determine how to finance their efforts, and to make provisions for gauging results. These efforts need and deserve support from national, state, and local leaders, as well as from leaders of business, the media, community organizations, and religious institutions.

Tough Questions

The conference report ends with a series of tough questions—the kinds of questions parents, teachers, and policy makers are beginning to pose as more knowledge about the brain becomes available. New insights into early development point to one key conclusion: the experiences children have and the attachments they form in the first three years of life have a decisive,

irrefutable impact on their later development and learning. Given this fact, what should be done?

Should new mothers stay home? If warm, responsive care is so crucial in the first years of life, shouldn't mothers (or fathers) put off employment and devote themselves to caring for their infants and toddlers? This longstanding debate may be rekindled as the relationship between secure attachment and healthy brain development is better understood. It is a reasonable question, so long as the decision remains a personal, family matter, and so long as working parents are not blamed for any and every developmental hurdle their children encounter. Given the economic realities of their lives, millions of women do not have the option of staying home, even in their child's first year. Ultimately, what is best for families is to have real choices, and that requires policies and societal attitudes that support parents whether or not they work outside the home. In particular, families need access to affordable, high quality child care and early education, and to flexible workplace policies that help accommodate modern family life.

What should be done when parents do not provide their children with the kind of care and setting that promote healthy development?

This wrenching issue promises to stir more controversy in coming years. Americans appear to be particularly concerned about young children being raised by teenage parents. Some have proposed placing young children from chaotic, neglectful, or abusive homes in orphanages, but research on the effects of institutionalization on brain development raises serious questions about this approach. Others have suggested foster care for young mothers and their children. How can parents be helped and, when appropriate, supervised effectively, so that families can stay together? How can existing parent education efforts and family support programs be strengthened or extended? The challenge in coming years will be to search for answers that support both families and young children.

Can we realistically hold out hope for children whose early development is compromised? This is not an academic question. How it is answered affects the expectations that parents and teachers convey to children; the placements and tracking decisions made by school administrators and teachers; and the kinds of decisions judges and juries hand down when juvenile offenders stand before them. As a society, we should never give up on any child. To be sure, as children move into the second decade of life, it appears to be more difficult to bring about change, but it is not impossible. As researchers learn more about brain plasticity, new ways to promote the development of people of all ages are likely to emerge. Moreover, brain development is not just a matter of intellectual development, but also physical, emotional, and social well-being. Children whose development is delayed in one area may have extraordinary capacities in other spheres that are less apparent and less likely to be measured.

Should we withdraw resources from older children and youth and give them to young children? How should we, as a nation, invest in the next generation, given the importance of early development? Should publicly supported education begin sooner and end earlier? Should we fund high schools at lower levels, in order to devote adequate resources to child care and early education? The relationship between budgets and policies is always complex, and there is no simple solution. But ensuring children's healthy development is not a zero-sum game. To be sure, good nutrition is vital in the prenatal period and the first years of life, but the needs of young children cannot justify skimping on the nourishment provided to older children and youth. By the same token, the early years are certainly crucial for healthy development, but there must also be strong support for school-age children and adolescents, as well as for adults who want to continue their education and strengthen their skills. Optimal development and learning must be a top national priority for Americans of all ages, so that a good start in life for our youngest children is not purchased at the expense of their older brothers and sisters.

Conveying New Knowledge about the Brain

Finally, new knowledge about the brain must be communicated to families and the public at large with immense care. While mothers and fathers have a powerful impact on their children's development and learning, many factors play a role and parents must not be made to feel solely responsible for every hurdle their children may encounter. While warm, responsive caregiving helps to promote healthy development, some neurological conditions remain fairly resistant to change. And while the neuroscientist's lens may appear to magnify or isolate such neurological problems, they are in fact only one facet of these children's rich and complex lives. The notion of critical periods also needs to be carefully qualified. To be sure, nature provides "prime times" for development and learning, but parents and other caregivers can take advantage of these times in many ways, drawing upon their own varied resources and beliefs. Moreover, it is never too late to improve the quality of a child's life.

In short, new insights into early brain development suggest that as we care for our youngest children, as we institute policies or practices that affect their day-to-day experience, the stakes are very high. But we can take comfort in the knowledge that there are many ways that we as parents, as caregivers, as citizens, and as policy makers can raise healthy, happy, smart children. We can take heart in the knowledge that there are many things that we as a nation can do, starting now, to brighten their future and ours.

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The Charles A. Dana Foundation

DAVID MAHONEY, CHAIRMAN

MAHONEY

DANA

January 15, 1997

Mrs. Clinton
The White House
Washington, D.C. 20500

My dear Mrs. Clinton:

I read with great interest a note in the January 13th issue of Newsweek magazine regarding your intention to hold a conference on the brain in relation to children's health and education. The Charles A. Dana Foundation and its education arm, the Dana Alliance for Brain Initiatives, has a long history of involvement with both education and neuroscience. I would like to volunteer our services to work with you in bringing your plans to fruition.

The Charles A. Dana Foundation has a twenty-six year history as a grant-making institution in the areas of education and health. Most recently, its focus in education has been on modernizing and energizing our country's approach to educating very young minds; our recent grants include awards to such innovative programs as Mildred Winter's Parents as Teachers program and the National Center for Family Literacy. In the past year, the Foundation has supported two seminal conferences on education and neuroscience, the June 1996 Invitational Conference on Brain Development coordinated by the Families and Work Institute and the July 1996 Education Commission of the States Conference in Colorado, *Bridging the Gap Between Neuroscience and Education*.

In the area of health, although we are perhaps best known for our support of the Dana-Farber Cancer Center in Boston, we have adopted an entire emerging field of medical science -- brain research -- not just funding its work, but taking an activist role in bringing it to public attention. Our grants currently focus on five areas: brain-imaging, language-based learning disabilities, memory loss and aging, HIV-dementia, and manic depression.

The Dana Alliance for Brain Initiatives is a grantee organization of the Foundation started in 1992 to conduct public education programs about the brain and brain research. The Alliance conducts public forums, publishes a wide range of layman-oriented publications, co-sponsors a PBS program called "Your Brain", and encourages science education activities for school children as well as the general public. In 1996, the Alliance launched Brain Awareness Week, a public information program which today unites over 275 universities, hospitals, community groups and schools in education programs about the brain.

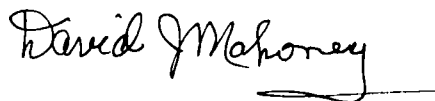
Mrs. Clinton
January 15, 1997
page two

At the core of the Alliance's outreach efforts is a stellar group of over 160 of the world's leading neuroscientists, including five Nobel laureates. These researchers, cognizant that their findings can have enormous impact on health and education decisions at both the personal and the policy levels, have joined our efforts to ensure that the highest caliber of information is made available to the public.

We have recently begun to explore with the National Education Goals Panel (chaired by Governor Romer of Colorado) joint opportunities for linking education and neuroscience. We hope that positive opportunities for linking the education and scientific communities on the important issues of early childhood development will result from this new collaboration.

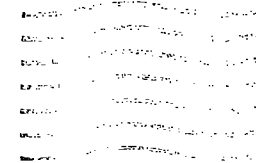
We hope that we may be of assistance to you in this important endeavor you propose, and we look forward to being in touch with your staff.

Respectfully yours,

A handwritten signature in cursive script that reads "David Mahoney". The signature is written in dark ink and includes a long, horizontal flourish extending to the right.

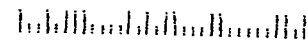
David Mahoney

The Charles A. Dana Foundation



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But possibly the biggest development in the last year had to do with stroke, the nation's third leading killer after heart disease and cancer. The first emergency drug, called t-PA, to improve outcome in stroke was announced. If a patient is treated with t-PA within six hours of a stroke beginning, the patient is at least 30 percent more likely to escape disability. The treatment is expected to be approved by the government this year.

PROGRESS FOR ANY AGE

No look at progress in brain research would be complete, however, without mentioning discoveries being made in understanding the healthy brain. If doctors knew nothing about the normal human body, they could not diagnose or treat it in sickness. Likewise, without understanding the normal healthy brain, more complex by far, scientists would find it hard to discover what goes wrong in brain illness, especially the disorders affecting thought and behavior.

Explorations of the healthy brain and its cells are starting to answer age-old questions, such as what happens when we form a memory (brain cells appear to strengthen their connections) or practice a sport or excel in music (larger areas of the brain become involved in the activity). But that is not all. Last year, scientists studying learning and memory found that natural compounds in the brain, called "growth factors," strengthen the connection between nerve cells and may lie at the heart of learning. Other scientists found a gene that, when defective, causes obesity in certain mice and its human version may be at fault in some cases of human obesity. Still different investigations, studying the brain's daily (circadian) clock system, suggested that synchronizing medications with daily cycles could improve therapeutic results in some conditions.

This brief progress report is a mere snapshot, but, like a ray of morning sun from the horizon, the work of brain science promises a splendid new day. That day of hope is for one group of people — those enduring the darkness of brain-related illness — which makes it for just about all of us.

The Dana Alliance for Brain Initiatives has prepared a comprehensive report on progress in brain research in 16 areas of study during 1995 and early 1996. The 36-page report, *Update 1996: The Discoveries Grow*, is the second detailed summary presented by the Alliance. The first (*Delivering Results: A Progress Report on Brain Research*, issued in May, 1995) reported the major gains in research from 1990 through early 1995. If you wish to receive a free copy of either report, please contact the Dana Alliance at:

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The Dana Alliance for Brain Initiatives is an independent, nonprofit organization of 148 leading neuroscientists, including five Nobel laureates, committed to advancing awareness of the personal and public benefits of brain research. The Dana Alliance is funded solely by the Charles A. Dana Foundation and does not conduct research or offer grants.

Chairman: David Mahoney
Vice Chairmen: W. Maxwell Cowan, M.D., Ph.D., and James D. Watson, Ph.D.

5/96. A Dana Alliance for Brain Initiatives publication. Produced and distributed by The Dana Press.

The
Dana
Alliance
for
Brain
Initiatives

Brain Research for the Life of Your Mind

PROGRESS AND PROMISE

Brain research is the most significant medical research going on today. It has the power to lighten the staggering load on our health economy from long term, chronic, and recurring care; it promises to give individuals, families, and communities better, healthier lives and more satisfying, successful aging. Such a sweeping claim may seem puzzling, as, indeed, "brain research" may sound like the ultimate "ivory tower." But consider:

Do you have migraine headaches or chronic back pain? Have you ever slipped into major depression, unrelenting despair that lasted for weeks? What about overwhelming anxiety or panic? Do you fret over someone who drinks or takes drugs to the point of ruin and can't seem to stop?

Do you fear for a parent whose memory is eroding, who has developed an ominous tremor, or seems ripe for a stroke? Or perhaps you are heartsick about a young man who was a promising teenager but, nearing his twenties, has developed strange delusions; or you are vexed by a child about ready to enter school but who seems unable to develop clear speech.

Possibly everything was fine until an accident put you in a wheelchair, your brother had a seizure, your sister was diagnosed with multiple sclerosis, your niece with a brain tumor, or your father with stroke.

All these are disorders of the brain or nervous system — trouble at the very center of our existence as human beings. Nothing so depletes our sense of life and its sweetness as brain-

related disorders; nothing has more personal consequence for all of us than the effort of researchers to understand and defeat these afflictions.

Tens of millions of Americans know the misery of neurological or psychiatric illness. According to statistics kept by the Federal government, about two out of three Americans seek treatment for such problems every year, and the most common disorders extract from our country a cost exceeding half a trillion dollars. In fact, more people are hospitalized for neurological and psychiatric disorders than for all other diseases combined.

PROGRESS. REAL PROGRESS.

Today, the specter of hopelessness is being banished. Brain research is making stunning progress; its advances go across the spectrum. For all three of the major stages of life that we experience — childhood, adulthood and our later years — important findings have been pouring out of the nation's labs. How the brain forms, grows, and ages; how to heal and

strengthen it; how to put the brakes on injury and degeneration — all these discoveries and more promise to help us deal with brain-related disorders, offering the realistic hope that you and your loved ones will avoid the suffering they cause.

Extremely powerful techniques have been developed in brain imaging, genetics, and molecular biology. Using them, researchers are learning about the activity of the living human



Uniphoto/Pictor

brain in operation and exploring the basic machinery of brain cells. Today is a new era in understanding how the brain supports thought and behavior and what happens in brain structures and cells that leads to illness.

Here is a look at how the thousands of studies now taking place are changing our future:

THE DEVELOPING BRAIN

Many serious neurological and psychiatric problems — for example, cerebral palsy and schizophrenia, begin early in human development. For the brain and nervous system, this period starts shortly after conception and continues until about age 10. Developmental problems are not just costly to treat; we also must measure them in terms of a lifetime of struggle and disability.

Scientists have found maternal health during pregnancy to be crucial. For example, after last year's discovery that folic acid can help prevent disorders of spinal cord development (neural tube defects), the federal Food and Drug Administration ordered all enriched food to be fortified with folic acid beginning in January 1998. Other findings suggest that proper diet and good health of the mother in early pregnancy also protect the baby neurologically.

Scientists have also discovered that, from infancy through about age 10, brain cells form most of the connections they will keep throughout life and, during these early years, a child's brain is most flexible and prepared to learn. It is also becoming clear that, for the best beginning in life, when problems such as learning disabilities appear, early diagnosis and remedial action are especially important. For example, to treat children with language-based learning disabilities, researchers developed a computer processor for speech that helped children in an experimental study advance two years in reading levels after only four weeks of training.

THE MATURE BRAIN

Every year, as many as one hundred million Americans need to seek treatment for one of the many problems that can affect the mature brain and nervous system. These include: depression and manic-depressive illness, addiction, vision or hearing loss, head or spinal cord injury, epilepsy, migraine headache, back pain, and the second most common disabling neurological disease after epilepsy in young adults, multiple sclerosis (MS).

Progress against these disorders is producing potent strategies of counterattack that promise to help people recover and resume a normal life. For example, both MS and spinal cord injury might even be treatable the same way: In both, a major reason for movement loss is that the affected nerve fibers lose their ability to carry nerve-cell signals, so that when the brain says "move" the message does not get through to the leg or

arm being signaled. This is due to damage to the nerve fibers' protective insulation (called "myelin"). Now, scientists have identified compounds that may be useful some day in treatments that can restore function in both MS and spinal cord injury.

In another exciting development last year, in experiments using rats, researchers studying addiction showed that a specially designed compound could act as a vaccine that dramatically reduced the animals' responsiveness to cocaine.

In depression, the most common mental illness, it is widely believed that low levels of a brain chemical called serotonin are involved. Last year, for the first time, brain imaging showed direct evidence of this insufficiency in patients with major depression. Also, several new effective antidepressant drugs have been introduced in the last year and highly effective drugs for other mental disorders have become available.

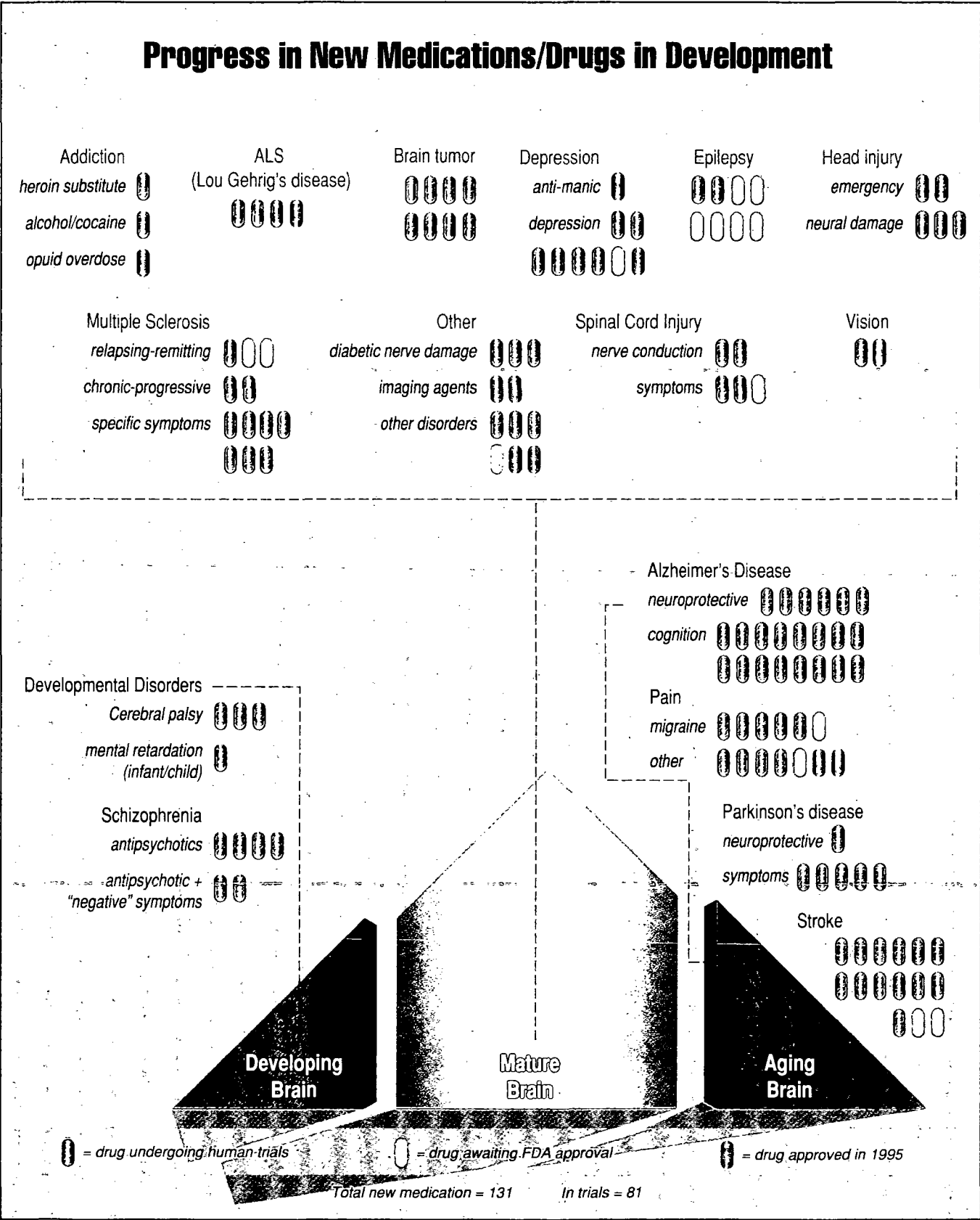
THE AGING BRAIN

People work toward making their older years a time of independence and good health. Thus, disorders that attack the aging brain rank as among the saddest, snatching away fulfillment so long worked for. That loss, together with high costs for care and an unwilling dependence on one's children, is why Alzheimer's and Parkinson's diseases and stroke, in particular, are so devastating to patients and families.

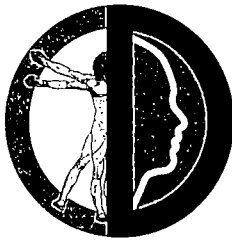
Effective treatments are still distant for Alzheimer's disease, but the main barrier — understanding it — is coming down. Progress in understanding Alzheimer's specific symptoms is speeding up drug research and improving the techniques for diagnosing the disease. Last year, more than 20 drugs entered clinical trials for possible use against symptoms (mainly memory loss) of Alzheimer's disease. Also, genes have been identified for most of the inherited forms of the disease, setting the stage for efforts to interrupt it.

For older people concerned about good brain function, many studies have shown the value of getting lots of mental stimulation, but one of the most interesting recent discoveries is that physical exercise is very important in maintaining mental sharpness. Particularly positive for those who dislike or cannot perform rigorous workouts is that simple aerobic exercises, including walking, seem to be the most beneficial.

Parkinson's disease is becoming one of the brightest spots in brain research. Scientists are trying extremely sophisticated strategies, such as a trial of implants of fetal pig tissue in five human Parkinson's disease patients. If this effort to replace the cells destroyed by the disease is successful it could effectively become a cure for it. Also in the past year, several new drugs for this wrenching illness began to be tested in clinical trials.



In barely a decade, compounds for relieving symptoms of brain-related disorders have multiplied at an impressive rate, from a few pain-relievers and not very effective psychiatric drugs to potential treatments for dozens of disorders. This chart shows the developments in a little more than one year, 1995 and early 1996.



Brain Awareness Week

March 17-23, 1997

Campaign Chairman

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The Charles A. Dana Foundation

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Howard Hughes Medical Institute

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National Mental Health Association

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B.A.W. Homepage
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NEWS ANNOUNCEMENT

DANA ALLIANCE ANNOUNCES BRAIN AWARENESS WEEK, 1997; PARTNERSHIPS FOR THE CAMPAIGN GROWING RAPIDLY

Washington, DC., October 24-- The Dana Alliance for Brain Initiatives formally announced its plans for the second nationwide Brain Awareness Week, March 17-23, 1997 at a meeting today of the advisory committee for the campaign.

The Dana Alliance serves as the primary organizer and national clearinghouse for the campaign which brings together government agencies, scientific organizations, volunteer organizations, and educators in a singular partnership to bring information about the progress of brain research to the general public and policy makers.

For the 1996 campaign 150 partners joined the campaign. For 1997, with the kick off event still five months away, 205 organizations have signed on, and, more are expected.

Following the pattern of last year's activities, a host of events will be held nationwide. Scientists will open their laboratories to the public, researchers will present symposia, museums will hold exhibits, and the Dana Alliance's radio program, *Gray Matters* will air a one hour program, *Drugs and the Brain*, over public radio stations.

Information about Brain Awareness Week is available on the Dana Foundation's web site at: www.dana.org/brainweek.

David Mahoney, chairman and ceo of the Charles A. Dana Foundation and the Dana Alliance serves as campaign chairman for Brain Awareness Week. Mr. Mahoney is the architect of the Brain Awareness Week campaign.

Brain Research for the Life of Your Mind

Brain Awareness Week 1997

Brain Awareness Week is a public information campaign created in 1996 by the Dana Alliance for Brain Initiatives to focus public attention on the importance of the brain and brain research. The campaign unites the interests and activities of federal agencies, patient service and advocacy groups, outreach organizations, professional groups, teaching hospitals and universities and private research centers. The 1997 campaign will take place March 17-23, 1997.

Government Agency Partners

Consumer Product Safety Commission
U.S. Department of Veterans Affairs
Library of Congress, Office of Scholarly Programs
National Aeronautics and Space Administration
National Center for Human Genome Research
National Eye Institute
National Institute of Child Health and Human Development
National Institute of Mental Health
National Institute of Neurological Disorders and Stroke
National Institute of Nursing Research
National Institute on Aging
National Institute on Alcohol Abuse and Alcoholism
National Institute on Deafness and Other Communication Disorders
National Institute on Drug Abuse

Outreach Partners

AARP
AARP Andrus Foundation
Abraham A. Low Institute
Academy of Neurologic Communication Disorders and Sciences
Acoustic Neuroma Association
"Addiction and the Brain, Beyond Saying No" -
 a Science Education Drug Abuse Partnership Award project funded by NIDA.
Alliance for Aging Research
Alliance of Genetic Support Groups
ALS Association (The)
Alzheimer Care and Research Center Foundation
Alzheimer's Association
Alzheimer's Disease Education and Referral Center

Alzheimer's Research Alliance of Oregon
 American Academy of Anti-Aging Medicine
 American Association for the Study of Headache
 American Chronic Pain Association
 American Council for Headache Education
 American Epilepsy Society
 American Federation for Aging Research
 American Methadone Treatment Association
 American Pain Society
 American Paralysis Association
 American Parkinson Disease Association
 American Syringomyelia Alliance Project, Inc.
 Anorexia Nervosa and Related Eating Disorders, Inc.
 Anxiety Disorders Association of America
 Brain Injury Association, Inc.
 Brain Trauma Foundation
 Center for Mental Health, Inc. (The)
 Center for the Advancement of Health
 Child Neurology Society
 Children with Attention Deficit Disorders
 Children's Brain Diseases Foundation
 Cochlear Implant Club International
 Community Access
 Coordinated Campaign for Learning Disabilities (CCLD)
 Dana Alliance for Brain Initiatives (The)
 Daniel Heumann Fund for Spinal Cord Research
 Dean Foundation for Health, Research and Education
 Depression and Related Affective Disorders Association (DRADA)
 Depressive and Manic-Depressive Association
 Dystonia Medical Research Foundation
 Epilepsy Foundation of America
 Erikson Institute
 Family Caregiver Alliance
 Foundation for Spinal Cord Injury Prevention
 Freedom from Fear
 French Foundation for Alzheimer Research
 Guillain-Barre Syndrome Foundation International
 Help Them Walk Again Foundation
 Hereditary Disease Foundation
 Hydrocephalus Association
 Hyperacusis Network (The)
 International Association for the Study of Pain
 International Brain Injury Association
 International Joseph Diseases Foundation
 International Rett Syndrome Association

International Tremor Foundation
International Ventilator Users Network
Late Onset Tay-Sachs Foundation
Learning Disabilities Association of America
Les Turner ALS Foundation
Lowe Syndrome Association
"Making Connections, Making Choices/Brain Power"-
a Science Education Partnership Award project funded by NIH
Manic Depressive Illness Foundation
Mental Health Association of Union County
Michigan Dyslexia Institute, Inc.
Multiple Sclerosis Association of America
Myasthenia Gravis Foundation of America, Inc.
Myoclonus Research Foundation
Narcolepsy & Sleep Disorders
National Alliance for Autism Research
National Alliance for Research on Schizophrenia & Depression
National Alliance for the Mentally Ill
National Anxiety Disorders Screening Day
National Anxiety Foundation
National Campaign to End Neurological Disorders
National Center for Post-Traumatic Stress Disorder
National Center for Youth with Disabilities
National Center on Deafness
National Coalition for Research in Neurological Disorders (NCR)
National Committee to Preserve Social Security and Medicare
National Council of Senior Citizens
National Down Syndrome Society
National Depression Screening Project
National Depressive and Manic Depressive Association
National Down Syndrome Society
National Dyslexia Research Foundation

National Sleep Foundation
 National Spasmodic Dysphonia Association
 National Spinal Cord Injury Hotline
 National Stroke Association
 National Tuberous Sclerosis Association
 Neurofibromatosis, Inc.
 New Jersey Center for Outreach and Services for the Autism Community, Inc.
 (COSAC)
 North American Brain Tumor Coalition:
 American Brain Tumor Association
 Brain Tumor Society (The)
 Childhood Brain Tumor Foundation
 National Brain Tumor Foundation
 Pediatric Brain Tumor Foundation of the United States
 Obsessive-Compulsive Foundation, Inc.
 Operation PAR, Inc.
 Orton Dyslexia Society
 Paralyzed Veterans of America
 Parkinson's Action Network
 Parkinson's Disease Foundation
 Parkinson's Institute
 Perspectives Network, Inc.
 Pilot International and Pilot International Foundation
 Purine Research Society
 Recovery, Inc.
 Research!America
 Restless Legs Syndrome Foundation
 Shy Drager Syndrome Group
 Sleep Research Society
 Society for Progressive Supranuclear Palsy, Inc.
 Sturge-Weber Foundation (The)
 Stuttering Foundation of America
 THINK FIRST Foundation
 Tourette Syndrome Association
 Traumatic Brain Injury Project
 Treatment and Research Advancements Association for Personality Disorder
 Trigeminal Neuralgia Association
 United Cerebral Palsy Associations
 United Parkinson Foundation
 Vestibular Disorders Association
 Vital Active Life After Trauma, Inc.
 Von Hippel-Lindau Syndrome Family Alliance
 Well Spouse Foundation
 Williams Syndrome Association, Inc.
 Zero to Three: the National Center for Infants, Toddlers and Families

Medical/Research Organizations

Autism Research Institute
Center for Child and Families Studies
Cold Spring Harbor Laboratory
Howard Hughes Medical Institute
Kennedy Krieger Institute
March of Dimes Birth Defects Foundation
Memorial Sloan-Kettering Cancer Center
Miami Project to Cure Paralysis
National Center on Addiction and Substance Abuse at Columbia University
New York State Institute for Basic Research in Developmental Disabilities
Salk Institute for Biological Studies
Scripps Research Institute
United Cerebral Palsy Research and Education Foundation
VZV Research Foundation

Professional Organizations

American Academy of Addiction Psychiatry
American Academy of Child and Adolescent Psychiatry
American Academy of Neurology
American Association for Anatomists
American Association for Geriatric Psychiatry
American Association of Electrodiagnostic Medicine
American Association of Neurological Surgeons
American Association of Neuroscience Nurses
American College of Mental Health Administration
American College of Neuropsychopharmacology
American Health Foundation
American Neurological Association
American Occupational Therapy Association (The)
American Physiological Society
American Psychiatric Nurses Association
American Psychological Society
American Public Health Association
American Society for Adolescent Psychiatry
American Society of Addiction Medicine
American Society of Clinical Psychopharmacology, Inc.

American Society of ElectroneurodiagnosticTechnologies
Americans for Medical Progress
Association for Applied Psychophysiology and Biofeedback
Association for Research in Vision and Ophthalmology
Association of American Medical Colleges
Congress of Neurological Surgeons
Gerontological Society of America (The)
International Association of Psychosocial Rehabilitation Services
National Association of Protection and Advocacy Systems
National Association of Psychiatric Health Systems
National Association of Psychiatric Treatment Centers for Children
National Association of State Mental Health Program Directors
National Community Mental Healthcare Council
National Treatment Consortium
Society for Light Treatment and Biological Rhythms
Society for the Advancement of Women's Health Research
Society for Neuroscience

Hospital/University Partners

One or more departments or research centers within the following teaching hospitals and universities have joined the 1997 Brain Awareness Week campaign as partners. Such departments include cellular biology, neurology, neuroscience, neurosurgery, and psychiatry.

Allegheny University of the Health Sciences
Barnes-Jewish Hospital, Stroke Management and Rehabilitation Team (SMART)
Baylor College of Medicine
Beaver College
Bowman Gray School of Medicine
Brandeis University
Brigham and Women's Hospital
Brown University
Case Western Reserve University
Charles A. Dana Center for Mathematics and Science Education
College of Physicians and Surgeons of Columbia University
College on Problems of Drug Dependence, Inc.
Columbia University
Columbia-Presbyterian Medical Center
Cornell University Medical Center
Council of Graduate Programs in Communication Sciences and Disorders
Dartmouth College
Duke University Medical Center
Felician College

George Washington University Medical Center
Harvard Medical School
Johns Hopkins University School of Medicine
Kresge Hearing Research Laboratory of the South
Louisiana State University Medical Center
Massachusetts General Hospital
Massachusetts Institute of Technology
Mayo Clinic
Medical Careers Institute
Mount Sinai School of Medicine
National Rehabilitation Hospital
New Mexico Institute of Neuroimaging
New York University Medical Center
Oberlin College
Oregon Health Sciences University
Rockefeller University
Southern Illinois University School of Medicine
State University of New York at Buffalo
Syracuse University -- Center for Human Policy
Temple University School of Medicine
UMDNJ-Robert Wood Johnson Medical School
University of Arkansas
University of California, Irvine
University of California, San Diego
University of California, San Francisco
University of Illinois, Urbana-Champaign
University of Iowa Hospital and Clinics
University of Massachusetts Medical Center
University of Miami Brain Endowment Bank
University of Miami, Jackson Memorial Medical Center
University of Michigan Medical Center
University of Oklahoma Health Science Center
University of Oxford, Great Britain
University of Pennsylvania School of Medicine
University of Pittsburgh School of Medicine
University of Southern California School of Medicine
University of Texas, Houston Health Science Center
University of Texas, Southwestern Medical Center
University of Washington
University of Wisconsin, Madison
University Hospitals of Cleveland
Vanderbilt University School of Medicine
Washington University School of Medicine
Yale University School of Medicine

Corporate Affiliates

BEEFNET, Inc.
Glenmede Corporation (The)
Life Resuscitation Technologies
Policy Directions, Inc.

The Charles A. Dana Foundation

DAVID MAHONEY, CHAIRMAN

January 15, 1997

Mrs. Clinton
The White House
Washington, D.C. 20500

EARLY CHILDHOOD
DEVELOPMENT

My dear Mrs. Clinton:

I read with great interest a note in the January 13th issue of Newsweek magazine regarding your intention to hold a conference on the brain in relation to children's health and education. The Charles A. Dana Foundation and its education arm, the Dana Alliance for Brain Initiatives, has a long history of involvement with both education and neuroscience. I would like to volunteer our services to work with you in bringing your plans to fruition.

The Charles A. Dana Foundation has a twenty-six year history as a grant-making institution in the areas of education and health. Most recently, its focus in education has been on modernizing and energizing our country's approach to educating very young minds; our recent grants include awards to such innovative programs as Mildred Winter's Parents as Teachers program and the National Center for Family Literacy. In the past year, the Foundation has supported two seminal conferences on education and neuroscience, the June 1996 Invitational Conference on Brain Development coordinated by the Families and Work Institute and the July 1996 Education Commission of the States Conference in Colorado, *Bridging the Gap Between Neuroscience and Education*.

In the area of health, although we are perhaps best known for our support of the Dana-Farber Cancer Center in Boston, we have adopted an entire emerging field of medical science -- brain research -- not just funding its work, but taking an activist role in bringing it to public attention. Our grants currently focus on five areas: brain-imaging, language-based learning disabilities, memory loss and aging, HIV-dementia, and manic depression.

The Dana Alliance for Brain Initiatives is a grantee organization of the Foundation started in 1992 to conduct public education programs about the brain and brain research. The Alliance conducts public forums, publishes a wide range of layman-oriented publications, co-sponsors a PBS program called "Your Brain", and encourages science education activities for school children as well as the general public. In 1996, the Alliance launched Brain Awareness Week, a public information program which today unites over 275 universities, hospitals, community groups and schools in education programs about the brain.

Mrs. Clinton
January 15, 1997
page two

At the core of the Alliance's outreach efforts is a stellar group of over 160 of the world's leading neuroscientists, including five Nobel laureates. These researchers, cognizant that their findings can have enormous impact on health and education decisions at both the personal and the policy levels, have joined our efforts to ensure that the highest caliber of information is made available to the public.

We have recently begun to explore with the National Education Goals Panel (chaired by Governor Romer of Colorado) joint opportunities for linking education and neuroscience. We hope that positive opportunities for linking the education and scientific communities on the important issues of early childhood development will result from this new collaboration.

We hope that we may be of assistance to you in this important endeavor you propose, and we look forward to being in touch with your staff.

Respectfully yours,

A handwritten signature in cursive script that reads "David Mahoney". The signature is written in dark ink and includes a horizontal flourish at the end.

David Mahoney

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brain connections



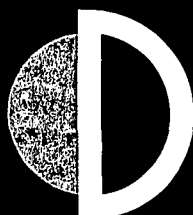
Your Source Guide



to Information on



Brain Diseases and Disorders



The
Dana
Alliance
for
Brain
Initiatives