DEPARTMENTS OF LABOR, HEALTH AND HUMAN SERVICES, EDUCATION, AND RELATED AGENCIES APPROPRIATIONS FOR 1990

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS

HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

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PART 4A

NATIONAL INSTITUTES OF HEALTH

Printed for the use of the Committee on Appropriations

U.S. GOVERNMENT PRINTING OFFICE

98-022 WASHINGTON : 1989

H181-46

For sale by the Superintendent of Documents, Congressional Sales Office
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THURSDAY, MARCH 23, 1989.

NATIONAL INSTITUTE ON DEAFNESS AND OTHER COMMUNICATION DISORDERS

WITNESSES

DR. JAY MOSKOWITZ, ACTING DIRECTOR

DR. JAMES B. WYNGAARDEN, DIRECTOR, NIH

DR. RALPH NAUNTON, DIRECTOR, DIVISION OF COMMUNICATION SCIENCES AND DISORDERS, EXTRAMURAL PROGRAMS, AND ACTING CLINICAL DIRECTOR, NIDCD

DR. JORGEN FEX, ACTING DIRECTOR, INTRAMURAL RESEARCH, NIDCD

GEOFFREY GRANT, ACTING EXECUTIVE OFFICER, NIDCD

WILLIAM MATTHEWS, BUDGET OFFICER, NINDS

DENNIS P. WILLIAMS, DEPUTY ASSISTANT SECRETARY, BUDGET, DHHS

GREETINGS AND INTRODUCTION OF NIDCD STAFF

Mr. NATCHER. We have before the committee at this time Dr. Moskowitz, the Acting Director of this Institute. Doctor, it is a pleasure to have you with the committee. Tell us who you have with you at the table.

Dr. MOSKOWITZ. Thank you. On my extreme left I have Dr. Naunton, the Director of the Division of Communication Sciences and Disorders as well as the Acting Clinical Director. Next to him is Mr. Matthews, the Budget Officer of the Neurology Institute. He is helping us out. Next to me is Mr. Geoffrey Grant, the Acting Executive Officer and Dr. Fex is to my right, the Acting Scientific Director, and also the Chief of the Laboratory of Molecular Otology.

Mr. NATCHER. Thank you. We will be pleased to hear from you.

OPENING STATEMENT

Dr. MOSKOWITZ. It is a privilege and a pleasure to appear before this committee as Acting Director of the newly created National Institute on Deafness and Other Communication Disorders (NIDCD) and to serve on behalf of the 30,000,000 Americans who suffer from hearing, balance, speech, language and other communication disorders.

Since October of 1988, we have initiated a nationwide search for a permanent Director, considered nominations for membership of the newly chartered Advisory Board and Advisory Council, and identified programs in deafness and other communication disorders totaling $91,677,000 for transfer from the National Institute of Neurological and Communicative Disorders and Stroke to the NIDCD. These funds will support ongoing research project grants, research and development contracts and intramural research projects, and new and competing renewal projects.

In addition, a Task Force for the Development of a National Research Strategy for Deafness and Other Communication Disorders, composed of ten panels of experts, was convened to assist the NIDCD in preparing a plan "to initiate, expand, intensify, and coordinate the activities of the Institute respecting disorders of hearing, balance, voice, speech and language, taste, and smell." The recommended strategy describes the state of knowledge in the major areas of research within the purview of the new Institute, identifies emerging research opportunities, and suggests approaches to meeting current and projected needs.

RECENT ACCOMPLISHMENTS

I would like to describe a few of the most recent accomplishments in some areas of research that will serve as a foundation for activities under the new Institute.

Research results indicate that excitatory amino acids are major neurotransmitters in the mammalian central nervous system and may also be involved in neuronal degeneration under conditions of ischemia and in some diseases. Several studies have identified these amino acids as neurotransmitters at a number of synapses in the auditory system. Investigators have recently isolated and made monoclonal and polyclonal antibodies to a "kainic acid receptor." This first purification of an excitatory amino acid receptor should enable investigators to determine the function of these receptors in the auditory system. An understanding of their role might permit the use of drugs affecting these neurotransmitters in the treatment of auditory system disorders.

Because the production of sensory (hair) cells in the ears of birds and mammals was thought to cease well before the time of birth, it has been assumed that any subsequent loss of auditory and vestibular hair cells in birds and mammals as a result of disease, drug therapy, loud noise, or aging would permanently damage the senses of hearing and balance. It is now known that auditory hair cell regeneration can occur in birds after acoustic trauma and that a corresponding recovery of hearing occurs. Recently, two teams of scientists have shown that auditory hair cells in the mature inner ears of young chickens and adult quail regenerate after acoustic trauma, and they have demonstrated that functional recovery occurred, as indicated by restoration of normal levels of electrophysiological activity in the auditory nerve of the chickens. These studies offer new hope of hair cell regeneration in mammals.

Since the development of cochlear implants in the sixties, more than 3,000 children and adults have been implanted with a variety of these devices. Controversy continues on several issues, however, including determination of appropriate candidates, selection of a single or multichannel device, suitable preimplantation and postimplantation assessments, and rehabilitation procedures. In order to address these and other associated issues, an NIH Consensus conference was held in the spring of 1988. The conference concluded that the implant is a valuable adjunct in the amelioration of profound deafness and that there is some evidence that multichannel devices are better than single devices in adults. In some persons there is substantial improvement in speech recognition after implantation, although—more typically—lip reading improves.

Studies of muscle actions during respiration, swallowing, phonation, and speech are providing new data of utmost importance for understanding the basis of a voice disorder called spasmodic dysphonia. These data are now being used to design a biomechanical computerized model of normal and disordered human laryngeal function that will provide the basis for understanding and treating various speech or voice disorders. Investigators have been successful in developing a new treatment. In two studies, injection of the laryngeal muscles with botulinum toxin was successful in eliminating or dramatically reducing symptoms in over 40 patients with spasmodic dysphonia. Other trials have demonstrated that this treatment can be used in other vocal tract muscles to reduce symptoms in stuttering.

Stuttering usually occurs during the preschool years. As many as 50 to 75 percent of those who begin to stutter will become fluent by adolescence. The cause of this debilitating speech disorder and the explanation of the common spontaneous recovery have remained elusive to researchers.

Normally, the muscles involved in opening and closing the vocal cords during breathing and producing speech sounds work together smoothly and efficiently. However, investigators have found that in stutterers these muscles, particularly those in the larynx, move irregularly. Stutterers have difficulty controlling and coordinating the rapid sequential movements necessary for smooth speech production, and even their tongue and jaw movements are significantly different from those of normal speakers. These findings suggest there is an underlying neuromotor control problem in stuttering. This may have important implications for treatment and for dismissing at least one theory, long unproven yet still espoused, that favors an emotional basis for the disorders.

RESEARCH IN THE AREA OF LANGUAGE

Most languages are linked to the auditory modality for transmission and are learned through hearing during an infant's early development of communication. Language, however, is not limited to speech and hearing for transmission. As described by Howard Poizner, Edward Klima and Ursla Bellugi in "What the Hands Reveal About the Brain", systems of symbolic communication are passed down from one generation of deaf people to the next, and have become autonomous languages not derived from spoken languages. These "visual-gestural languages of the deaf" are rooted in the visual modality and provide a means for examining competing explanations of how the brain is organized for language and how that organization can be modified. Studies on the breakdown of sign language following localized brain damage in deaf signers have provided important implications of brain organization for sign language. The study of sign language breakdown now offers hope of discovering the basic principles underlying both the specialization of the two cerebral hemispheres and the modification of their functions.