Monday 5 March 2018
Kl. 10.00–12.00
Kungl. Vetenskapsakademien
Lilla Frescativägen 4A, Stockholm

KUNGL. VETENSKAPS-AKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

Language and the brain

Language is a defining feature of the human brain, but its underlying processes are debated. This event focuses on the legacy of pioneering 19th century neurologists Carl Wernicke and Paul Broca, and how modern brain research helps us understand the human capacity for language. The event features the third installment of the Stockholm Brain Lecture series with Marsel Mesulam, Ruth Dunbar Davee Professor of Neurology and Director of the Cognitive Neurology and Alzheimers Research Center at Northwestern University. The event is sponsored by the Royal Swedish Academy of Science class for humanities and for outstanding services to science, and the Board of Human Sciences, Stockholm University.

10.00 Welcome address
Jonas Olofsson, Associate Professor of Psychology at Stockholm University

10.10 Broca's and Wernicke's areas subserving processing of language structure: Evidence from fMRI
Julia Uddén, researcher at Stockholm University Departments of Linguistics and Psychology, and Pro Futura Scientia fellow at the Swedish Collegium for Advanced Study

10.45 Coffee break

11.00 Stockholm Brain Lecture: *Anatomy of Word Comprehension in Wernickes Area and Beyond*
Marsel Mesulam, Ruth Dunbar Davee Professor of Neurology at Northwestern University

Despite 150 years of fruitful research, the anatomy of language in the human brain is still in flux. Many insights have come from the investigation of neurological patients with focal lesions. For example, cerebrovascular accidents in the left temporoparietal cortex of the left hemisphere have been known to cause Wernicke's aphasia, a syndrome characterized by severe word and sentence comprehension impairments. However, recent analyses of regional atrophy sites in patients with a neurodegenerative syndrome known as Primary Progressive Aphasia (PPA) show that traditional neurological models of language need to be revised. In particular, the left anterior temporal lobe, a region ignored by classic aphasiology, needs to be inserted into the language network with a critical role in word comprehension and object naming.

For registration and further information visit www.kva.se/languageandthebrain

BOX 50005, SE-104 05 STOCKHOLM, SWEDEN, RECEPTION +46 8 673 95 00, FAX +46 8 15 56 70
BESÖK/VISIT: LILLA FRESCATIVÄGEN 4A, STOCKHOLM, KVA@KVA.SE * **WWW.KVA.SE**

KUNGL. VETENSKAPS-AKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

Abstract

Despite 150 years of fruitful research, the anatomy of language in the human brain is still in flux. Many insights have come from the investigation of neurological patients with focal lesions. For example, cerebrovascular accidents in the left temporoparietal cortex of the left hemisphere have been known to cause Wernicke's aphasia, a syndrome characterized by severe word and sentence comprehension impairments. The underlying lesion site, known as Wernicke's area, has therefore been assumed to play a critical role in language comprehension. However, recent analyses of regional atrophy sites in patients with a neurodegenerative syndrome known as Primary Progressive Aphasia (PPA) showed that neuronal loss in temporoparietal areas encompassing Wernicke's area leave single word comprehension intact and cause only modest and inconsistent impairments of sentence comprehension. The most severe sentence comprehension impairments were associated with a heterogeneous set of cortical atrophy sites variably encompassing the temporoparietal components of Wernicke's area as well as Broca's area and dorsal premotor cortex. Severe comprehension impairments for single words, on the other hand, were invariably associated with peak atrophy sites in the anterior temporal cortex of the left hemisphere. These results deviate from traditional neurological models of language and show that the neural substrates of word and sentence comprehension are dissociable and that a circumscribed cortical area equally critical for word and sentence comprehension is unlikely to exist anywhere in the cerebral cortex. Reports of combined word and sentence comprehension impairments in Wernicke's aphasia come almost exclusively from patients with cerebrovascular accidents where brain damage extends into subcortical white matter. The syndrome of Wernicke's aphasia is thus likely to reflect damage not only to the cerebral cortex but also to underlying axonal pathways, leading to strategic cortico-cortical disconnections within the language network. The results of this investigation further reinforce the conclusion that the left anterior temporal lobe, a region ignored by classic aphasiology, needs to be inserted into the language network with a critical role in the multisynaptic hierarchy underlying word comprehension and object naming.

About Marsel Mesulam

Marsel Mesulam is Ruth Dunbar Davee Professor of Neuroscience and Director of the Cognitive Neurology and Alzheimer's Disease Center (CNADC) at Northwestern University. He obtained B.A. and M.D. degrees at Harvard University. He is past president of the Organization for Human Brain Mapping and past vice president of the American Neurological Association. His research has addressed the neural connectivity of the monkey brain, organization of human cholinergic pathways, representation of cognitive functions by large-scale networks, and neurobiology of dementias. He has received the Potamkin Prize for research on Alzheimer's disease from the American Academy of Neurology, the Javits Award from the National Institutes of Health, the McKnight Foundation Director's Award, and the Bengt Winblad Life Achievement Award from the Alzheimer's Association. He held the Robert Wartenberg Lectureship and the H. Houston Merritt Lectureship of the American Academy of Neurology. His textbook, Principles of Behavioral and Cognitive Neurology, has been part of training programs in Neurology, Psychiatry, Neuropsychology and Cognitive Neuroscience. His current research focuses on the functional imaging of neurocognitive networks, the factors that promote memory preservation in advanced age, and the treatment of dementias. His trainees in clinical, cognitive and basic neuroscience lead major research programs in the United States and abroad.