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in the untreated eye. These preliminary results suggest that the peripheral autonomic system in AD exhibits an abnormal cholinergic response and may provide a relatively noninvasive diagnostic test for AD.

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unaffected twin using magnetic resonance imag... MRI), 18-F-fluorodeoxyglucose and 15-0-water positron emission tomography (PET), and neuropsychological tests. MRI was normal in the unaffected twin, but showed widespread atrophy in the proband that was most severe in the right parietal lobe. In the unaffected twin, PET disclosed focal hypometabolism in the left inferior parietal lobe, and despite normal language skills, neuropsychological testing showed significantly lower scores on verbally than nonverbally mediated tests. In the proband there was extensive hypometabolism of posterior cortices bilaterally, which was worse on the right, and neuropsychological scores, though lower on all tests, were higher on verbally than nonverbally mediated tests. We conclude that the clinically unaffected twin may have an early stage of ACD with a different laterality than his brother, which suggests that there are both genetic and nongenetic contributors to topographical patterns of ACD.

P192. Regional Brain-Behavior Correlations Using Magnetic Resonance Volumetric Measures in Alzheimer's Disease

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Volume loss in some brain tissue compartments has recently been found by volumetric magnetic resonance (MR) analysis in Alzheimer's disease, but the relationship between regional volume loss and neuropsychological performance remains unclear. Ten subjects with probable Alzheimer's disease and 10 age- and education-matched controls underwent T2-weighted, high-resolution MR imaging (1.5 tesla). On bifeature segmentation of brain compartments, interrater reliability was 90%. Hippocampal volumes were measured on three-dimensional T1-weighted images. Brain measures were correlated with detailed neuropsychological testing. We confirmed a significant increase in overall CSF volume in Alzheimer's subjects, as well as in frontal, temporal, and parietal regions ($p < 0.002$). Multivariate models using age, years of education, and global measures of cognitive function showed significant effects of regional CSF volumes on corresponding neuropsychological tests. For example, left parietal atrophy accounted for 26% of the variance on semantic fluency ($p < 0.02$), left hippocampal volume for 24% of the variance on verbal learning ($p < 0.04$), and frontal atrophy for 33% of the variance on the Wisconsin card sort test ($p < 0.01$). A modulating effect of premorbid intelligence was seen in relating global atrophy to overall cognitive performance. We conclude that this is a promising technique for longitudinal quantitation and for assessing biological benefits of drug interventions.

P193. Immunohistochemical Study of Copper-Zinc and Manganese Superoxide Dismutases in Senile Plaques

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To investigate the role of the oxygen-free radical in senile plaque formation, we made an immunohistochemical study in brains of patients with dementia of the Alzheimer type utilizing antibodies to copper-zinc and manganese superoxide dismutases (CuZn-SOD, Mn-SOD). These enzymes scavenge superoxide anion. CuZn-SOD is localized mainly in cytosol and Mn-SOD is localized in mitochondria matrix. The material consisted of autopsied brains from 6 patients with dementia of the Alzheimer type (average age, 77.0 yr; range, 62–89 yr). Buffered 10% formalin-fixed, paraffin-embedded 6-μm–thick sections of hippocampus from all cases were immunostained with rabbit polyclonal antibodies to human CuZn-SOD and Mn-SOD with the ABC method. Most dystrophic neurites of primitive and classic plaques were immunoreactive for CuZn-SOD as fine positive structures. Reactive astrocytes surrounding senile plaques had granular structures positive for Mn-SOD in their cell bodies and proximal processes. Diffuse or burned-out plaques had no immunoreactivity for either SOD. Results of this study suggest that neurons and astrocytes may have different responses to oxidative stress during senile plaque formation.

P194. Neuropsychological Correlates of Competency Loss in Alzheimer-Type Dementia

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Our objective was to reveal the neuropsychological changes associated with competency loss in Alzheimer's disease (AD). Little is known about the cognitive changes that are associated with loss of competency in AD and other dementias. Identification of neuropsychological criteria will assist physician decision makers who currently lack objective measures for competency assessment. The investigators developed 2 clinical vignettes that reliably and validly test subject competency (treatment decision capacity) under 5 accepted and increasingly stringent legal standards. Thirty subjects (10 normal elderly and 20 AD patients) were administered the vignettes, as well as a battery of neuropsychological measures theoretically linked to competency function. Neuropsychological test scores for the 2 patient groups were correlated with scores on the legal standards. AD patients performed significantly below normal controls on the more stringent legal standards and on all neuropsychological measures. Scores by AD patients on the 5 legal standards strongly correlated ($r > 0.60$, $p < 0.02$) with neuropsychological measures of verbal conceptualization, confrontation naming, auditory comprehension, short-term verbal memory, and verbal fluency. Identical correlational analyses using the normal older controls revealed virtually no significant correlations. The study revealed that neuropsychological measures of verbal conceptualization, auditory comprehension, verbal fluency, and short-term memory were strongly associated with the impaired performance of AD subjects on different standards of competency.

(57.) * Foster J., Black S., Stanchev P., Buck B., Moscovich M., Winocur G., Bronskill M., "Regional Brain - Behaviour Correlations Using Magnetic Resonance Volumetric Measures in Alzheimer's Disease", ***Annals of Neurology*** **1993**, No. 34, 293.