

POSTER SESSION I—FEBRUARY 19,
2006—5:30 P.M. TO 7:00 P.M.

Basic Neuroscience

P1. Modulation of corticolimbic function through engraftment of a monoaminergic cell line

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Background: Previous work in this laboratory has demonstrated antidepressant effects with neural transplants of embryonic stem (ES) cells ("N2-5HT") that have been engineered to differentiate into high proportions of serotonergic (5HT) and dopaminergic (DA) neurons. Clinically and neuroanatomically, the pathoetiology of depression and anxiety are intimately associated with corticolimbic function. Here, we sought to further characterize N2-5HT cells engrafted into the anterior cingulate cortex (ACCx) and assess graft effects in animal models of anxiety and depression. **Method:** The ACCx of 24 adult rats were engrafted with N2-5HT cells, 14 control subjects received feeder cells, and 10 subjects underwent sham surgery. Behavior was examined using Forced Swim, Social Interaction and the Elevated Plus Maze. Immunohistochemical reactions used to characterize the engrafted cells included anti-TH, -5HT, -DAT, -AADC, and -DBH. Functional integration was assessed with electron microscopy, bromo-deoxyuridine (BrdU) labeling, anterograde tracing from the basolateral amygdala (BLA), and up-regulation of *c-fos*. **Results:** Large numbers of 5HT and DA neurons were found integrated within ACCx - up-regulating *c-fos* and interacting with amygdalofugal fibers. Increased numbers of BrdU-labeled cells were seen in the dentate gyrus. Transplants produced robust anxiolytic effects in addition to previously seen antidepressant effects. **Conclusions:** N2-5HT cells functionally integrate within the corticolimbic system producing significant effects in models of anxiety and depression. Locally, they may provide elevated levels of 5HT and DA, and are associated with afferents from the BLA. Increased neurogenesis within the dentate gyrus suggests modulation of function influence by these grafts across corticolimbic regions.

P2. Intravenous levodopa administration in humans based on a tracer kinetic model

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Background: Levodopa, when combined with a decarboxylase inhibitor, delivers dopamine directly to the brain and has no net effect on brain blood vessels. For neuroimaging studies of

Parkinson disease and Tourette's syndrome, we sought to produce rapidly a biologically relevant levodopa concentration in plasma and then maintain that concentration long enough to allow us to assess motor, cognitive, emotional, and neuroimaging responses. We also wished to minimize side effects in individuals without prior levodopa treatment. **Method:** Our previous method (Black et al., 2003) used a large loading dose to fill the estimated volume of distribution, followed by a slow maintenance infusion that balanced estimated metabolic and excretory losses. With that method, the peak plasma concentration at the end of the loading dose was much higher than the eventual steady-state concentration. In dopa-naïve subjects this peak produced intolerable side effects at doses designed to lead to a steady-state plasma concentration of 1200ng/mL or higher. Based on published and our unpublished pharmacokinetic data and a two-compartment model, we designed a decreasing-exponential-rate infusion intended to rapidly produce a steady-state plasma concentration and maintain it for 90 minutes. **Results:** We report results of 12 infusions in six healthy subjects, half placebo infusions under double-blind conditions. **Conclusions:** Using this new method, mean plasma LD concentrations were within 3% of their target of 1200ng/mL at 20 and 40 minutes into the infusion, and within 20% between 12 and 90 minutes. Prolactin levels decreased by >60% ($p < 0.005$) and growth hormone levels increased. Volunteers had no significant side effects.

P3. A randomized control trial of levodopa for treatment of tics

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Background: Tourette's syndrome (TS) is a chronic neuropsychiatric disorder defined by the presence of both vocal and motor tics which fluctuate in phenomenology over time and are not attributable to another cause. Improvement in tics with dopamine antagonists suggests TS may involve abnormal function of brain dopamine pathways. Surprisingly, dopamine agonists can also reduce tic frequency. Available treatments for TS are limited by partial efficacy and substantial side effects. We previously observed an unexpected 40% mean decrease in tic severity in 6 patients after a single acute oral dose of levodopa. **Method:** We performed a placebo-controlled, double-blind, parallel-group, flexible-dose trial of levodopa in 20 children and 10 adults with chronic tic disorders. We collected data on tic severity, overall clinical status, side effects and medication compliance. The primary analysis took place in repeated measures analyses of variance (ANOVAs). **Results:** There were no serious adverse events. Mean group serum prolactin decreased by 25% with levodopa but increased in the placebo group, consistent with a dopamine-like effect. Our *a priori* primary outcome measure was the Yale Global Tic Severity Scale (YGTSS). The YGTSS total score decreased by a mean of 9% in the levodopa group only ($p = 0.11$, Time x

Drug effect). The YGTSS tic score decreased by 7% in the levodopa group only, $p = 0.09$. **Conclusions:** These changes in the expected direction, though not statistically significant, suggest the need for larger clinical studies of levodopa. Furthermore, the lack of deterioration supports previous indications that TS may involve abnormal dopamine function, but that the abnormality is not a simple excess of dopamine.

P4. Protective effect of quercetin and curcumin, against colchicine-induced cognitive impairment and oxidative stress in rats

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Background: Alzheimer's disease is the most common cause of dementia in older people. Alzheimer's disease (AD) is a progressive neurodegenerative disorder with an unknown etiology. Colchicine has been used as a neurotoxin in animal models of Alzheimer disease. Intracerebroventricular (ICV) administration of colchicine causes cognitive impairment and represents sporadic dementia of Alzheimer's type in rats. The role of antioxidants has recently been proposed to be beneficial in the treatment of Alzheimer's disease. In this study, the effect of quercetin and curcumin was explored against colchicine-induced cognitive impairment and oxidative stress in rats. **Method:** Colchicine was administered intracerebroventricularly (15 $\mu\text{g}/5\mu\text{L}$) in the rats to induce cognitive impairment and oxidative stress. The rats were treated with quercetin (20 and 40 mg/kg, p.o.), and curcumin (10,20 mg/kg, p.o.), twice daily for 24 days starting 3 days prior to colchicine injection. The memory dysfunction was assessed using elevated plus maze and water maze paradigms, locomotor activity was also assessed. Oxidative stress was estimated by measuring the levels of brain malondialdehyde (MDA) and reduced glutathione. **Results:** Colchicine significantly induced memory impairment in rats as indicated by poor performance in memory tasks ($p < 0.05$). Chronic treatment with both quercetin and curcumin significantly reversed colchicine-induced memory dysfunction ($p < 0.05$). There was a significant rise in MDA level and decreased reduced glutathione and acetyl cholinesterase levels in a colchicine-treated rat, which was reversed by chronic quercetin and curcumin treatment ($p < 0.05$). **Conclusions:** The study establishes the protective effect of quercetin and curcumin against oxidative stress induced Alzheimer's disease.

Epilepsy

P5. Epileptic dementia: cognitive impairment associated with subclinical epileptiform discharges

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Background: The elderly are the fastest growing population segment at risk for epilepsy. Seizures in the elderly often lack the striking clinical features seen in younger patients, and cli-

nicians usually do not consider them in the differential diagnosis of cognitive impairment. The purpose of this study was to evaluate the presence of epileptiform activity as a source of memory or cognitive deficits in the elderly. **Method:** We investigated patients who presented for an evaluation of dementia in the memory disorders program with clinical examinations for seizure activity and standard, awake and drowsy electroencephalograms (EEGs). **Results:** Over a 6-month period, we identified six patients with cognitive impairments likely associated with epileptiform activity (age range: 64–83 years). Study findings included focal or generalized bursts of spikes or sharp waves intermixed with slow waves in five patient records and frequent prolonged bursts of slow waves in one patient. One patient with cognitive impairment and depression had electroconvulsive therapy. His post treatment EEG showed a sharp wave focus at the right frontal central region. Only one patient had previously diagnosed epilepsy with complex partial seizures. He was hospitalized for dementia which subsequently resolved with treatment of his recurrent epileptiform discharges. **Conclusions:** Seizures in older people may present as subtle changes or unexplained fluctuations in cognitive abilities. These patients suggest that clinicians need to consider subtle or subclinical seizures in the differential diagnosis of cognitive deficits in the elderly. Epilepsy is a potentially reversible cause of dementia.

P7. Musical hallucinations following temporal lobectomy

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Background: Musical hallucinations are rare and often associated with hearing loss, female gender, older age, and various brain pathologies including epilepsy. We describe a unique case in which, following temporal lobectomy and oto-toxic therapies, the patient experienced the onset of songs replaying constantly in his mind for days to weeks. **Case Report:** A 49-year-old, right-handed male, with childhood meningitis and mild hearing loss, had had intractable partial epilepsy since age 26. He underwent presurgical neurodiagnostic evaluations, which revealed a left temporal focus, left hippocampal magnetic resonance imaging (MRI) abnormalities, bilateral language representation, and cognitive deficits lateralized to the left hemisphere. He underwent a partial left temporal lobectomy, but required repeated antibiotic courses for post-op bone flap infections, resulting in tinnitus. Surgery led to near seizure-freedom, plus improved cognitive and emotional function, including improved memory for facts and numbers. Pathology revealed focal cortical dysplasia. Two years post-surgery, amidst antibiotic treatment, he noted songs replaying in his head, which increased in frequency over ensuing years. He had heard these songs in the recent or remote past; they con-

tinue to occur and are constantly present, with one song lasting up to a month. **Conclusions:** We report, to our knowledge, the first case of musical hallucinations associated with temporal lobectomy for epilepsy. The patient had multiple risk factors for these unwanted musical perseverations, including epilepsy, mild neuropsychiatric and cognitive dysfunction, and tinnitus and hearing loss. Each of these factors is discussed and implications for pathophysiology are presented.

P8. Psychopathology: frequency and severity among patients with refractory epilepsy

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Background: Psychopathology among patients with epilepsy has been widely described. Different instruments have been used to evaluate psychopathologic symptoms in these patients. There is not a universally accepted method to assess accurately this issue. The purpose of this study was to determine the frequency and associations of psychopathology among patients with refractory epilepsy using the SCL-90-R scale. **Method:** Cross-sectional study of 116 patients with refractory epilepsy between June 2002 and August 2005. The SCL-90 R scale was assessed and scored. Bivariate analysis was performed by chi-square and Mann Whitney U test. **Results:** Patients mean age was 31 years (SD = 10); 51% were men; 63.65% have partial-onset secondary generalized; frequency of seizure 17 times per month; mean onset of epilepsy at 12 years; and mean time of evolution of epilepsy of 19 years. Higher scores on GSI were associated with partial-onset seizures and uncontrolled seizures. Associations were found between Somatizations and females ($p = 0.045$); obsessiveness and partial seizures ($p = 0.001$); interpersonal sensitivity with females ($p = 0.034$) and uncontrolled seizures ($p = 0.002$); depression with females ($p = 0.012$); uncontrolled seizures ($p = 0.023$); low socioeconomical status ($p < 0.001$) and partial seizures ($p = 0.045$). Anxiety and Hostility were associated with uncontrolled seizures ($p = 0.024$) and partial seizures ($p = 0.043$); paranoia was associated with uncontrolled seizures ($p = 0.003$) and older age ($p = 0.034$). **Conclusions:** The severity of psychopathology among patients with epilepsy is high and related to the presence of partial-onset seizures and poor seizure control. The most frequently reported symptoms were obsessiveness, depression, paranoia and interpersonal sensitivity. Female gender, partial-onset seizures, uncontrolled seizures and age were associated with psychopathology among patients with epilepsy.

General Clinical Neuropsychiatry

P9. Delirium in the neurosurgical postoperative

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Background: Delirium is a syndrome characterized by concurrent disturbances of consciousness, global cognitive impairment, abnormal attention, increase or reduction of psychomotor activity, and sleep-wake cycle disturbances; it is commonly diagnosed among patients in the postoperative period and with high mortality rates. The purpose of this study was to determine the frequency of delirium among patients who underwent neurosurgical procedures, and the possible associations with clinical variables. **Method:** We performed a cross-sectional study of 87 patients in the neurosurgical postoperative period (between 24 and 72 hours after neurosurgery) treated among January and December 2004 at a referral neurological center in Mexico. All patients were assessed by means of Mini-Mental State Exam (MMSE) and DRS to determine the diagnosis of delirium according to DSM-IV criteria. **Results:** Delirium was diagnosed in 13 patients (14.9%). Among these patients 55% were women, mean age 41 years (SD = 15); the most common subtype of delirium was mixed (46.1%), followed by the hypoactive (38.5%) and hyperactive (15.4%) subtypes. Age, presence of delirium prior to surgery, use of atracurium, two or more supratentorial left hemispheric lesions, leukocytosis, and CSF abnormalities were associated with delirium. **Conclusions:** Delirium among patients in the neurosurgical postoperative period is highly frequent and it is associated with age, localization of the lesion, use of atracurium, history of delirium and leukocytosis.

P10. Long-term neurobehavioral and functional outcome following neuroinvasive West Nile Virus infection

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Background: We described previously a frontal-subcortical pattern of neurobehavioral impairments among persons with neuroinvasive WNV infection (WNV-CNS) in the acute rehabilitation period. The natural course of neurobehavioral and functional recovery following WNV-CNS remains unknown. **Objective:** To characterize the long-term neurobehavioral and functional consequences of WNV-CNS. **Method:** 10 subjects (5 women), age 62.1 years (SD = 18.8), were evaluated with a reliable informant 21.7 (SD = 0.5) months following WNV-CNS. The Scripps Neurologic Rating Scale (NRS), Neurological Examination Scale (NES), Neuropsychiatric Inventory—Nursing Home version (NPI-NH), Mini-Mental State Exam

(MMSE) and Frontal Assessment Battery (FAB) were administered. MMSE and FAB scores ≥ 2 SD below age-adjusted performance expectations defined cognitive impairment. Functional Independence Measure (FIM), Functional Activities Questionnaire (FAQ), and Disability Rating Scale (DRS) scores were obtained. **Results:** NRS = 91.7 (SD = 5.3) (essentially normal), while NES = 16.9 (SD = 5.1) (abnormal). Neuropsychiatric symptoms were mild (NPI-NH = 10.1 (SD = 10.7) but common, and included depression/dysphoria (90%), anxiety (60%), and irritability/lability (30%), agitation/aggression (20%), disinhibition (10%). Age-adjusted MMSE and FAB differed significantly ($p < .02$). All MMSE scores were normal; 40% were impaired on the FAB. Functional outcome scores were within the normal range: FIM = 122.8 (SD = 3.4), FAQ = 1.5 (SD = 1.8), DRS = 0.6 (SD = 0.6). **Conclusions:** The pattern of neurobehavioral signs and symptoms in this group suggests that WNV-CNS produces mild persistent impairment of frontal-subcortical function. The functional status of these subjects is good despite their neurobehavioral disturbances. Additional investigation of the implications of persistent neurobehavioral symptoms, and particularly their effects on quality of life, among WNV-CNS survivors is needed.

P12. HIV-associated cognitive impairment: a pilot project to evaluate and improve diagnosis in a university infectious disease clinic

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Background: The lifetime risk of AIDS Dementia Complex is approximately 30%, despite an increase in life expectancy associated with antiretroviral therapy. HIV-related cognitive impairment can occur in up to 37% in clinic populations, but still may be under-recognized in many settings. The purpose of this study was to identify the frequency with which HIV-related cognitive impairment is recorded by clinicians in a university infectious disease clinic. **Method:** This study is a retrospective chart review of a random sample of 50 consecutive HIV+ patient visits. Patients were required to meet strict inclusion and exclusion criteria, and cognitive impairment was identified in the medical records using key search terms. Subjects' clinical data were also collected. **Results:** Subjects were 78% male with median age 44.5 (range 28–64) years. Cognitive impairment was noted in 6% (3/50) of subjects' medical records; these included memory loss, HIV dementia, encephalopathy, and "language problem." Only one person had undergone any type of cognitive screening. 22% of subjects had Hepatitis C co-infection and 16% had a history of interferon therapy. Hepatitis C co-infection ($p = 0.02$) and a history of interferon therapy ($p = 0.001$) were present in all three subjects with documented cognitive impairment. **Conclusions:** Cognitive impairment is noted less frequently in this population than reported in the literature, suggesting it may be under recognized. Identification and treatment of cognitive impair-

ment has implications for health outcomes among HIV+ persons, and cognitive screening measures are needed to improve diagnosis. Hepatitis C co-infection and history of interferon therapy may contribute to cognitive impairment in this population. Further studies are needed to determine the true prevalence of cognitive impairment and explore the long-term effects of interferon therapy and Hepatitis C co-infection in this population.

P13. Against all odds: establishing a neuropsychiatry practice in Lebanon

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Background: Subspecialty clinics in Lebanon are uncommon; physicians often treat conditions unrelated to their specialty. There is a high prevalence of psychiatric disorders among patients presenting to neurological clinics. The purpose of this study was to assess the feasibility of a neuropsychiatry practice and memory disorders clinic in Lebanon. **Method:** Medical records of all patients presenting to a newly established out-patient neuropsychiatry clinic over a 20-month period were reviewed. **Results:** 269 charts were reviewed. The patient population consisted of 128 (47.6%) women and 141 (52.4%) men. Mean patient age was 40. 205 (76%) patients presented by self-referral and 64 (24%) were referred from physicians of various specialties. 182 (67.6%) patients presented with a neuropsychiatric disorder; the most common diagnoses were neurodegenerative disorders in 54 (20%), developmental disorders in 38 (14.1%), and neuropsychiatric sequelae of traumatic brain injury in 28 (10.4%). The most common psychiatric diagnosis was a mood disorder in 54 (20.1%) patients. **Conclusions:** The patient population described is younger than expected for a practice targeting memory disorders. The extensive self-referral could be attributed to the health care system in Lebanon, where the role of primary care physicians, as gate-keepers, is minimal, in addition to doctor-shopping, a common cultural characteristic. Lack of appropriate referral by physicians could result from competition over rendering health care services, unawareness of the presence of subspecialty clinics, and the role of the Lebanese doctor as the "man-of-all-trades." Current practice in Lebanon discourages the establishment of subspecialty clinics, delaying diagnosis and treatment of complex neuropsychiatric cases.

P14. Hallucinosi s of uncertain etiology

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Background: The differential diagnosis of visual hallucinations presenting as an isolated symptom includes a variety of neuropsychiatric conditions. Generally, the correct diagnosis emerges from history, mental status, investigations and longitudinal follow-up. A specific case will be presented where the diagnosis remained unclear over the course of several

years. **Case Report:** A 32-year-old single man, working as a truck driver, complained to his family doctor of frightening visual hallucinations. He saw threatening human figures outside of his truck. Although he attempted to confront these shadowy figures, he remained aware that they were not "real." He denied current or recent abuse of alcohol or street drugs, including psychostimulants. He also denied auditory hallucinations, other specific psychotic symptoms, or a history of seizures. His past history included extensive alcohol abuse and numerous barroom fights, some leading to him being "knocked out" for brief periods. He had also worked as a rodeo rider, reporting an incident in which he was unconscious after being thrown from a horse. **Conclusions:** Neither specific investigations nor empirical treatment with various medications led to any change in his symptoms. During the course of treatment, he began to abuse "crack" cocaine. He was jailed for two years for robbing convenience stores to support this new habit. Both during and after his incarceration, medication trials continued. Ultimately, he developed a means of coping with his visions involving neither prescribed medications nor street drugs. The patient has done well, despite the fact that his symptoms remain neither explained nor resolved.

P15. Varied presentation of catatonia in neuropsychiatric patients

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Background: Catatonia is historically associated with psychiatric illness, especially schizophrenia. Recent work has shown that catatonia is more commonly associated with affective illness. Knowledge of whether catatonia presents atypically in the clinical context of intellectual disability, cognitive impairment, and autistic spectrum disorders is sparse. **Case Report:** Two women and one man, with catatonia occurring in conjunction with intellectual disability or neuropsychiatric illness, were in our care. One woman [Patient 1] had cognitive impairment resulting from presumptive hypoxic brain injury. Another woman [Patient 2] had Down's syndrome and mild intellectual disability. Patient 3 had autism and intellectual disability. Patient 2 showed clear evidence of catatonia, with muteness, negativism and posturing. For Patients 1 and 3 catatonic signs were obscured by clinical features of presumed dementia and autism, respectively. Persistent negativism, motor symptoms, failure to respond to current treatment, and a waxing and waning quality were important diagnostic clues in each case. All three patients received lorazepam. Patient 1 fully recovered and Patient 3 improved. Patient 2 improved, and then relapsed. Eight electro-convulsive treatments led to recovery. Diagnosis was most difficult in Patient 3 and hinged on a striking response to one dose of lorazepam. **Conclusions:** 1) Symptoms of catatonia, such as motor disturbances, negativism, and disinhibited behavior, can overlap or mimic symptoms of other neuropsychiatric disorders, making diagnosis difficult. 2) Failure to diagnose catatonia can result in ineffec-

tive treatment, unnecessary suffering and complications including death. Neuropsychiatrists should be alert for signs and symptoms of catatonia so that appropriate treatment can occur.

P17. First, do no harm: predicting a "no medication" response

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Background: This poster reviews the ability to predict psychotropic medication response. Various uses of quantitative EEG are emerging as possible ways to predict positive and adverse psychotropic medication responses. Three clinical cases are presented which illustrate the harm of inappropriate medication use that is a common inadvertent occurrence. The cases also demonstrate the benefit achieved by using Referenced-EEG (rEEG) to guide medication selection. **Case Report:** Three brief case histories of patients having been on as many as 22 previous medications are presented along with their rEEG responses. In all cases the results suggested the patients did not need any medications, which correlated to how well they were doing clinically once tapered off of their drugs for purposes of testing. **Conclusions:** For the past 2 years, rEEG has been used by the author in over 200 hard-to-treat cases with 67% of the patients tested, resulting in medication changes or combinations that would not have been chosen without the aid of rEEG. rEEG may offer a way to provide psychiatry with a set of clinically useful biomarkers to guide the physician's pharmacotherapeutic choices. These patients' current improvements off of psychotropic drugs ultimately may not suggest psychiatric well-being, but in all cases the past medications did not lead to clinical improvement, were probably causing psychological symptoms or neurotoxicity, and the rEEG report predicted the previous medications would have a low probability of being helpful. Implications for increased remission rates, as well as lower health care costs, also suggest reasons for why rEEG should be seriously investigated.

P18. Comparative sensitivity of three versions of the Hamilton Depression Rating Scale in a clinical trial setting

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Background: The Hamilton Depression Rating Scale (HAMD) has been the gold standard assessment measure in clinical trials of major depressive disorder (MDD) for over 40 years. Various versions of the HAMD have been developed to enhance understanding of the varied phenotypic manifestations of MDD. However, the ability of these different HAMD versions to discriminate active drug from placebo has been less evident. The goal of this study was to explore the relative sensitivity (the power to detect difference from placebo) between three versions of the HAMD. **Method:** Two large, identical, multi-site, double-blind 8-week trials involving outpatients with

moderate to severe MDD were conducted utilizing 1:1:1 randomized assignment to placebo, extended-release bupropion (WXL) or escitalopram (ESC). The primary antidepressant outcome measure was the HAMD, which was analyzed as a 28 item (HAMD-28), 17 item (HAMD-17) and 6 item (HAMD-6) format. **Results:** 785 subjects constituted the intent-to-treat population. In combined analyses, the HAMD-6 emerged as the most sensitive at discriminating active drug from placebo (WXL vs. placebo, $p = 0.002$; ESC vs. placebo, $p = 0.002$), while the HAMD-17 was less sensitive (WXL vs. placebo, $p = 0.053$, ESC vs. placebo, $p = 0.011$), and the HAMD-28 fell in between (WXL vs. placebo, $p = 0.016$; ESC vs. placebo, $p = 0.011$). **Conclusions:** These findings suggest that the most streamlined version of the HAMD (the 6-item version) may perform as well, if not better, than the more ubiquitous 17-item version, at least in clinical trial settings. This may have implications for the clinician seeking a sensitive measure of antidepressant response in outpatients with MDD.

P19. The association of insomnia with non-medical sedative use disorder

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Background: Uncertainty as to the role of insomnia in the etiology of non-medical sedative use disorder (NMSUD) may prevent physicians from prescribing sedatives to alleviate sleep problems. The purpose of this study was to estimate the association between sleep problems and past-year NMSUD, before and after adjusting for sociodemographic factors and comorbid substance use disorders. **Method:** *Design* Cross-sectional analysis of nationally representative data from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions for U.S. adults 18 and older who reported low mood lasting 2+ weeks or anxiety lasting 6+ months ($N = 14,680$). *Setting* Face-to-face personal interviews conducted in households. *Measures:* Lifetime general and substance-related sleep problems (LTSP) and past-year substance related sleep problems (PYSP) were defined based on self-reported problems falling or staying asleep. NMSUD, non-medical other prescription drug use disorders (NMODUD), other illicit drug use disorders (OIDUD), alcohol use disorders (AUD) and nicotine dependence (ND) were defined based on DSM-IV criteria. **Results:** At the bivariate level, past-year NMSUD was significantly associated with PYSP (OR = 4.8, 95% CI = 2.28-9.95) but not with LTSP (OR = 2.7, 95% CI = 0.98-7.22). In multivariate logistic regression models, the association of PYSP and NMSUD remained significant after adjusting for sociodemographic characteristics (OR = 3.1, 95% CI = 1.44-6.87), but it fell short of significance after controlling for any of the substance use disorders. **Conclusions:** These data do not rule out pharmacological treatment for non-substance induced insomnia; however, individuals with a history of substance use disorders have an increased risk of NMSUD, irrespective of sleep problems.

P20. A potentially SSRI-induced case of Call-Fleming syndrome

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Background: Serotonin Specific Reuptake Inhibitors (SSRIs) are widely used in depression. Other indications include obsessive-compulsive disorder, panic disorder, anxiety and eating disorders. Here we report a rare potential side-effect. Call-Fleming syndrome (CFS) is a reversible segmental vasoconstriction of cerebral arteries presenting with thunder-clap headache and focal neurological deficits most common in women aged 20-50 years. **Case Report:** A 41-year-old-woman with history of hypothyroidism and depression was admitted with left upper and lower extremity weakness/numbness, pounding headache and loss of vision for five days. She had a recent history of severe abrupt headache diagnosed as migraine. The patient was agitated and sleepless and could not walk. She was taking levothyroxine, paroxetine and (occasional) marijuana. Brain magnetic resonance imaging (MRI) showed acute infarctions in bilateral occipital and right frontoparietal regions. Magnetic resonance angiography (MRA) of the Circle of Willis demonstrated diffuse irregularity of circulation suggestive of vasculitis. Vasculitis work-up and lumbar puncture were unremarkable. Paroxetine was stopped and Nimodipine together with physical/occupational therapy were begun. Headache resolved and strength and vision gradually improved. MRA 6 days after admission showed overall improvement and marked lessening of vasoconstriction. **Conclusions:** Extensive evaluation failed to delineate additional causes, and diagnosis of CFS was entertained. In conjunction with prior reports of possible association between vasoactive drug exposure and development of CFS, this case suggests that Paroxetine's effects on serotonergic or noradrenergic systems may precipitate reversible vasoconstriction in susceptible individuals. Careful inquiry into the use of these substances is warranted in patients presenting with headache, focal deficits, and evidence of cerebral ischemia.

P21. Cognition in euthymic bipolar disorder patients: neuropsychological and neuroimaging correlates

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Background: Patients with bipolar disorder appear to have selective cognitive impairment, namely executive functioning and memory problems, even during the euthymic phase of bipolar disorder. However, the nature and extent of these purported cognitive deficits in memory and frontal/executive functioning are not well understood. This was a pilot cross-sectional study of the neuropsychological functioning and neuroimaging correlates of participants with bipolar I disorder ($N = 9$) compared to a healthy comparison group ($N = 8$) without psychiatric illness. **Method:** Participants underwent a

comprehensive battery of neuropsychological tests and brain magnetic resonance imaging (MRI) for regional brain volumetric measurements. **Results:** Both groups had similar cognitive functioning across broad cognitive domains. However, these two groups had dissimilar performance on isolated measures of verbal memory and frontal executive functioning. Marked differences in brain volumetric measures of tissue and CSF existed between groups, with the healthy comparison group having significantly greater frontal and temporal volumes than the bipolar disorder group. Furthermore, medial temporal structures (hippocampus and amygdala) were smaller in the bipolar disorder group. **Conclusions:** These findings are in marked contrast to most prior imaging studies finding few differences in cortical brain volumes or hippocampal volumes, and marked increase in amygdala volume in comparison controls. Although there was little relationship between brain volumetric measures and cognitive performance for the bipolar disorder group, there was marked correlation between brain volumetric measures and clinical markers of bipolar disorder severity. Frontal and temporal tissue and CSF volumes were significantly correlated with lifetime total number of mood episodes and lifetime number of major depressive episodes.

P22. Pathological gambling associated with a dopamine agonist in Restless Legs Syndrome

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Background: Dopamine agonists are used for Parkinson's disease. Pathological gambling has been associated with dopamine agonists. To our knowledge those effects have not yet been described with Restless Legs Syndrome (RLS) patients. **Case Report:** A 48-year-old woman developed typical and severe RLS symptoms at the onset of an SNRI treatment for post-traumatic stress disorder. Three months after the introduction of pramipexole 0.5 mg hs, she began to gamble and as a result, came very close to bankruptcy. Pathological gambling disappeared 3 weeks after cessation and has not reappeared. **Conclusions:** Although other factors may have been involved, Dopamine agonists may induce pathological gambling and gambling-like symptoms in non-Parkinson's disease patients.

P23. Affective cognitive syndrome in cerebellar vascular disease

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Background: Exploration of the cognitive, affective and behavioral cerebellar disorders is quite recent. The information in case reports and with a few patient series reveals that pla-

neation, visuo-spatial intelligence, verbal fluency, abstract thought, prosody, working memory, and learning motor functions may be impaired. Vascular disease has been considered the best model to study these functional networks. Few vascular series have been reported. The purpose of this study was to establish the most common neuropsychiatric features in patients with pure ischemic cerebellar vascular disease. **Method:** A cross-sectional survey including 17 patients with pure chronic cerebellar ischemic infarct and 17 control subjects was developed. We performed the Neuropsychiatric Inventory, the Wechsler Memory Test, STROOP Test, IQ code, Trail Making Test, Cognistat, Beck Depression Scale, Rey Figure and Mini-Mental State Exam. **Results:** We included 17 subjects with chronic cerebellar infarct. 53% were men, and 47% were women. Mean age was 51.3 years old. Main neuropsychiatric disturbances were: agitation, anxiety and irritability (65%), followed by apathy, disinhibition, and dysphoria (59%). Visual memory (93%), sustained attention (86%), abstract reasoning (79%) and verbal memory (71%) were the most impaired cognitive functions. **Conclusions:** According to previous reports, our study reveals cognitive-affective and behavioral symptoms as frequent manifestations in patients with cerebellar infarcts. These findings are supported by: (1) the high presence of behavioral symptoms, including agitation, disinhibition, anxiety and irritability; (2) the disturbances in cognitive functions such as visual memory, sustained attention and abstract reasoning; (3) the presence of apathy and dysphoria as the main affective symptoms. The pathophysiology of cognitive-affective manifestations is still open to debate and the findings from present study suggest that some of these symptoms are related to disturbances of the frontal-pontine-cerebellar pathways.

P24. The effect of antidepressant treatment on executive function following stroke: a 2-year longitudinal study

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Background: Decline of executive function is common after stroke and may impair rehabilitation efforts with profound effects on outcome. There is little empirical evidence of effective biological treatments to improve executive function following stroke. Antidepressant medications administered after a cerebro-vascular accident prevent subsequent depression, improve activities of daily living, and reduce mortality independent of depression. We examined the effect of antidepressant treatment on executive function in subjects who suffered recent stroke. **Method:** Forty-seven patients who had stroke during the prior 6 months received an extensive executive function examination after a 3-month antidepressant treatment with either nortriptyline, fluoxetine, or placebo in a double-blind placebo-controlled study, and 2 years afterwards. Assessment of

executive function included the Controlled Oral Word Association Test, Wisconsin Card Sorting Test, and the Similarities, Digit Span, and Arithmetic subtests of the WAIS-R. They were combined to form an executive index score after z-transformation. Patients who developed complications after the initial stroke which could impair executive functions were removed from analyses. **Results:** No significant group effect was found at completion of the treatment phase. At 2 years however, patients in the placebo group showed deterioration of executive function whereas patients in the active treatment group showed clear improvement independent of depressive symptoms ($F = 12.1$, $df = 1, 45$, $p = 0.001$). **Conclusions:** Improvement of executive function following stroke appears to be fostered by treatment with antidepressants. These results suggest that modulation of the monoaminergic neurotransmission in the first 6 months after stroke might have positive effects on the re-organization of neuronal networks associated with prefrontal functions.

P25. Mirtazapine improves sleep in SSRI-treated depressed patients with Insomnia: a randomized controlled trial

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Background: Insomnia affects 90% of depressed patients and is a risk factor for new-onset and recurrent depression. The SSRI antidepressants induce or worsen insomnia and may need conjunctive use of a hypnotic in 40% of cases. Mirtazapine is a novel sedating antidepressant suggested to promote slow-wave sleep (SWS) and sleep continuity. The purpose of this study was to determine if mirtazapine may be used at low doses as a hypnotic in SSRI treated depressed patients with insomnia. **Method:** Eight patients who fulfilled DSM-IV criteria for depression, had ≥ 4 points on the HAM-D sleep measures and were under treatment with an SSRI, were included in a randomized, open-label trial to receive 2 mg of Lorazepam ($N = 4$) or 15 mg of Mirtazapine ($N = 4$) nightly for 2 weeks. HAM-D, insomnia and somnolence evaluation scales, and standard polysomnography were assessed at baseline and after treatment. Polysomnographic studies were scored blindly. **Results:** Preliminary data show marked tendencies in favor of Mirtazapine vs. Lorazepam to improve total sleep time (mean increase of 98 vs. 47 minutes), sleep efficiency (mean increase of 22.5% vs. 5.5%) and SWS (mean increase of 8.68% vs. mean decrease of 2.24%), although no statistical significance was yet obtained. Lorazepam improved sleep latency significantly more than Mirtazapine (mean decrease of 62.5 vs. 6.75 minutes; $p = 0.02$). Both treatments equally alleviated subjective reports of insomnia. Mirtazapine showed a tendency to cause less somnolence and to improve HAM-D scores. **Conclusions:** Low-dose Mirtazapine may be more effective as a hypnotic

than Lorazepam in SSRI treated depressed patients with insomnia.

P26. Restless Legs Syndrome induced by mirtazapine: a report of three cases

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Background: The literature reports three cases of Restless Legs Syndrome (RLS) induced by mirtazapine and one case of inherited RLS exacerbated by the same antidepressant. **Case Report:** Two women and one man aged 63, 50 and 41 years, respectively, were included in a clinical trial for patients with DSM-IV criteria for depression and ≥ 4 points on the HAM-D sleep measures. None had family or personal history of RLS and all were otherwise healthy individuals. Standard polysomnography at baseline revealed periodic leg movements in all three subjects during nREM sleep (index/h of 41.3, 30.2 and 67.6). Mirtazapine (15 mg/d) was administered nightly for 2 weeks following baseline registration, after which time participants developed symptoms compatible with RLS (e.g. bothersome paresthesias and jerks in both legs with relief upon movement). Likewise, periodic leg movements ascertained by polysomnography augmented slightly in the female patients (index/h 56.3 and 32) while they decreased in the male patient (61.6), due to an increase in his total sleep time. Symptoms in all three patients ceased immediately after discontinuance of Mirtazapine. **Conclusions:** Mirtazapine may induce RLS in susceptible patients and may interfere in this way with treatment adherence.

P27. Personality disorder symptomatology and neuropsychological function in a sample of patients with closed head injury

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Background: Despite an emerging literature characterizing the neuropsychological profiles of borderline, antisocial, and schizotypal personality disorders, relations between other PD traits and neurocognitive domains remain unknown. The study examines the relations among neuropsychological function and a broad range of personality disorder traits in order to delineate potential neurocognitive underpinnings of those personality disorders that have received less attention in the neuropsychological literature. **Method:** Associations among Millon Clinical Multiaxial Inventory-III personality disorder scales and eight neuropsychological domains were examined in 161 patients referred for neuropsychological evaluation following closed head injury. **Results:** Most personality disorder

scales were associated with some decrement in cognitive function, particularly speeded processing, executive function, and language, while histrionic and narcissistic scales had positive relations with neuropsychological functioning. **Conclusions:** Most personality disorder traits are associated with multiple neurocognitive functions, particularly those functions subserved by frontal and temporal brain regions.

P28. Treatment of cluster headaches with psilocybin and LSD: 53 cases

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The purpose of this study was to describe the use of psilocybin and lysergic acid diethylamide (LSD) for treatment of cluster headache. **Method:** Patients, recruited by online Internet surveys and interest groups, were questioned about their use of psilocybin and LSD to treat their cluster headaches. Of 383 patients identified, 53 consented to interviews and provided medical records, thus qualifying for our primary analysis. An additional 147 respondents provided quantifiable information on use of psilocybin to terminate cluster periods, but failed to provide medical records or declined to be contacted; these individuals were included in a secondary analysis. **Results:** Of the 53 participants in the primary analysis, 52 had used psilocybin and 9 had used LSD to treat their cluster headaches. Twenty-two (85%) of 26 psilocybin users reported that psilocybin had aborted attacks; 25 (52%) of 48 psilocybin users and seven (88%) of eight LSD users reported termination of at least one cluster period; and 18 (95%) of 19 psilocybin users and 4 (80%) of five LSD users reported extension of their remission period. Twenty-two (42%) psilocybin users and two (22%) LSD users experienced therapeutic effects with sub-hallucinogenic doses. In the secondary analysis, 76 (52%) of the 147 respondents reported that psilocybin terminated at least one cluster period. **Conclusions:** Our observations, although uncontrolled and largely retrospective, suggest that psilocybin and LSD may be effective in treating cluster attacks, aborting cluster periods, and extending remission periods in a manner unrelated to the hallucinogenic properties of these drugs. The authors do not endorse this treatment, however.

P29. Excessive variability of reaction time to auditory vs. visual stimuli in a subgroup of learning disabled subjects

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Background: Excessive variability of performance has been described in subjects with prefrontal dysfunction. We observed three different modality-specific patterns of RT variability in a CPT task in learning disabled subjects referred for clinical evaluations. The purpose of this study was to identify

possible explanations for this difference. **Method:** Of 37 learning disabled subjects (mean age 178.9 months [SD = 91.5]) assessed on a choice-reaction CPT, 3 different groups emerged. Group 1 (N = 13; 35.1%) had a significantly greater (> 1 S.D.) difference in the normalized coefficient of variation of reaction time (nCoVRT) to auditory stimuli in comparison to visual stimuli. In Group 2 (N = 20; 54.1%) the auditory/visual nCoVRT difference did not exceed 1 S.D. Group 3 (N = 4; 10.8%) Ss manifested greater visual than auditory nCoVRT. Ss underwent a standard neurological and neuropsychological assessment including language, prefrontal executive function, and academic performance. **Results:** The three groups did not differ in age or intellectual function. Roughly twice as many men as women were represented in Groups 1 and 2; in Group 3, men = women. nCoVRT differences were not because of slow simple RT (in fact, Group 1 had rapid simple RTs). Although more Ss in group 1 manifested impaired stimulus detection in both modalities, deficient stimulus detection did not appear correlated with differences in auditory/visual nCoVRT. Most Ss in Groups 1 and 2 were reading disabled. Group 1 Ss manifested receptive language deficits, difficulty integrating complex semantic concepts, and subtle prefrontal dysfunction (impaired switching on DKEFs verbal and figural fluency and/or difficulty switching set on the Wisconsin Card Sorting test). **Conclusions:** This pattern is suggestive of executive dysfunction in this subgroup of learning disabled patients.

Neuropsychology

P30. A novel brain-plasticity-based training program enhances memory in community dwelling elderly

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Background: Existing approaches for the treatment of age-related cognitive decline generally rely on pharmacological therapies or strategy learning. We have developed a novel brain-plasticity-based training program to enhance cognition in older adults. This training program exercises auditory and language systems in ways designed to strengthen the representational salience of speech input, improve signal-to-noise ratios, and drive neuromodulatory systems that control learning and memory. The current study reports results from a pilot randomized controlled trial of this training program in community dwelling healthy older adults. We hypothesized that subjects who participated in our novel brain-plasticity-based training program would improve on auditory memory tasks. **Method:** 162 normal older adults (mean age = 70.9, range = 60–87) were randomly assigned to treatment, active control, or no contact groups. Treatment and active control groups trained on a computer for 60 minutes/day, 5 days/weeks for approximately 40 hours. The Repeatable Battery of Assessment of Neuropsychological Status was administered pre- and post-training. This measure was dissimilar to the training exercises.

Results: The treatment group showed significant improvement on Auditory Memory index of RBANS ($p < 0.05$); no such relationship was seen in either of the control groups. Participants who completed 75 + % of the core speed of processing training exercise showed greater improvement. **Conclusions:** This novel brain-plasticity-based training can drive improvements in standardized measures of neuropsychological function in older adults. Participants completing more of the treatment show more benefits. These findings open up new, non-invasive and non-pharmacological avenues for treating age-related cognitive decline.

P31. The long-term effects of psycho-stimulants on ADHD children's cognitive functioning

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Background: The use of medication in the treatment of attention deficit hyperactivity disorder (ADHD) and its effects on the cognitive development of children is the subject of much concern, especially given the conflicting evidence found in the research literature concerning the effect on academic achievement. Much of the evidence is based on short-term studies with few investigations into the long-term effects of medication. **Method:** Purposive sampling procedures were used to obtain three groups of non-ADHD, ADHD on medication and ADHD non-medicated, with an age range of 6–18 years. All participants were working with the ICP (Individualized Cognitive Program) for at least 3 years. All participants were tested on the WISC-IV. **Results:** An ANOVA of change scores from Year 1 to Year 3 indicated that there were significant differences between the groups. The greatest positive gains were made by the ADHD non-medicated group. Medication appeared to effect scores for the sub-tests of coding, short-term visual memory; symbol search and overall general memory where, after 3 years, there was a significant reduction in scores on these sub-tests. **Conclusions:** These results would appear to conflict with much of the earlier research. Tentative explanations and suggestions of implications on overall general cognitive development are discussed.

P32. Differential performance of individuals with anxiety disorders and normal individuals using a standardized sensory-motor approach

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Background: Recent research has revealed a strong neurological connection between anxiety and alterations in neurological functioning. For example, differential size of the limbic system has been implicated in generalized anxiety disorder, panic attacks, and posttraumatic stress disorder. The presence of sensory-motor difficulties is relatively unknown in individuals with anxiety disorders. A standardized approach to the mea-

surement of sensory-motor skills allows an actuarial quantification of traditionally qualitative measurements. A normative approach to any component of a neurobehavioral exam is important, since even one unrecognized error on a sensory-motor exam may be pathognomic of dysfunction. The goal of the current study was to investigate the presence of sensory-motor deficits in individuals diagnosed with an anxiety disorder. **Method:** This study examined the sensory-motor performance of 146 individuals diagnosed with an anxiety disorder (mean age = 48.16 years [SD = 21.1]) and 950 healthy comparison subjects (mean age = 29.7 years [SD = 21.3]). All participants were administered the Dean-Woodcock Sensory Motor Battery (DWSMB). **Results:** Multivariate analysis of variance (MANOVA) revealed that the change in the combined dependent variable of the subtests for group participants was significantly related to diagnosis, Wilks' Lambda = 0.709, $F(35, 1059) = 12.435$, $p > 0.00$. Subsequent univariate tests indicated that normal individuals performed better on 15 sensory-motor tasks. **Conclusions:** Sensory-motor differences were present on cortical and subcortical sensory-motor skills. This poster will present the results of this study, as well as discuss the advantage of a standardized approach to the assessment of sensory-motor skills.

P33. Post-operative receptive and expressive language loss following tumor resection: a preliminary report

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Background: One of the most frequent concerns expressed by patients undergoing tumor resection is the loss of language. Although the amount of language loss is based on the interaction of medical, environmental, and psychological variables, there are empirical approaches based on neuropsychological test data to gather actuarial data. This study presents a preliminary analysis of a large scale data collection that is attempting to predict acute post-operative receptive and expressive language functioning based upon pre-operative language functions. **Method:** This is a preliminary report of an ongoing data collection study involving patients undergoing tumor resection. Ten participants (mean age = 39.70 years [SD = 7.90]) who had a brain tumor resection were selected for this initial analysis. Each participant received the Luria-Nebraska Neuropsychological Battery-Second Edition (LNNB-II) prior to, and following tumor resection. There was a mean of 57.10 days between administrations. **Results:** Paired sample t-tests revealed a mean decline of 1.00 T-score points in receptive language ($t = 0.102$, $p = 0.921$) and a mean decline of 0.400 T-score points in expressive language ($t = 0.647$, $p = 0.534$). **Conclusions:** Although the slight decline in language functioning is encouraging, the actual loss is likely underrepresented by the sample size. This presentation will present preliminary data analysis results, discuss plans for the ongoing study, and present results from a larger sample of patients.

P34. Predicting acute post-operative recovery of language functions with a pre-surgical comprehensive neuropsychological battery: a preliminary report

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Background: Patients undergoing tumor resection are generally made aware of the potential risks, including death, loss of motor skills, personality changes, and a general decline in cognitive functioning. However, the literature is lacking in empirical predictive studies of language loss based on pre-surgical cognitive functioning. This is a significant oversight, since an increased actuarial ability to predict post-operative language functioning allows the neurosurgical treatment team to adequately explain the sequelae to the patient and their family, as well as to manage recovery. This study is in the early stages of a large-scale data collection that is attempting to predict acute post-operative language functioning based upon variables related to tumor characteristics (i.e., size, type, histology, etc.) and the patient's pre-operative functioning. **Method:** This is a preliminary report of an ongoing data collection study involving patients undergoing tumor resection. Ten participants (mean age = 45.00 years [SD = 13.06]) who had a brain tumor resection were selected for this initial analysis. Each participant received the *Luria-Nebraska Neuropsychological Battery-Second Edition* (LNNB-II) prior to surgery, and the *Repeatable Battery for the Assessment of Neuropsychological Status* (RBANS) as soon as possible following the tumor resection. **Results:** Although the current sample was not large enough to permit multivariate linear regression, those results will be presented with a larger sample. However, preliminary bivariate Pearson correlations ranged between 0.007 and 0.566. **Conclusions:** This presentation will present preliminary data analysis results, discuss plans for the ongoing study, and present regression and correlational results from a larger sample.

P35. Post-operative cognitive decline following tumor resection: a comparison of crystallized versus fluid processing

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Background: Cognitive decline following tumor resection can result from radiotherapy, the tumor resection process, chemotherapy, or psychological stress. Although the location of the tumor can affect the nature of the cognitive decline, fluid intelligence, or the ability to solve novel problems, is thought to be more susceptible to trauma than crystallized intelligence. Knowledge of the level of fluid versus crystallized decline immediately following surgery can help guide treatment options, as well as predict recovery. The purpose of the current study was to investigate the use of a brief cognitive measure, the Wide Range Intelligence Test (WRIT), to investigate alterations in cognitive functions following brain tumor resection, as well

as to investigate the loss of fluid and crystallized abilities. **Method:** This is a preliminary report of an ongoing data collection study involving patients undergoing tumor resection. Sixteen participants (mean age = 49.81 years [SD = 19.36]) who had a brain tumor resection were selected for this initial analysis. Each participant received the WRIT prior to their surgical intervention and after their surgery (mean of 8.1 days between evaluations). **Results:** Paired sample t-tests revealed a mean decline of 2.56 points in crystallized intelligence ($t = 1.831, p = 0.087$) and a mean decline of 0.625 points in fluid intelligence ($t = 0.159, p = 0.876$). **Conclusions:** In the limited sample, the differential decline was the opposite of the traditional literature. However, this study is significant for measuring the decline immediately following the resection. Further data analysis of the larger sample will be presented and discussed.

P36. Predicting cognitive processing abilities using construction tasks with children with ADHD

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Background: Recent research has revealed children with attention deficit hyperactivity disorder (ADHD) demonstrate sensory-motor impairments compared to healthy comparison subjects. This is consistent with neuroimaging findings which indicate ADHD has a more pronounced right hemisphere component; right hemisphere impairment is associated with many sensory-motor deficits. Construction tasks are a common part of a neuropsychological evaluation and a hallmark of a mental status examination. Construction tasks are sensitive to global neurological impairment, since multiple processing domains are responsible for construction output. However, limited research exists regarding the ability of these powerful tasks to predict functional performance in individuals with ADHD. This study examined the associations between construction tasks and higher order cognitive processing for individuals with ADHD. **Method:** This study used multiple regression analyses between scores on the two construction subtests from the Dean-Woodcock Sensory Motor Battery (DWSMB) and 12 cognitive processing subtests from the Woodcock-Johnson Tests of Cognitive Ability-Revised. A sample of 118 participants (mean age = 11.78 [SD = 5.36]) diagnosed with ADHD participated in this study. **Results:** Regression analysis showed a moderate to large association (R^2 ranged from 0.113 to .454) between Clock and Cross Construction and Cattell-Horn-Carroll (CHC) theoretically based higher order cognitive processing tasks. Analysis of variance measures revealed that construction tasks predicted a significant proportion of the variance for each task. **Conclusions:** Performance on the Cross and Clock Construction tasks is linked to performance on higher order cognitive processing skills for individuals with ADHD. This poster will discuss the relationship between construction tasks and cognition, and discuss the implications of these results for practitioners and researchers.

P37. Diagnostic classification of cognitive disorder: a comparative study using standard age—corrected vs. age & education-corrected indices from the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS).

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Background:The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) is in common use, and standard indices are age-corrected. However, the influence of education on neuropsychological tests is notable and recently authors have suggested relevant corrections for geriatrics with specific levels of education (Gontkovsky, Mold, & Beatty, 2002). The current study compares diagnostic classification rates using age-corrected indices (ACIs) vs. age-education-corrected indices (AECIs) from the RBANS in a clinical geriatric sample presenting with mixed cognitive disorder vs. non-cognitive psychiatric disorder. **Method:** Of 71 cases examined, 32 were excluded because of incomplete data, because they were under 60 years of age, or because of advanced education. Two independent raters based diagnoses on all available medical information without reference to neuropsychological testing. There were 35 cases with mixed cognitive disorder and 4 cases with non-cognitive psychiatric disorders. Average age was 77.97 years (SD = 6.6), and average education was approximately 12 years (SD = 3.9). Diagnostic classification rates were compared between ACIs and AECIs using discriminant function analysis. **Results:** Using ACIs led to an 84.6% rate of correct classification. When AECIs were used, this increased to 92.4%. Examination of misclassified cases revealed more false positives than misses, as might be appropriate for a screening test. **Conclusions:** The difference in classification rates was notable and supports the use of education corrections. We encourage clinicians using the RBANS to be aware of education and the availability of score corrections. Demographic factors for those reclassified are further considered. Limitations in sample size and suggestions for future research are discussed.

P38. A longitudinal investigation of neuropsychological sequelae in blood or marrow transplantation

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Background: Cognitive dysfunction is a frequently observed complication in cancer patients and can be detrimental to quality of life, compliance and safety. Bone marrow transplantation (BMT), a treatment for cancer that utilizes high-dose chemotherapy and often radiation may increase the risk of treatment-related cognitive deficits, but prospective studies utilizing valid measures are absent from the literature. The study aimed to prospectively identify the nature of neuropsychological sequelae secondary to BMT by using standardized measures to assess cognitive functioning across several domains. **Method:** Consecutively admitted patients to Roswell Park Cancer Institute for autologous or allogeneic blood or marrow transplantation were invited to participate. Pre-transplant (admission), discharge and 100-day post-transplant assessments were completed by 46, 37, and 32 participants, respectively. The neuropsychological domains assessed included global cognitive functioning, new learning and memory, attention, visuospatial skills, language, and executive functioning. **Results:** Statistically significant decreases in performance were revealed from admission to 100-day test in domains of attention (TMTA, $p = 0.002$) and memory (HVLt-R Trial 1, $p < 0.001$; Trial 2, $p < 0.001$; HVLt-R Trial 4, $p = 0.005$), and from discharge to 100-day test on executive functioning (category fluency, $p = 0.001$). Effect sizes ranged from 0.22 to 1.01. **Conclusions:** BMT patients demonstrated cognitive deficits on tasks of attention, executive functioning, and memory that persisted at 100 days post-transplant. Future prospective research should include a comparison group to account for potential moderators and mediators of these effects. A brief neuropsychological exam as part of BMT patients' treatment is warranted.

P39. Isolated right temporal lobe stroke patients present with Geschwind Gastaut syndrome, frontal network syndrome and delusional misidentification syndromes.

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Background: Right temporal lobe syndrome elicitation presents a clinical challenge. Aside from occasional covert quadranthopias, heralding elementary neurological deficits are absent. **Method:** Isolated right hemisphere stroke patients were analyzed from a dedicated cognitive stroke registry. Patients were screened by a validated bedside and neuropsychological

test battery, including the Bear Fedio Inventory, frontal network syndrome (FNS) testing, emotional intelligence testing, frontal systems behavioral inventory, a Geschwind Gastaut (GG) syndrome inventory (three principal features; viscous personality, metaphysical preoccupation, altered physiological drives) and delusional misidentification syndromes (DMIS). NIH stroke scores were documented and lesion location identified with the 3 dimensional digitized Cerefy coxial brain atlas. **Results:** From the right hemisphere infarct (N = 3) or hemorrhage (N = 2) patients (413/1705, 24%), those isolated to the temporal lobe (N = 5, 0.3%) were analyzed further. Exclusion were coma, encephalopathy and medication related effects. The GG syndrome and FNS were present in all five patients. Other frequent syndromes included DMIS in four, mental diplopia in two, visuospatial dysfunction in two and amusia in one. No patient had a NIHSS greater than 1 (quadrantanopia in 3). Lesion location was mid and lateral temporal lobe (N = 2), middle and mesial temporal lobe (N = 1) middle temporal lobe (N = 1) and lateral temporal lobe (N = 1). **Conclusions:** The GG syndrome, FNS and DMIS are prominent syndrome constellations in stroke patients involving the right temporal lobe, and constitute the neurological deficit without heralding long tract signs. By extrapolation these syndromes may also be present in the general right hemisphere lesion population.

P40. Problem solving in individuals with partial callosal agenesis

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Background: Recent research revealed that people with complete agenesis of the corpus callosum (ACC) perform worse on problem solving tasks compared to normal controls. However, little is known about individuals with partial agenesis of the corpus callosum (pACC). The present research looked at the performance of individuals with pACC on neuropsychological tasks of problem solving. **Method:** Participants varied in degree of presence of the corpus callosum, ranging from 20-70%. The Categories Test, Raven's Standard Progressive Matrices (SPM), Rey-Osterreith Complex Figure Test copy (ROCFT), Trails B, and the Wisconsin Card Sorting Test (WCST) were given to eight individuals with pACC (age range 9-28) with normal intelligence (FSIQ: M = 98, SD = 16; VIQ: M = 100, SD = 18; PIQ: M = 97, SD = 15). **Results:** The participants' scores were converted to z or T-scores and compared to 0 for z scores and 50 for T-scores using one-sample T-tests. Though scores for some tests were not significant, scores for this pACC group were all lower than the normative mean. Scores for this pACC group were significantly lower for Trails B (M = -2.56; SD = 2.01; t = -3.605; p = 0.009); percent errors on the WCST (M = 35.17; SD = 10.83; t = -3.354; p = 0.02); and percent conceptual level response on the WCST (M

= 34.5; SD = 10.03; t = -3.783; p = 0.013). There was no significant difference on the ROCFT (M = -1.32; SD = 4.13; t = -0.905; p = 0.396); Categories Test (M = 38; SD = 16.69; t = -1.76; p = 0.139); and SPM (M = 34; SD = 37.07; t = -1.142; p = 0.297). **Conclusions:** These results suggest that individuals with pACC perform worse than the normative average on problem solving tasks. This lower performance is consistent with the performance of individuals with complete ACC.

P43. A potential test to identify vulnerability to coercion in early Alzheimer's disease

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Background: The validity of a last will and testament can be challenged based on questions about testamentary capacity and/or undue influence affecting the contents. Coercion by family members, care takers or organizations during the planning of a will can be a powerful influence and source of stress to Alzheimer's disease (AD) patients who may present early in the course of illness with frontal/executive dysfunction. The purpose of this study was to establish a new direction for research into cognitive competence assessment through the identification of a tool to evaluate vulnerability to coercion in early AD patients. **Method:** Medical and legal literature were surveyed to identify a current methodology for individually establishing general cognitive competence, testamentary capacity, and susceptibility to coercion in AD. **Results:** No commonly agreed upon guidelines were identified for these topics. No single psychometric test was identified that proved useful for the assessment of vulnerability to coercion in AD patients. Forensic psychology literature yielded an assessment, the Gudjonsson Suggestibility Scale (GSS), used to evaluate non-demented persons for the propensity to produce false confessions to crime. Studies using the GSS revealed that low intelligence, poor memory recall, low self-esteem, lack of assertiveness, anxiety and intrinsic suggestibility are factors which predispose to making a false confession. Some early AD patients presenting with executive dysfunction share characteristics with persons who are vulnerable to being coerced into making false confessions. **Conclusions:** The GSS, or a modified GSS, could prove useful in quantifying suggestibility in AD patients, thereby assessing for vulnerability to coercion.

P44. Consistency in malingering detection among compensation seeking patients

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Background: The number of subjects evidencing signs of symptom exaggeration depends on assessment method and

sample characteristics. The Test of Memory Malingering (TOMM) from 1996 and the revised California Verbal Learning Test (CVLT-II) from 2000 both provide estimates of test performance validity. A high, but non-redundant level of agreement between the two has been reported in an American study (Moore & Donders, 2004). The paper reports incidence of malingering in a sample of Norwegian outpatients referred for social benefits or litigation evaluation, by studying the level of agreement between TOMM and CVLT-II. **Method:** Seventy consecutively referred outpatients are included (age: 46 years; level of education: 12 years; gender: 69% male; IQ: 94); all sought compensation for claimed brain dysfunction. Tests measures reported are TOMM, CVLT-II, RCFT, and WAIS-III. **Results:** Twenty patients (29%) were found to malingering using TOMM and 12 (17%) using CVLT-II criteria. Of the 20 invalid TOMM protocols, 12 were confirmed below cut-off on CVLT-II whereas all invalid CVLT-II protocols were below cut-off on TOMM ($\kappa = 0.68, p < 0.001$). Irrespective of criteria, groups did not differ significantly in verbal IQ but malingerers obtained poorer performance IQ and impaired memory scores. **Conclusions:** A substantial minority of Norwegian outpatients seeking social benefits or pursuing litigation is found to exaggerate neuropsychological deficits. Consistency in detecting malingerers is satisfactory but not perfect with TOMM being a more sensitive instrument than CVLT-II. Caution should be taken when drawing conclusions since unconscious symptom exaggeration and cognitive deficits may also cause poor test performance.

P45. Somatization and malingering of cognitive deficit in twelve medicolegal cases of Chronic Fatigue Syndrome

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Background: In spite of recent growth in disability claims about Chronic Fatigue Syndrome (CFS), a review of the empirical literature demonstrates scattered and unreliable findings concerning the relationship between CFS and neuropsychiatric and/or neuropsychological impairment. While some studies demonstrate no impairment, others indicate that patients may show declines in processing speed and complex attention. It has been suggested that when an association is found, it is mediated by the presence of depression. However, it is also likely that the relationship is mediated by effort, especially in cases where there is incentive to feign. The purpose of this case study was to examine the results of personality test data, multiple cognitive effort indices and neurocognitive findings in 12 patients in litigation who claimed cognitive symptoms secondary to medical diagnosis of CFS. **Case Report:** Eleven of the patients revealed evidence of somatization (based on background information and the results of psychological testing), one was shown to be malingering (based on the failure of indicators of non-credible performance) and five met criteria for both somatoform disorder and malingering. Of

the 12 patients, only two somatoform patients who were also depressed showed credible evidence of neuropsychological dysfunction. **Conclusions:** Analysis of these cases suggests the presence of three subtypes of CFS litigants: somatoform (with or without depression), malingering, or both. Analysis also shows that the presence of depression is related to observed cognitive dysfunction. Also revealed is the importance of assessing levels of effort and motivation in this population.

P46. A case of mental retardation and malingering

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Background: The stakes for successfully feigning intellectual deficit are now quite high since the 2002 Supreme Court, in *Atkins vs. Virginia*, ruled that the execution of persons with mental retardation (MR) is unconstitutional. While recent estimates indicate that approximately 11% of people in maximum security and Death Row meet criteria for the diagnosis, a substantial percentage of "normal" individuals will likely be inclined to try and feign impairment. The possibility, however, that an individual with true MR might try to feign should not be overlooked. **Case History:** We present the case of a 41-year-old male prison inmate with documented history of MR based on school records from age 18 (FSIQ = 58) seen for neuropsychological exam to determine competency to stand trial. He was found to fail effort indicators, including the Test of Memory Malingering (Trial 2 = 4/50). His score on Finger Tapping was also below standard cutoffs, even when compared to an MR validation sample. Further, the patient also claimed to have unlikely difficulties (e.g., how to recite the alphabet despite attending school for 12 years). **Conclusions:** Although their efforts may be somewhat unsophisticated and easily detected, it is important to recognize the possibility that individuals with MR may also attempt to feign neuropsychological impairment when there are incentives to do so. Subjects with MR are frequently excluded from effort test validation samples. Additional research is needed to investigate performance on effort indicators in this population, including determination of which techniques are most effective.

P47. An examination of the relationship between IQ and effort test performance

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Background: There is little established validity for using our current effort indicators with persons who are mentally retarded (MR), as this special clinical population is not typically found in validation samples, which are instead based on individuals with "normal" intelligence. This is particularly alarming in light of the fact that MR individuals are known to

have difficulty with areas of cognition that many of our effort tests rely upon. The way in which IQ is related to performance on effort tests is of both clinical and medicolegal significance. The purpose of this study is to examine the predictive accuracy of commonly used effort indices across a range of IQ levels with the prediction that false positive errors would be higher in groups of lower intellectual functioning. **Method:** Subjects were a clinical sample of 200 patients with no identified incentive to feign and with no reported history of psychotic illness or dementia. **Results:** Results were analyzed by comparing the specificities of each effort indicator across a series of IQ ranges (50–59, 60–69, and so on thru 130–139). As predicted, specificity values for most indicators dropped to unacceptable levels (i.e., <0.90) at less than average levels of IQ. **Conclusions:** These results need to be further explored, but imply that lower cutoffs may be more appropriate for individuals with lower levels of intellectual functioning; more stringent cutoffs are appropriate when a patient's estimated levels of premorbid functioning are higher than average.

P48. The effects of different EEG biofeedback protocols on attention networks in the two hemispheres of learning disabled young adults

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Background: EEG biofeedback (EEGBF) is an operant conditioning method for modulating one's own ongoing EEG pattern. Clinical reports suggest that EEGBF is effective for modulating attention in adults with learning disabilities. Do different EEGBF protocols have differential effects on attention networks in each cerebral hemisphere of young adults with learning disabilities? **Method:** We developed a new hemifield tachistoscopic instrument, the Lateralized Attention Network Test (LANT), for measuring the three networks of attention, conflict, spatial orienting, and alerting, in each hemisphere. The LANT adapts Posner and associates' Attention Network Test (ANT). The LANT was administered to two groups of 20 young Israeli adults with learning disabilities, including ADHD, before and after a 20 session protocol of EEGBF. One group was trained at electrode C3 or C4 to arrest power in the Theta band (4-8 Hz) and increase power in the Beta band (12-18 Hz). The other group was trained at electrode Fz or Cz. **Results:** Before EEGBF, the first group exhibited increased conflict and reduced alerting. EEGBF training at C3/C4 decreased conflict and increased alerting, thus normalizing the attention profile. By contrast, the second group showed an asymmetric attention deficit, larger in the left hemisphere, and EEGBF training at Fz/Cz failed to normalize attention. **Conclusions:** The LANT is a sensitive measure of the attention networks, conflict, orienting, and alerting, in each hemisphere. Using this measure, we showed that EEGBF training to arrest Theta and increase Beta can normalize attention when applied at certain sites (C3/C4) but not at others (Fz/Cz).

POSTER SESSION II—FEBRUARY 21, 2006—5:00 P.M. TO 6:30 P.M.

Dementia

P1. Characterization of a large kindred with frontotemporal dementia that affects men and women differently

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Background: Frontotemporal dementia (FTD), a common form of non-Alzheimer's dementia, generally occurs sporadically, but familial cases, typically associated with movement disorders or motor neuron disease, have been described. Further investigation of FTD families may lead to an understanding of mechanisms responsible for this disease. Characterization of a large kindred with a unique and progressive FTD was initiated to better understand different manifestations of and mechanisms responsible for FTD. **Method:** Twenty-three family members were evaluated with comprehensive neuropsychological testing, stratified by age and gender. DNA was isolated from blood samples, processed using PCR, and *tau*, *presenilin 1* and *presenilin 2* genes were sequenced. **Results:** All family members have progressive impairment of frontal executive functions and visuospatial abilities. However, only women develop language, social and occupational dysfunction, meeting the criteria for FTD. Associated neurological disorders are not present until very late in the course of the disease. No DNA mutations were noted in *tau*, *presenilin 1* or *presenilin 2* genes isolated from these family members. **Conclusions:** In conclusion, we have identified a family with a unique progressive dementia, consistent with FTD that differentially affects men and women and is not associated with genes commonly associated with FTD or early onset Alzheimer's dementia.

P2. Early and late onset Alzheimer's disease patients differ in presenting clinical characteristics

Eliot A. Licht, Aaron M. McMurtray, Ronald E. Saul, Mario F. Mendez (VA Greater Los Angeles Healthcare System, Department of Neurology/Neurobehavior, Los Angeles, CA; University of California, Los Angeles, Department of Neurology, Los Angeles, CA) eliotlicht@earthlink.net

Background: Early investigators suggested that Alzheimer's disease (AD) and senile dementia were different disorders; however, neuropathological studies removed this distinction. Early studies had found clinical differences between Early and Late Onset AD. In order to clarify whether these were distinct clinical syndromes, we compared presenting features of patients with (nonfamilial) AD with early vs. very late ages of onset. **Method:** The study identified 45 patients who presented

initially to a Veteran's Affairs Medical Center Memory Disorders Clinic, met criteria for Clinically Probable AD, and had very late ages of onset (>83 years). They were compared to 45 patients who met similar criteria for AD but had early ages of onset (<65 years). In addition to demographic variables, the groups were compared on neuropsychological variables including tests of attention, language, memory, perception, and frontal-executive functions. **Results:** Except for age, there were no significant differences between Early and Late Onset AD patients in demographic variables and on most neuropsychological measures. The Late Onset AD patients, however, were significantly more impaired at presentation than Early Onset patients in frontal-executive functions (Luria hand sequence, alternating programs, and verbal fluency [all $p < 0.02$]). **Conclusions:** These findings support the original belief that AD in young vs. old manifests as different clinical syndromes. These findings differ from those reported in the earlier studies and suggest that AD in the very old preferentially impairs frontal lobe functions, possibly indicating an age-related vulnerability of this critical region of the brain.

P3. Presence of leukoariosis affects cognitive performance after lacunar stroke

Aaron M. McMurtray, M.D., Eliot Licht, M.D., Ronald E. Saul, M.D., Mario F. Mendez, M.D., Ph.D.;
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Background: Leukoariosis is variably present in patients presenting with cognitive impairment after lacunar infarct. Presence of leukoariosis indicates increased severity of small vessel vascular disease, which may affect cognitive performance. This study investigated the effect of leukoariosis on patients presenting with cognitive impairment after lacunar stroke. **Method:** We identified 57 patients who presented sequentially over a 4-year period to a Veteran's Affairs based Memory Disorders clinic with cognitive impairment associated with lacunar stroke detected by magnetic resonance imaging (MRI). These patients were divided into quartiles according to degree of leukoariosis present on MRI. Cognitive performance was assessed at presentation with a neuropsychological battery. Mean performance scores were compared between lacunar stroke patients with and without leukoariosis using two-tailed t-tests, and the relationship between degree of leukoariosis and cognitive performance was further evaluated by Pearson correlation. **Results:** Patients with both lacunar infarct and leukoariosis had significantly lower mean performance scores on the Mini-Mental State Examination (MMSE, $p = 0.03$), naming ($p = 0.02$), verbal fluency for animals ($p = 0.004$), constructional ability ($p = 0.04$), and verbal ($p = 0.01$) and non-verbal ($p = 0.03$) memory, compared to those with lacunar infarct without leukoariosis. The degree of leukoariosis significantly negatively correlated with MMSE score, verbal fluency for animals, verbal and non-verbal memory. **Conclusions:** The presence of leukoariosis in patients with cognitive impairment after lacunar infarct is associated with worse performance in

multiple cognitive domains. These findings suggest that lacunar infarct plus leukoariosis is a common etiology for vascular dementia.

P4. The social dysfunction scale in patients with frontotemporal dementia

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Background: Social dysfunction is a core diagnostic feature of frontotemporal dementia (FTD). Decreased social competence, however, may be difficult to quantify, particularly in early stages of the disease. Clinicians need a measure that evaluates social dysfunction in patients with FTD. This study evaluated the validity, sensitivity, and specificity of the Social Dysfunction Scale (modified from Schneider et al, 1996) in FTD. This instrument rates items for social extraversion, warmth, influence, insight, openness, appropriateness, and maladjustment on a 5-point Likert scale. **Method:** We administered the Social Dysfunction Scale to 12 patients who met Consensus Criteria for FTD, 12 with Alzheimer's disease (AD), and 12 healthy comparison subjects. The three groups were comparable (FTD: 6 men, age 61.8 [SD = 3.9 years, education 14.2 years [SD = 3.4], Mini-Mental State Exam 23.1 [SD = 3.1, CDR 1.6 [SD = 0.7]; AD: 6 men, age 65.5 years [SD = 3.5], education 13.9 years [SD = 2.6], MMSE 22.5 [SD = 3.1], CDR 1.9 [SD = 1.0]; healthy comparison subjects: six men, age 63.8 years [SD = 4.8], education 14.6 years [SD = 3.4], MMSE 29.3 [SD = 0.8]). **Results:** The scale had convergent validity in that it corresponded with the clinical symptoms, and the inter-rater reliability for two independent raters was 0.92. There were overall group differences on the Social Dysfunction Scale ($F = 22.5$, $p < 0.001$), and the FTD patients had significantly greater Social Dysfunction compared to the AD patients ($F = 8.8$, $p < 0.01$). Using receiver operator curves, the scale had an optimal cutoff of >96 with a sensitivity of 100% and a specificity of 91.7% for FTD. **Conclusions:** These findings suggest that the Social Dysfunction Scale is a valid and reliable instrument with sensitivity and specificity in the assessment of patients with FTD.

P6. The Emotional Blunting Scale in patients with frontotemporal dementia

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Background: Emotional blunting is a core diagnostic feature of frontotemporal dementia (FTD). This symptom, however, may be difficult to characterize or quantify particularly in early stages of the disease. Clinicians need a measure that evaluates emotional blunting in patients with FTD. This study evaluated the validity, sensitivity, and specificity of the Emotional Blunting Scale (Abrams and Taylor, 1978) in FTD. This instrument

measures lack of pleasure seeking behavior, affective blunting, and cognitive blunting on a 3-point scale. **Method:** We administered the Emotional Blunting Scale to 12 patients who met Consensus Criteria for FTD, 12 with Alzheimer's disease (AD), and 12 healthy comparison subjects. The three groups were comparable (FTD: 6 men, age 61.8 years [SD = 3.9], education 14.2 years [SD = 3.4], Mini-Mental State Exam (MMSE) 23.1 [SD = 3.1], CDR 1.6 [SD = 0.7]; AD: 6 men, age 65.5 years [SD = 3.5], education 13.9 years [SD = 2.6], MMSE 22.5 [SD = 3.1], CDR 1.9 [SD = 1.0]; healthy comparison subjects: six men, age 63.8 years [SD = 4.8], education 14.6 years [SD = 3.4], MMSE 29.3 [SD = 0.8]). **Results:** The scale had convergent validity in that it corresponded with the clinical symptoms, and the inter-rater reliability for two independent raters was 0.83. There were significant overall group differences on the Emotional Blunting Scale ($F = 384.3, p < .001$), and the FTD patients had significantly greater emotional blunting compared to the AD patients ($F = 19.59, p < .001$). Using receiver operator curves, the scale had an optimal cutoff of >12 with a sensitivity of 100% and a specificity of 100% for FTD. **Conclusions:** These findings suggest that the Emotional Blunting Scale is a valid and reliable instrument with sensitivity and specificity in the assessment of patients with FTD.

Imaging

P7. Implicit learning and depression in mild cognitive impairment

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Background: To date, no studies of implicit learning and depression in mild cognitive impairment (MCI) have been reported. The purpose of this study was to investigate implicit learning and depression in MCI, and to determine whether some forms are impaired while others remain preserved when MCI patients with depression are compared to those without depression. **Method:** Six MCI patients with depression were age- and gender-matched to six patients without depression. Participants completed two different paradigms of implicit learning—contextual cueing and sequence learning. In the former, subjects learn to use repeated spatial configurations to facilitate search for a target. In the latter, they learn to use subtle sequence regularities to respond more quickly and accurately to a series of events. Subjects are not informed of the regularity embedded in both tasks. **Results:** For each task, the difference in performance between repeated and novel events was analyzed on response time and accuracy measures, and the data were submitted to mixed-design analyses of variance

(ANOVAs). Results revealed MCI patients with depression were significantly slower at performing both tasks. Further, there was a dissociation: MCI patients with and without depression both showed sequence learning. In contrast, only those without depression showed contextual learning. **Conclusions:** Contextual learning, which relies on the medial temporal lobe system, is affected particularly in MCI patients with depression, implicating further impairment of this system by depression. Sequence learning, which relies on the fronto-striatal system, appears to be preserved. These findings have implications for potential intervention programs that can utilize the relatively preserved implicit system to delay further cognitive decline in MCI.

P8. Cerebral activation in response to negative and positive emotionally valenced images in neurosurgical patients using fMRI.

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Background: Emotion is defined as a set of reactions produced by an evocative stimulus, which involves perception, expressive motor behavior, subjective experience, physiological arousal, and goal-directed behavior. Emotions with positive and negative valence are thought to activate different brain regions. The purpose of the study was to determine the neural activity during the presentation of images with negative and positive valence in neurosurgical patients. **Method:** Two neurosurgical patients were stimulated with 40 positive, 40 negative, and 40 neutral pictures selected from the International Affective Picture System (IAPS) database (Lang et al., 1997). Images were randomly presented in block design. GE 3.0T equipment BOLD technique was used in order to get the cerebral EPI images T2-weighted, 30 axial images with a matrix of 64x64 and 24cms FOV, 40 milliseconds echo time and 3000 TR. Anatomical images were correlated with high resolution anatomical T1 and SPGR images. **Results:** Case 1 MRI shows an anaplastic glioma. Activation was found in the anterior cingulate and left insular cortex, ventral to the corpus callosum splenium. Case 2 Magnetic resonance imaging MRI shows a Meningioma. Activation was found in the corpus callosum, cingulate and right frontal cortex. **Conclusions:** Emotional responses to pictorial stimuli were significantly and positively correlated with activity in the anterior cingulate, insular cortex, and frontomedial cortex. Frontal cortex activity associated with emotional evaluation. Many studies have reported that the amygdala plays a crucial role in emotional behavior in both animals and humans. In spite of these findings, in this research, probably due to the condition of the patients, no activation was found in this area.

P9. Anatomical correlates of executive functioning in Parkinson's disease: an fMRI study of planning ability

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Background: Executive memory declines in Parkinson's disease (PD) for unclear reasons. Little is known about possible changes in the neural circuitry of these deficits, although prefrontal cortical changes have been implicated. We used a computerized task similar to the Tower of London to study brain bloodflow changes during planning in PD patients. We hypothesized that PD patients would show reduced dorsolateral frontal bloodflow compared to controls. Our secondary hypothesis was that PD patients would recruit additional regions to compensate for dorsolateral dysfunction. **Method:** Patients with early PD (N = 5) who were cognitively intact and age matched healthy comparison subjects (N = 5) were scanned using functional magnetic resonance imaging (fMRI) during performance of a planning task developed for this study, the Tower of Catonsville (TOC). Statistical parametric mapping (SPM2) fixed effects subtraction analyses were used to compare bloodflow changes between the groups. **Results:** Performance on the TOC showed similar accuracy for PD patients and controls (p = 0.22). Compared to controls, PD patients had decreased dorsolateral prefrontal bloodflow (p < 0.001) and relatively increased superior parietal bloodflow (p < 0.001, uncorrected). **Conclusions:** Changes in dorsolateral prefrontal bloodflow during planning in PD may represent dysfunction of these regions in PD secondary to dopaminergic deficits, along with compensatory increases in parietal cortex to facilitate spatial abilities. Understanding of how PD patients may use alternate brain regions to enable them to perform executive tasks may help in devising behavioral and pharmacological interventions.

P10. Structural neuroimaging correlates of cognitive impairment in HIV/AIDS

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Background: HIV/AIDS results in neuropsychological abnormalities that become more prevalent with increasing severity of the infection. With the increased use of combination anti-retroviral therapy (CART), the nature of the neurological complication of HIV/AIDS is changing. This study aimed to identify regional brain atrophy on a voxel-by-voxel basis among HIV/AIDS patients and to correlate these changes with patterns of neuropsychological impairment. **Method:** 54 AIDS patients and 21 HIV-seronegative controls underwent SPGR anatomical magnetic resonance imaging (MRI) studies of the

brain as part of a comprehensive neurobehavioral evaluation. The volumes were then processed using standard procedures for a modulated voxel-based morphological analysis. Grey matter volumes were analyzed on a voxel-by-voxel basis using SPM2. **Results:** There were significant differences between the AIDS subjects and controls in terms of both grey and white matter integrity. However, more important were differences within the AIDS subjects as a function of degree of neuropsychological impairment. Among the cases with mild cognitive dysfunction, the atrophy was predominantly cortical, including parietal and anterior cingulate regions. However, among those with severe impairment, the atrophy was focused in the ventral putamen and associated subcortical structures. The differences between the two groups of impaired subjects were also statistically significant. **Conclusions:** In the era of CART, the nature of the neuropsychological impairments in HIV/AIDS is changing. Subjects with mild or severe cognitive impairments are associated with different patterns of brain regional atrophy, and may be caused by different pathological processes.

P11. Evaluation of therapeutic response to donepezil by FDG-PET

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Background: Donepezil hydrochloride (donepezil) is a centrally selective inhibitor of acetylcholinesterase which is used for the symptomatic treatment of Alzheimer's disease (AD). Recently, the impact of donepezil in patients with AD has been reported using positron emission tomography (PET) or single photon emission computed tomography (SPECT). This study is to evaluate usefulness of fluorine-18-fluorodeoxyglucose (FDG)-PET in assessing the therapeutic response of Donepezil to AD. **Method:** The study participants included nine outpatients diagnosed with AD. The patients underwent FDG-PET before initiating donepezil therapy and after 12 weeks of medication. Cognitive change was measured using the Japanese version of the Alzheimer's disease Assessment Scale cognitive subscale (ADAS-Jcog) and the group was divided into Responders and Non-responders based on these results. We used FDG-PET to investigate glucose metabolism of the brain and measured FDG uptake of regions of interest (ROIs) in each lobe of the brain. Then the ratios of the post-treatment uptake to pre-treatment uptake were determined. **Results:** In the responders, the mean ratios of the frontal, temporal, occipital, parietal and temporoparietal lobes were 2.42, 1.78, 1.23, 0.97 and 1.23 respectively. The mean ratios of the non-responders were 0.74, 0.84, 0.81, 0.99 and 0.84 respectively. Significant differences were found between the ratios of responders and non-responders in the frontal, temporal and occipital lobes (p < 0.05). **Conclusions:** Findings suggest that FDG-PET would be useful for monitoring response to donepezil.

P12. 3DSRT evaluation of responses of Alzheimer type dementia to donepezil hydrochloride therapy

Shigeaki Higashiyama, Joji Kawabe, Hiroshi Hashimoto, Hisanori Akiyama, Kenji Torii, Etsushi Kawamura, Koki Inoue, Susumu Shiomi, Yuichi Inoue

Background: Dementia of the Alzheimer's type (DAT) has been diagnosed objectively by using single photon emission computed tomography (SPECT). Donepezil is available for the symptomatic treatment of DAT. In a quantitative evaluation of therapeutic response in DAT, to compare with the regional cerebral blood flow (rCBF) of various lesions before and after treatment, uptake in some cerebral regions of interests (ROIs) were measured. But ROI analysis has problems such as poor reproducibility and lack of objectivity. The aim of this study was to investigate the evaluation of therapeutic response by three-dimensional stereotaxic ROI template (3DSRT), fully automated ROI analysis software, which can objectively estimate rCBF. **Method:** SPECT studies and Alzheimer's Disease Assessment Scale-cognitive component-Japanese version test ADAS-J-cog, as cognitive function test were performed for 22 patients (16 women, six men, mean age = 73.6 years) who were diagnosed with DAT. On 3DSRT, we compared ratios of the rCBF values of the parietal lobes, temporo-occipital lobes, hippocampus, corpus callosum and the frontal lobes/cerebellar hemispheres before and after medical treatment. We attempted to determine the optimal cut-off number of areas exhibiting improved blood flow for judgment and improvement of cognitive function in response to treatment. **Results:** The number of cases exhibiting changes in cognitive function was greatest (18 of 22 cases) when the cut-off number of areas exhibiting improved blood flow was set at 5. **Conclusions:** The possibility of evaluation of therapeutic response to donepezil in patients with DAT using 3DSRT was thus demonstrated by our study.

P13. Sub-regions of the human anterior cingulate cortex and alexithymia

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Background: Anterior cingulate cortex (ACC), a convergence zone for emotional and cognitive information is a putative neural underpinning for alexithymia, a condition characterized by reduced emotion (re)cognition. While the ACC may show age-related structural changes, alexithymia has been found to be associated with older age. This study aimed to correlate gray matter (GM) volumes of three ACC sub-regions in the magnetic resonance images (MRI) of healthy volunteers with the subjects' alexithymia scores. **Method:** Twenty-four healthy volunteers aged 25 to 79 received assessment of alexithymia using the TAS-R and an MRI scan. Based on function, histological features, and neural connections, three ACC sub-regions (dorsal, rostral, subgenual) were manually traced ac-

ording to in-house developed tracing guidelines and locally developed software (BRAINS2). TAS-R factors, such as difficulties in identifying and verbalizing feelings, and poor ability to separate somatic from emotional sensations (Factor 1), and externally oriented thinking (Factor 2) were correlated with ACC sub-regions. **Results:** Rostral ACC GM volumes inversely correlated with age (right $r = -0.45$, $p = 0.03$; left $r = -0.38$, $p = 0.07$). Age correlated with TAS-R total score, Factor 1 and Factor 2 (respectively $r = 0.34$, $r = 0.28$, $r = 0.37$). The right rostral ACC inversely correlated with the TAS-R Factor 2 ($r = -0.48$, $p < 0.02$), indicating that greater externally oriented thinking was associated with smaller right rostral ACC volume. No other correlation was found to be statistically significant. **Conclusions:** Smaller gray matter volumes of the right rostral ACC were associated with greater propensity to experience events in a non-emotional fashion. An age-associated reduction of GM in rostral ACC may be responsible for the greater alexithymia scores reported in older age.

P14. Enlarged right superior temporal gyrus in youth with autism

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Background: Despite mounting evidence from neuroimaging studies suggesting abnormalities of the superior temporal gyrus (STG) in autism, a limited number of studies have been conducted specifically examining its size. This investigation tested the hypothesis that STG volume is abnormal in autism. **Method:** Subjects included 18 right-handed, non-mentally retarded child and adolescent men with autism and 20 healthy controls, group-matched for gender, handedness, age, IQ, and total brain volume (TBV). Diagnosis was based on the Autism Diagnostic Interview-Revised and Autism Diagnostic Observation Schedule. Magnetic resonance imaging (MRI) scans were obtained on a 1.5-T scanner and volumetric measurements were performed using the BRAINS2 software package. The STG was divided into anterior and posterior sections, and manually traced along gyral boundaries as seen in coronal views. An automated algorithm used cross-sectional area and slice thickness to compute volume measurements. Left-right asymmetry was assessed using the symmetry index. **Results:** One subject in the control group was identified as an outlier for most of the volumetric measurements. When this individual was excluded from the analysis, total STG as well as right and right posterior STG volumes significantly increased in the autistic group, especially after controlling for TBV. No significant group differences were noted in asymmetry. When this outlier was included, no group differences were observed in STG measurements. **Conclusions:** This preliminary investigation suggests right STG volumetric alterations in autism. The STG is involved in processing language and auditory information which are functions relevant to language/communication deficits, a defining feature of this pervasive developmental disorder.

P15. Evaluating the possibility of estimating therapeutic response to donepezil in patients with DAT using eZIS

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Background: Donepezil is not effective for all patients with dementia of the Alzheimer's type (DAT). Estimation of the therapeutic response to donepezil before the start of treatment is anticipated. eZIS is a new statistical imaging analysis system permitting brain standardization. In this study, we examined the possibility of estimating therapeutic response to donepezil in patients with DAT, using eZIS. **Method:** Sixteen patients of DAT were recruited. They received daily oral doses of donepezil (5 mg/d). Each patient underwent the Alzheimer's Disease Assessment Scale-cognitive component-Japanese version (ADAS-Jcog) test, a recognition function test, and brain perfusion single photon emission computed tomography (SPECT) examination at the time of initial evaluation. Each test was followed clinically by a second ADAS-Jcog test 12 weeks later. All data of SPECT images were analyzed by the eZIS software. By Z-values for each side of the posterior part of the cingulate gyrus, parietal lobe, the posterior part of the temporal lobe and hippocampus, scores of these eight regions were determined. The total numbers of scores were compared with changes in the results of ADAS-Jcog tests before and after donepezil medication. **Results:** The total scores for seven patients in whom improvements in ADAS-Jcog tests were found ranged from 0 to 8 (mean = 3.7). The total scores for the other nine patients in whom improvement was not observed ranged from 5 to 11 (mean = 8.8). A significant difference ($p < 0.05$) was recognized between these two groups (Mann-Whitney U-test). **Conclusions:** The possibility of estimating therapeutic response to donepezil in patients with DAT using eZIS was demonstrated by our study.

P16. Effect of D2/D3 receptor agonist pramipexole on cerebral metabolism in bipolar II depression

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Background: An indirect line of evidence suggests a deficiency of the central dopaminergic system in bipolar depression. Preliminary studies have shown antidepressive effects of pramipexole, a dopaminergic D2/D3 receptor agonist, in treating depressed bipolar II patients. The current study used 18F-fluorodeoxyglucose (18FDG) positron emission tomography (PET) to investigate the effect of the D2/D3 receptor agonist pramipexole on brain metabolism in bipolar II depression. **Method:** PET scans were acquired pre- and post-treatment in 15 depressed bipolar II patients (12 F; mean age 43, sd = 10.7) in a

6-week double-blind, placebo controlled trial of pramipexole (PRAM) as an adjunct to mood stabilizer medications. Changes in regional metabolism were compared between PRAM and placebo (PB) groups using region-of-interest (ROI) and voxel-by-voxel analysis (SPM2). The relationship between metabolic changes and clinical improvement was also evaluated. **Results:** ROI analyses showed that PRAM treatment was associated with significantly decreased metabolism in the R anteromedial prefrontal cortex (PFC) ($p = 0.036$), bilateral orbital PFC ($p < 0.05$), and L ventrolateral PFC ($p < 0.1$). Similar findings were obtained from the whole-brain analysis. Improved mood was associated with decreased activity in the L pregenual, L subgenual PFC, and L medial thalamus. Lower anxiety scores were correlated with decreased metabolism in the L medial thalamus. **Conclusions:** Pramipexole treatment in bipolar II depression was associated with decreases in metabolic rates in brain regions previously shown to be abnormally elevated in the baseline depressed condition, such as the ventrolateral and anteromedial PFC, consistent with the effects of other somatic antidepressant treatments. In contrast, pramipexole treatment had no effect on metabolism in other regions, such as the amygdala, which have been found to be reduced with SSRI and TCA medications.

P18. Brain metabolic abnormalities in Tourette's syndrome: a magnetic resonance spectroscopic imaging study

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Background: Though neuroimaging studies have reported neurobiological abnormalities in autism, the underlying tissue abnormalities are unknown. The purpose of this study was to examine regional and global cellular neurochemistry in autism using proton magnetic resonance spectroscopic imaging (MRSI). **Method:** Proton MRSI examinations were conducted in 27 men with autism (age 10.0 years [SD = 3.3]) and 30 male comparison subjects (age 11.3 years [SD = 2.6]). Estimates of mean gray and white matter levels of the metabolites N-acetylaspartate (NAA), creatine, choline, myo-inositol, and Glx (glutamate + glutamine) were made by regression analysis of whole-slice MRSI data and compared between groups. In addition, localized spectra were analyzed and metabolite levels were quantified and compared between groups. **Results:** Patients with autism exhibited significantly reduced levels of whole-slice gray matter NAA (8%, $p = 0.01$), Glx (10%, $p = 0.0001$) and myo-inositol (8%, $p = 0.01$) compared to control subjects. No differences were detected in whole-slice white matter metabolite levels. Regional analysis also revealed deficits of Glx in frontal and occipital gray matter and the thalamus and reduced NAA in the frontal gray and white matter and occipital gray matter. **Conclusions:** These results indicate widespread reductions in neuronal integrity and dysfunction of glutamatergic neurons. These neuronal abnormalities may

be associated with the aberrant cortical connectivity hypothesized to underlie the disorder.

P19. Amygdalar-cortical functional connectivity during estrogen infusion: relevance to the visuospatial attention network

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Background: Amygdalar-cortical interactions are known to be central to many affective and cognitive functions. Because the amygdala has a greater estrogen (E2) receptor density than the cortex, many of the neuropsychological functions that correlate with changes in estrogen levels (Drake et al, *Neurology* 2000; 54:599-603) may be primarily mediated at the amygdala, with subsequent functional effects being manifested in the cortex. The aim of this study was to determine whether amygdalar-cortical interactions change as a function of estrogen levels. We evaluated amygdalar-cortical functional connectivity during low and high dose estrogen infusion. **Method:** FDG-PET scans were collected in eleven postmenopausal women at times 0, 24, and 72 hours in relation to a graded E2 infusion. Subsequently, each subject's PET scan was coregistered with their MRI scan, allowing for acquisition of counts from an amygdalar region of interest (ROI) by means of the SPM99 Marsbar toolbox. A functional connectivity analysis of amygdalar activity was conducted by means of regression analysis with amygdalar ROI counts as the covariate for an omnibus analysis of each subject's PET scan. **Results:** E2 levels increased from 30 +/- 3.0 pg/ml at baseline to 235 +/- 114 pg/ml at 24 hr and 400 +/- 159 pg/ml at 72 hr. The cerebral metabolic rate (CMR) of the right intraparietal sulcus (spanning MNI coordinates 42, -64, 50 through 48, -46, 48) correlated negatively with right amygdalar activity during low E2, but not during high E2 ($p < 0.001$). **Conclusions:** Amygdalar-cortical functional connectivity varies with changes in estrogen levels. This phenomenon is most apparent in components of the visuospatial attention network.

P20. High resolution brain SPECT in the evaluation and management of children and adolescents with coexisting neuropsychiatric conditions

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Background: In view of the known difficulties encountered in the treatment of comorbid conditions in youngsters, we evaluated the impact of brain single photon emission computed tomography (SPECT). **Method:** Triple head gamma camera, Tc-HMPAO. Slices, 3D and normalized surface displays were obtained. Population: 124 cases with various psychiatric comorbidity; ages 7-21. **Results:** Evaluation of Global and/or

Focal Hemispheric Increases (GHI and/or FHI) or Decreases (GHD and/or FHD). Subcortical Increases (SCI) and/or Decreases (SCD) were considered for multiple structures. In general, most of the cases with GHI and FHI, whether associated or not with SC changes responded to mood stabilizers/TAD (thymoleptic anticonvulsant drug). When thalamus was the only SCI, antidepressant was required. When basal ganglia were the only SCI, anxiolytics and/or TAD was required. When cingulate gyrus or one of the insula-s was involved alone, all cases responded to TAD, but often needed antidepressants. More than one SCI responded most of the time to TAD. If the thalamus was one of the additional SCI, the addition of antidepressants was beneficial. When the thalamus increase occurred in conjunction with GHD, antidepressants followed by stimulants were needed. In 87% the features detected on Brain SPECT provided a rationale for the clinical manifestations and for past medication failures. SPECT provided a clear direction for medical treatment resulting in a good or excellent response to treatment in most cases. **Conclusions:** The presence and pattern of brain SPECT abnormalities has proven to be of clinical relevance in children and adolescents with comorbidity.

P21. Influence of diazepam on clinically-designed fMRI

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Background: The increased use of fMRI in clinical applications calls for further methodological improvements. One complication is that many neuropsychiatric patients feel uneasy in the unfamiliar imaging environment and may need sedatives to be able to undergo the examination. The aim of this study was to explore whether diazepam in premedication doses affects clinically relevant measures of fMRI results. **Method:** Twenty young adults were scanned on two separate occasions. In one of the sessions they received 5 mg diazepam orally; in the other they received a placebo. Three functional tests were used, motor, word generation and n-back. Each subject's images was analyzed individually and from the resulting activation maps the number of activated voxels and the laterality index (LI) were calculated. The results were evaluated statistically to test whether there were any session or drug-related effects. **Results:** The results from the motor task showed significant effects related to session number for both LI and the number of activated voxels. Further, there was a significant effect on the number of activated voxels for the n-back task. No effects related to diazepam intake were found. It is possible that the session differences are explained by a learning effect; the subjects may have been able to perform the tasks more efficiently on the second scanning occasion. **Conclusions:** Even though there were no diazepam-related effects on the scores, one should not conclude that it is safe to give diazepam to patients prior to scanning. The session effects may have obfuscated a less evident drug effect.

P22. Structural and functional neuroimaging methods in the diagnosis of dementias—a retrospective chart and brain imaging review

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Background: Currently, there is no accepted standard among practitioners for the use of neuroimaging methods in the diagnosis of dementias. Structural methods (e.g. computed tomography and/or magnetic resonance imaging) are more commonly used but are not sensitive to mild-moderate stages of dementias and lack specificity to dementia types. Functional methods (e.g., single photon emission computed tomography), although shown to be more sensitive and specific, are not commonly used. The aim of this study was to assess the contribution of structural and functional neuroimaging methods to the diagnosis of dementias. **Method:** We retrospectively reviewed neuroimaging and clinical data for 26 patients who had received CT/MRI and/or SPECT during their dementia evaluation. We analyzed the relative contribution of each step in the diagnostic process—the first interview with an attending physician, the family meeting, the CT/MRI, the SPECT—towards establishing the final diagnosis at discharge. **Results:** 23 patients had a first attending note and one or more neuroimaging studies, 22 received both CT/MRI and SPECT, and 20 had a family meeting. Main initial diagnoses were Dementia NOS (#9), Vascular Dementia (VD, #2), Alcohol Dementia (#1), delirium (#4), MDD (#6), and BPD (#5). Main final diagnoses were Dementia NOS (#6), VD (#10), DAT (#8), Frontotemporal Dementia (#1), Dementia with Lewy Bodies (#4), delirium (#3), MDD (#5), and BPD (#6). Fifteen diagnostic changes occurred after the family meeting, nine after CT/MRI and 17 after SPECT. The family meeting and SPECT resulted in the highest number of diagnostic changes, with CT/MRI contributing only modestly. **Conclusion:** Neuroimaging methods contribute greatly to the diagnosis of dementia. Functional methods are underutilized. More studies are needed to determine the appropriate sequence in using structural and functional neuroimaging studies in the diagnosis of dementia.

Schizophrenia

P24. Insulin resistance is associated with a better psychopathology profile in non-diabetic schizophrenia patients

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Background: Studies have demonstrated an increased prevalence of insulin resistance and metabolic disturbances in pa-

tients with schizophrenia, compared to the general population. Among available atypical antipsychotic agents, clozapine and olanzapine carry a higher liability for metabolic dysfunction. Yet these two have shown better treatment efficacy than other atypical antipsychotic agents. This study was undertaken to examine whether insulin resistance is associated with a better psychopathology profile in a cross-sectional sample of non-diabetic schizophrenia patients. **Method:** Subjects were recruited from psychiatric inpatient units. Each subject underwent a psychopathology assessment battery. A fasting blood sample was taken for plasma glucose and serum insulin. Insulin resistance was calculated by using the homeostasis model assessment (HOMA-IR). **Results:** Twenty-six subjects (7 women, 19 men) were included in the study. Pearson correlation analysis showed significant negative relationships between HOMA-IR and PANSS-Positive Symptom subscale, PANSS-General Psychopathology subscale, and BPRS scores ($p < 0.05$). However, there were no significant relationships between HOMA-IR and PANSS-total or PANSS-Negative Symptom subscale scores ($p > 0.05$). Partial correlation analysis showed significant negative relationships between HOMA-IR and PANSS-total, PANSS-Positive Symptom subscale, PANSS-General Psychopathology subscale, and BPRS scores after controlling for gender, family history of mental illness, and age of illness onset ($p < 0.05$). **Conclusions:** Insulin resistance, despite its established unfavorable role in the development of metabolic dysfunction, is associated with a better psychopathology profile. It is speculated that insulin resistance and subsequent hyperinsulinemia might improve clinical symptoms of schizophrenia through the potentiation effect of insulin on N-methyl-D-aspartate (NMDA) receptors.

P25. Neural correlates of self-evaluation in individuals with schizophrenia

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Background: Self-evaluation involves the ability to think about and make judgments regarding one's own cognitive, personality, physical, and emotional characteristics, and is an important aspect of self-awareness. A majority of patients with schizophrenia demonstrate unawareness of their illness, including difficulty identifying their symptoms, recognizing that they have a mental disorder, and recognizing the consequences of their illness. This can significantly impact treatment compliance, and is associated with poorer prognosis and response to treatment and poorer social and vocational functioning. The authors evaluated whether patients with schizophrenia would show abnormal activation of frontal-parietal circuitry during a self-evaluation task using fMRI, as this circuitry was previously shown to be involved in self-awareness in healthy adults. Additionally, we hypothesized that greater

awareness of illness would correlate with frontal lobe activation in patients with schizophrenia. **Method:** 12 patients with DSM-IV diagnoses of schizophrenia spectrum disorder and 12 healthy controls (matched for age, gender, parental education) participated. Patients were assessed for level of awareness using the Scale for Unawareness of Mental Disorders. In the fMRI paradigm, participants made decisions that were either self-reflective in the domains of mood, social interactions, cognitive and physical abilities (e.g., "I like to socialize with others") or autobiographical (e.g., "I am right-handed") which controlled for auditory processing, attention, language comprehension, decision making, and motor response. Participants responded to each statement with an "agree" (right thumb) or "disagree" (right index finger) button press. **Results:** Significantly different activation patterns were found for the self-evaluation greater than autobiographical decision contrast for patients and controls. While controls demonstrated a profile generally consistent with previous findings in self-evaluation tasks, patients with schizophrenia showed a notable absence of frontal lobe activation. However, a significant correlation was found between level of awareness and activation in the left superior frontal gyrus indicating that patients with greater awareness about their symptoms had greater activation in this region ($r = -0.78$, $p = 0.003$). **Conclusions:** Despite an absence of frontal activation in patients during self-reflection, higher awareness correlated with increased activation in the left superior frontal gyrus, suggesting a relationship between frontal lobes, awareness, and self-evaluation.

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P26. Impulsivity in Tourette's syndrome associated with premature responses in fast-paced detection

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Background: Tourette's syndrome (TS) is often associated with urge-control problems affecting cognition (obsessions) and behavior (impulsivity). Impulsivity is difficult to quantify objectively with tasks that reflect clinical symptoms and also show good discriminating power. We examined whether impulsivity could be indexed by the tendency to respond in advance in fast-paced situations. **Method:** We compared children with TS and with ADHD, TS without ADHD and controls on a rapid detection task in which they had to press a key to a target-letter embedded within a brief (1s) series of rapidly presented letters (10/s) with feedback on response speed and an emphasis on rapid responses. Three conditions manipulated the temporal predictability of the target. **Results:** The TS+ADHD group showed more anticipatory responses and faster response times than other groups. Temporal predictability also affected responses, but not differentially in the three groups. **Conclusions:** The data suggest that motor impulsivity

in TS is associated with a tendency to precipitate responses in situations involving time pressure.

P27. Open-label flexible dosing 8-week trial of aripiprazole in Tourette's syndrome children/adolescents/young adults

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Background: Atypical neuroleptics have been shown to reduce tic manifestations of Tourette's syndrome (TS) adults and children. A recent report described favorable effects on tic symptoms in two TS adults with the newest atypical neuroleptic, aripiprazole. There has been no report of effects of aripiprazole on tics or other symptoms of TS in childhood or adolescence. This study evaluated the effects of aripiprazole on tics, behavior, cognition and mood in childhood through young adulthood TS. **Method:** Fifteen TS patients, 12 male, mean age 15 years (range 9–25) were placed on aripiprazole 2.5 mg/d and eventually up to a maximum of 15 mg/d (mean 7.5 mg/d) with IRB-approved informed consent. Initially, concomitant medications were continued, nine on SSRI, three on other atypical neuroleptics, and five on psychostimulants. Patients were monitored for 8 weeks at baseline, Week 4 and 8, personally, weekly by telephone. Test comparisons are baseline vs. Week 8. *Behavior* DSM-IV Rating Scale(DSM-IV), Achenbach Child Behavior Checklist (CBCL). *Tics* Yale Tic Rating Scale (TRS). *Cognition* Test of Variables of Attention (TOVA), 3-Letter Cancellation Test (LCT), Digit Span (DS). *Mood* Children's Depression Inventory (CDI), CBCL, Ham D. **Results:** Normalized/Abnormal *Behavior* DSM-IV 10/12 attention, 4/6 hyperactivity, 4/7 impulsivity; CBCL 8/12 attention. *Tics:* simple motor 12/15, complex motor 11/13, simple phonic 10/11, complex phonic 9/10. *Mood* CDI 4/4, CBCL obsessive 2/2, Ham D 1/2. *Cognition* LCT 3/6, DS 4/7, TOVA 2/4, Adverse Effects-Hematology/Chemistry 0/15, nausea 4, >5%ile weight increase 4, >5%ile weight decrease 1. **Conclusions:** Aripiprazole is a safe, effective treatment for TS tics and may benefit both cognitive and behavioral attention deficit hyperactivity disorder (ADHD) symptoms as well as mood/obsessiveness.

P28. Arousal instability in Tourette's syndrome

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Background: Tourette's syndrome (TS) is associated with sleep problems but the nature of these problems and their link to behavioral co-morbidities are still unclear. One hypothesis is that TS is linked to arousal problems during sleep, but there is little data on arousal regulation in TS. **Case History:** We

tested whether arousal instability was increased in TS children with little co-morbidity using polysomnographic measures. Nine children with TS and nine matched controls (8–16 yrs) underwent polysomnographic recordings during 2 consecutive nights. Subjects showed minimal ratings in anxiety, depression, hyperactivity, and obsessive-compulsive symptoms. Analyses examined sleep microstructure (micro-arousals, spindling activity (spectral analysis on 4-s epochs), cyclic alternating pattern (CAP) in non-REM sleep) as well as standard sleep macrostructure measures. Compared to healthy comparison subjects, TS children showed reduced sleep stability (higher cyclic alternating pattern rate) in non-REM sleep. TS children also tended to have more stage 2, less spindling activity. **Conclusions:** The data indicate clear arousal instability in sleep in TS children with little comorbidity. This suggests impaired thalamic regulation of arousal in TS.

P29. Symptom profiles and treatment characteristics of children with intellectual or developmental disabilities and comorbid bipolar spectrum disorder

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Background: It is increasingly considered that irritability, aggression, impulsivity, and affective lability seen in children with Intellectual or Developmental Disabilities (IDD) might reflect underlying neuropsychiatric pathology consistent with the bipolar disorder spectrum. Description of "explosive mood disorder" or "outer-directed irritability" syndromes has been applied to IDD with emphasis upon selecting medications commonly used for bipolar disorder. This study aimed to compare symptom profiles and medications effectively used in IDD children with comorbid bipolar spectrum disorder. **Method:** A retrospective chart review was conducted in a tertiary pediatric facility. IDD patients were further classified as having Autism Spectrum Disorder (ASD) and/or Bipolar I Disorder (BPD). Two pediatric mental health clinicians independently verified DSM-IV diagnoses and rated Clinical Global Impression-Improvement (CGI-I) for medication trials. Positive treatment response was noted if CGI-I was 1 or 2. **Results:** 61 cases (average age 11.3; 48 male; 40 ASD; 34 BPD) met inclusion criteria. Impulsivity (59), psychomotor agitation (59), and explosive rage (40) were highly prevalent in all subgroups. ASD patients had more distractibility ($p = 0.005$) and judgment indiscretions ($p < 0.001$) whether or not BPD was present. Monotherapy was attempted on 58 occasions with 15 different medications. Medications used most commonly were divalproex sodium, olanzapine, and risperidone. Divalproex sodium was associated with clinical improvement more frequently than olanzapine ($p = 0.02$), but not more than risperidone ($p = 0.182$). **Conclusions:** Most bipolar symptoms were widespread regardless of ASD or BPD distinction. Many medications were effective; however, in this sample, divalproex sodium was more effective than olanzapine, and equal to risperidone.

P30. Behavior in children with a chronic illness: a descriptive study of child characteristics, family adjustment, and school issues in children with cystinosis

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Background: When caring for a child with a chronic illness, parents, physicians, and other medical personnel often focus their attention on treatment of the medical illness. The child and family's coping and mental health are often secondary to medical management. Cystinosis is a genetic metabolic disease that affects multiple organs, including the brain. Neurological and post-mortem studies have found structural brain abnormalities including cerebral atrophy, white matter necrosis, ventricular dilatation, and cystine crystal deposition. Neuropsychological studies have found a profile of poor visuo-spatial skills on a background of relatively normal intelligence. This study summarizes types of behavior and adjustment issues reported by parents of children with cystinosis. **Method:** The Cystinosis Behavior Questionnaire was administered to 63 parents of children and adolescents with cystinosis (ages 2–17 years). The questionnaire was composed of both open-ended and closed-ended questions that probed areas of child characteristics, family adjustment, peer relationships, school performance, and intervention for mental health issues. **Results:** Parents reported many areas of strength (e.g., good sense of humor, pleasing personality, sensitive to others) and difficulty (e.g., does not enjoy life, strongly defiant, irritable) within their child and family. Interestingly, however, very few of the families had sought out intervention for behavioral and/or adjustment issues. **Conclusions:** In better defining behavioral and adjustment issues in cystinosis families, the current findings may prompt greater awareness in individuals caring for and/or working with a child with cystinosis. This awareness is a critical element in helping to optimize the child's behavioral functioning and family adjustment.

P31. Late onset psychosis in survivors of pediatric central nervous system malignancies

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Background: Survivors of pediatric intracranial malignancies are at high risk for neurocognitive and psychosocial dysfunction, endocrinopathies, growth abnormalities, and second neoplasms. The late onset of persistent psychosis may represent an additional serious psychiatric consequence of childhood intracranial malignancies. **Method:** All psychiatric consultations performed at Children's Hospital Los Angeles from April 16, 1991 through December 31, 2000 were reviewed, and patients with persistent psychosis were identified. Their clinical presentation and course were summarized, and data were analyzed and reported descriptively. **Results:** Eight patients, six

boys and two girls, had the delayed onset of hallucinations, delusions, and bizarre behavior, 2 to 12 years after diagnosis and treatment of brain tumors. Their tumors arose in the right thalamus, posterior fossa, optic chiasm, right frontal lobe, and right temporal-parietal lobe. They were treated with surgical resection, cranial radiation and chemotherapy. One patient has died, and all have been resistant to antipsychotic treatment. **Conclusions:** This series of pediatric patients represents a heterogeneous group with primary lesions in multiple different sites in the brain. Late onset psychotic symptoms may be related to critical damage to the limbic system and its extensive connections within the cortico-cerebellar-thalamic-cortical circuit and resultant disruption to the complex interplay of essential cortical and subcortical circuits, resulting in psychotic symptoms, bizarre behavior, mood dysfunction, hallucinations, and delusional thinking.

P32. Youth with impulsive aggression: anticonvulsant medication compliance and outcome

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Background: Youth with impulsive aggression comprise a discrete and hard to treat population. Treatment plans after discharge usually include mood stabilizing anticonvulsant medications, which help manage the juveniles' impulsive aggression and are the subject of this outcome study. **Method:** The population included 187 (128 men, 59 women) children and adolescents (6-19 years old, average of 13 years) in a residential neuropsychiatric treatment center because of severe, explosive, impulsive aggression. The multi-modal treatment included after-care plans for continuation of anticonvulsant medication within specific ranges of either blood levels or dosage by weight (mg/kg/day). **Results:** Mailed questionnaires were sent to discharged patients at 1 month (88 cases), 6 month (61 cases), and 1 year (38 cases) follow-ups. At 1 month, 81 patients had maintained anticonvulsant drug therapy, 51 at 6 months, and 32 at 1 year (Compliant Groups); seven had discontinued anticonvulsant drug therapy at 1 month, 10 at 6 months, and six at 1 year (Non-Compliant Groups). Using chi-square, the results showed that the Compliant Groups had significantly fewer re-hospitalizations, fewer incarcerations, and reduced frequency and severity of aggressive episodes. **Conclusions:** Although this was not a controlled, randomly assigned study, the results show significantly better outcomes at 1 month, 6 months, and 1 year follow-ups with continued use of anticonvulsant medications.

Traumatic Brain Injury

P33. A longitudinal case study addressing the neurodevelopmental outcome of a child diagnosed with perinatal asphyxia

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Background: The most common insult to the developing central nervous system during the perinatal period is asphyxia

(Unanue and Westcott, 2001). This results in decreased cognitive and motor development and is associated with neurological conditions such as cerebral palsy, seizures, and even learning disabilities (Maneru, et al., 2001). Neurodevelopmental measures, such as the Mullen Scales of Early Learning and the Bayley Scales of Infant Development-II (BSID-II) have been noted to lack predictive validity for later intelligence in childhood. This is particularly true with regard to children assessed prior to 18 months of age (Crowe, et al., 1987; Bradley-Johnson, 1997, 2001). However, recent studies have shown that when children are evaluated after the age of 18 months, the predictive power of cognitive measures increases. This is especially true for the developmental outcomes among children diagnosed with developmental delays and cerebral palsy (Harris, 1987). **Method:** For this study, a child diagnosed with perinatal asphyxia with secondary cerebral palsy was evaluated over the course of 4 evaluations spanning six years. The most recent assessment was completed in 2004 when the child was 8 years old. Both the Bayley and the Mullen were administered at 27 and 36 months and indicated significant delays in both fine and gross motor development. Subsequent assessment of motor functioning revealed ongoing delay while language skills were spared of deficit. **Conclusions:** Findings from this study lend credibility to the predictive validity of the Mullen and BSID-II, particularly for those children with developmental delays who are assessed after 18 months of age.

P34. A comparison of executive function and memory in adolescents diagnosed with traumatic brain injury

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Background: Past research has documented the negative effects that traumatic brain injury can have on memory and learning. The California Verbal Learning Test- Children's Edition (CVLT-C) has been validated as a measure of both memory and learning. The present study examined CVLT-C variables measuring executive skills (e.g. organization and self-monitoring) among adolescent patients diagnosed with a traumatic brain injury. **Method:** 58 adolescents with mild-moderate and severe traumatic brain injury (ages 12-17) were matched on variables of age, gender and race with 58 controls from the standardized sample of the CVLT-C (N = 94). A one-way analysis of variance was conducted across the groups (within the age ranges: 12-13, 14-15, 16-17) on measures of memory and executive ability. **Results:** On all six measures of memory, the mild-moderate group performed better than the severely impaired group ($p < 0.02$). Both TBI groups also performed approximately one standard deviation below that of the normative group. On three measures most associated with executive functioning (i.e. semantic clustering, intrusions, perseverations), there was no statistical difference between the clinical or control groups. **Conclusions:** The study supports prior research from Beebe, Ris, and Dietrich (2000) that the CVLT-C appears to be less sensitive to executive functioning

and it is more predictive of memory impairment. These findings suggest that though the CVLT-C is a valid measure of learning outcomes and memory, it is not an effective measure of executive functioning in adolescents.

P35. Treatment of intractable hiccups following recent severe traumatic brain injury with olanzapine

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Background: Intractable hiccups (IH) are defined as hiccups that last longer than a month, and may develop in the context of many medical and neurological conditions. Although traumatic brain injury (TBI) produces a litany of neurological problems, there are no reports describing IH as a consequence of TBI at the time of this writing. We describe the first case report of IH following TBI and its effective treatment with olanzapine. **Case Report:** A previously healthy 20 year-old male suffered a severe TBI in a motor vehicle accident. Following extubation, approximately 2 weeks post-injury, the patient remained encephalopathic, agitated, and developed IH. Treatment with olanzapine afforded relief of psychotic symptoms and IH during the period of acute rehabilitation after severe TBI. Although the pharmacologic interventions afforded to this patient were complex, including concurrent prescription of metoclopramide and donepezil, the frequency and severity of this patient's IH appear to have varied only as a function of increases or reductions of olanzapine: discontinuation of metoclopramide did not influence this patient's IH, and this symptom recurred during monotherapy with donepezil. By contrast, this patient's IH remitted during treatment with olanzapine, and recurred during each reduction to doses of less than olanzapine 2.5 mg daily. **Conclusions:** We propose that olanzapine, by antagonizing postsynaptic serotonergic receptors, may decrease phrenic motoneuron excitability and thereby reduce hiccups. Further investigation of the therapeutic mechanisms and potential role of atypical antipsychotics, and in particular the activity of atypical antipsychotics at serotonergic receptors, in the treatment of IH is needed.

P36. Impairments of frontally-mediated cognition characterize posttraumatic encephalopathy following resolution of posttraumatic amnesia

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Background: Resolution of posttraumatic amnesia (PTA) is often used as a marker of recovery following traumatic brain injury (TBI). However, memory impairments represent only one aspect of posttraumatic encephalopathy (PTE), and incompletely predict rehabilitation outcome after severe TBI. This study aimed to characterize posttraumatic cognitive impairments after resolution of PTA and to investigate their relationship with inpatient rehabilitation outcomes. **Method:** Charts of 72 adults (16 women), age 46.4 ± 20.76 years, with recent severe TBI admitted to inpatient rehabilitation were reviewed. The Galveston Orientation and Amnesia Test was used to assess PTA. The MMSE and Frontal Assessment Battery (FAB) were used to assess cognition; scores ≥ 2 standard deviations below age-adjusted performance expectations defined impairment on these measures. Rehabilitation outcome was assessed using Functional Independence Measure (FIM) scores and hospital lengths of stay (LOS). **Results:** Duration of PTA was 29 days (SD = 21); 49 subjects (68%) were out of PTA at the time of evaluation. In this group, 67% and 43% were impaired on the FAB and MMSE, respectively ($p < 0.02$), and FAB scores were significantly lower than MMSE scores ($p < 0.001$). Although both Mini-Mental State Exam and FAB scores correlated with cognitive FIM scores at discharge, only FAB scores were inversely correlated with total LOS ($p < 0.002$). **Conclusions:** After resolution of PTA, PTE is dominated by impairments of frontally-mediated cognition. Such impairments are strongly related to total LOS after severe TBI. Additional studies using formal neuropsychological and neurobehavioral assessments are needed to investigate further the contribution of posttraumatic frontal dysfunction to rehabilitation outcome following severe TBI.

P37. Long-term effects of rivastigmine in patients with traumatic brain injury with cognitive deficits: results of a 26-week open-label extension to a 12-week double-blind study

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Background: Traumatic brain injury (TBI) is a significant medical problem in the U.S. A substantial number of individuals with a non-penetrating TBI have persistent cognitive deficits or other neuropsychiatric disorders, for which there are no currently approved treatments. Objectives of this open-label extension were to evaluate the safety and tolerability and efficacy of memory and attention of rivastigmine 3-12 mg/day in patients who completed the double-blind period. **Method:** This was a 26-week, open-label extension to a 12-week double-blind, placebo-controlled, multi-center pilot study assessing the safety and efficacy of rivastigmine 3-6mg/day in patients with non-penetrating TBI with persistent cognitive deficits. Eligible patients had injury at least 1 year prior to baseline. **Re-**

sults: Of the 157 patients treated in the double-blind phase, 127 patients (85 men/42 women) entered the extension. Mean age was 37.4 (range 19–55); 90.6% were Caucasian. In those patients who had at least 25% impairment on the HVLt at baseline, statistically significant improvement from baseline was observed at endpoint; in CANTAB-RVIP mean latency; CANTAB Reaction time; and HVLt Total Trials 1-3. These data are consistent with results from the double-blind treatment period and further support the findings of treatment response in TBI patients with significant memory impairment. **Conclusions:** These results suggest that the enhancement of central cholinergic activity associated with long term use of rivastigmine may improve a number of cognitive deficits secondary to TBI.

P38. Anatomic correlates of alexithymia in patients following traumatic brain injury

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Background: Alexithymia has been reported in patients with traumatic brain injury (TBI). The medial prefrontal cortex and, more specifically, the anterior cingulate cortex (ACC) integrate cognitive and emotional information and subsequently have been proposed as neural underpinnings of alexithymia. The hippocampus also integrates cognitive and emotional information in the formation of contextual memory and is involved in the generation of autonomic arousal associated with emotions. Volume reductions in the hippocampus have previously been reported with TBI. The purpose of this study was to correlate a measure of alexithymia in TBI patients with the gray matter volumes of rostral ACC, other areas of the medial prefrontal cortex and the hippocampal formation. We expected a negative correlation between rostral ACC volume and alexithymia (see Jones et al. abstract). Secondary hypotheses sought correlations with other areas of the medial frontal cortex and hippocampi. **Method:** Thirty-three inpatients, ages 18 to 68, were recruited following TBI. The 20-item version of the Toronto Alexithymia Scale (TAS-20) measured alexithymia at 3 months after injury. A research MR image obtained at 3 months was analyzed using in-house developed software (BRAINS/BRAINS2). Hippocampi were hand-traced using methods developed by Pantel et al. (2000). Other regions of interest were hand-traced using methods developed by Crespo-Facorro et al. (1999). Age and severity of TBI were included as covariates in the partial correlations. Volumetric data was expressed as relative to total intracranial volume. **Results:** The TAS-20 score inversely correlated with left hippocampal volumes ($r = -0.38$, $p = 0.03$). No other correlations were found to be statistically significant. **Conclusions:** Smaller volumes of the left hippocampus are associated with alexithymia in patients following TBI. Further study is required to demonstrate if this finding is specific to TBI or other neuropsychiatric disorders.

P39. Comparison of the GOAT and O-Log as measures of posttraumatic amnesia

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Background: The Galveston Orientation and Amnesia Test (GOAT) is used widely to assess posttraumatic amnesia (PTA). The Orientation Log (O-Log) is also available for this purpose. The comparability of these measures is not well-established. This study aimed to compare the O-Log and GOAT with respect to: identification of PTA; PTA severity and duration; and relationships with rehabilitation outcome variables (rehab and total lengths of stay; Functional Independence Measure (FIM) scores at discharge). **Method:** Review of 84 subjects with severe traumatic brain injury (age 47 years [SD = 20.6]) treated on an acute inpatient rehabilitation unit. Emergence from PTA was defined as GOAT score ≥ 76 on 2 consecutive days. GOAT and O-Log scores were compared (Pearson's r), and Fisher's exact test was used to test for their differences in PTA identification. GOAT- and O-Log-determined durations of PTA were compared using Student's t -test, and their relationships to rehabilitation outcome variables were tested (Pearson's r). **Results:** GOAT and O-Log scores were correlated ($p < 0.001$), and did not differ in their identification of PTA ($p = 0.23$). However, O-Log-determined duration of PTA was shorter ($p = 0.03$). Both measures of duration of PTA correlated with lengths of stay (all $p < 0.001$) and inversely correlated with total and motor FIM scores (all $p < 0.04$); only O-Log determined duration of PTA inversely correlated with cognitive FIM scores ($p < 0.03$). **Conclusions:** The O-Log and GOAT perform similarly as measures of PTA, although duration of PTA was shorter and relationship with functional cognition at rehabilitation discharge was stronger using the O-Log. Additional studies of this measure are warranted.

P40. Personality as a predictor of depression and post-concussion syndrome after mild-to-moderate traumatic brain injury

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Background: Traumatic brain injury (TBI) is a well-established antecedent of major depression. Because major depression poses great morbidity and mortality and is readily treatable, defining predisposing-factors for major depressive episodes is of clinical value. Personality has been well-documented in the general population as a predictor of major depression. In the TBI population, personality as a predisposition for major depression has not yet been investigated. Additionally, post-

concussive symptoms (PCS) following injury have long been postulated to be related to underlying personality difficulties. The purpose of the present study is to investigate the role of personality in major depression and PCS following mild-to-moderate TBI. **Method:** A consecutive sample of 171 patients with a mean age of 38 years was assessed for the presence of major depression within 12 months of mild-to-moderate TBI. A standardized personality inventory and post-concussive symptoms questionnaire was administered to all patients. Using a cross-sectional design, the relationship between personality profiles and major depression and PCS was assessed. Logistic regression and analysis of covariance was used to control for potential confounders. **Results:** Patients with major depression (21%) reported higher degrees of neuroticism, and decreased extraversion as measured by the NEO-PI. However, personality profiles were not correlated with PCS. **Conclusions:** Increased neuroticism and decreased extraversion are associated with major depression, suggesting a potential role for personality assessment following TBI. The origins of PCS remain elusive, as in this study PCS was not associated with personality.

P41. Examination of family members' quality of life after traumatic brain injury at one and two years postinjury: a longitudinal multi-center investigation

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Background: Evaluating of quality of life as an area of relevant outcome is an obligation of researchers. A good deal is known about quality of life for patients following traumatic brain injury (TBI). Although researchers have examined quality of life in family members of individuals with other neurological disorders, comparatively little is known about quality of life for family members burdened with long-term care of individuals with TBI. The purpose of this study was to determine levels of quality of life among family members of patients with TBI as measured by the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). **Method:** Family members' responses to SWLS, as collected for the federally-funded TBI Model Systems database from 17 centers, were examined using a longitudinal design. In evaluating responses, total scores were compared with normative data (mean = 23.7 [SD = 6.4]; Pavot & Diener, 1993). For individual items, values of 3 or less (slightly to strongly disagree) indicate life dissatisfaction. **Results:** Data were analyzed for family members completing SWLS at one and two years postinjury (N = 565). Mean total scores were 21.1 for Year 1 (SD = 8.1) and 21.6 for Year 2 (SD = 8.2). These scores were significantly lower than the reported

mean for a normative sample of adults ($p < 0.001$). The average SWLS for the sample at year one (mean = 4.2) and Year 2 (mean = 4.3) corresponds to an average item endorsement indicating "neither" agreement nor disagreement with statements regarding life satisfaction. **Conclusions:** A substantial number of family members of TBI survivors report dissatisfaction with life. Results indicate additional analysis of family members' life satisfaction following TBI is warranted.

P42. Reported neuropsychiatric symptoms in traumatic brain injury—issues for long-term recovery

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Background: The impact of services provided in New Mexico to traumatic brain injury survivors had not been evaluated, nor the barriers to accessing psychiatric services been addressed. Given that need for psychiatric care was not known, we performed a pilot needs assessment. Interviews were conducted between March, 2003 and January, 2005. This study aimed to identify the current neuropsychiatric functioning and needs for supports in TBI survivors living in the community, at least 1 year after injury. **Method:** Sixty survivors of TBI (16–64 years old) were interviewed face-to-face using a structured interview schedule, including the MINI. All gave informed consent. Second reporters chosen by the identified subjects provided independent answers to the same questionnaire about the TBI survivor. **Results:** 31/60 reported psychiatric symptoms warranting attention. 32% reported significant anxiety symptoms alone; 68% reported mixed depressive/anxious symptoms mixed with drug/alcohol use. Rates of alcoholism declined to 0%, while 18% were intoxicated at initial injury. Survivors and reporters had significant diversion in ratings on ease of access and reliability to physicians and other supports. Overall health improved in 20% and worsened in 53%. **Conclusions:** Neuropsychiatric symptoms in survivors contribute to the difficulties they experience in advocating for themselves and can be better accommodated by our systems of care.

P43. Analysis of predictive variables on subtest performance of the word memory test

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Background: The current study examined select variables as predictors to differentiate malingered neurocognitive dysfunction on the different subtest and subscales of the Word Memory Test (WMT), a measure designed to assess both effort and memory. **Method:** Archival Data of 123 individuals (Age: mean = 42.1 [SD = 13.9]; Education: mean = 12.0, [SD = 2.6]; Gender: 67 men/56 women) who were referred for a compre-

hensive neuropsychological assessment after sustaining a traumatic brain injury (TBI). Predictor variables included severity of injury; classified as either mild, moderate, or severe, based on available medical records, neuro-imaging results, Glasgow Coma rating scale, self-reported loss of consciousness, and history of post-traumatic amnesia, and performance on the MMPI-2 (L, F, K, F-k, and FBS Scales). It was hypothesized that protocols identified with exaggerated neurocognitive deficits would exhibit different patterns and elevations across the various subscales and test items on the WMT. **Results:** Results of the analysis on variance indicated that predictor variables were able to differentiate performance on 10 of the 19 subtests of the WMT. Subtests that were found statistically significant to differentiate between malingering and non-malingering performance include: Immediate and Delayed Recall, Consistency, Multiple Choice Recognition, Paired Association Recall and Intrusion, Easy and Hard Recall Items, and Free and Long Delay Recall. **Conclusions:** Results of this study generally confirm the hypothetical construct of the WMT as being sensitive when measuring aspects of performance during forensic neuropsychological evaluations in litigated TBI cases, with the abovementioned subtests found to be more sensitive when differentiating malingering neurocognitive dysfunction than others.

P44. Lesion location in post traumatic brain injury using magnetic resonance spectroscopy: preliminary results from a pilot study

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Background: Traumatic brain injury (TBI) is a public health problem of increasing importance in the United States. TBI survivors often suffer multiple neuropsychiatric sequelae, including depressed mood. Depressed mood can contribute to disability after TBI by interfering with rehabilitation and exacerbating cognitive deficits, as well as contributing directly to suffering and morbidity. The neuroanatomical correlates of post TBI depression is an under-researched area and deserves attention. The purpose of this study was to determine the metabolic status of the brain in post-traumatic brain injury (TBI) depression using proton magnetic resonance spectroscopy (MRS). We hypothesized that TBI depressed subjects would have decreased N-acetylaspartate (NAA): Choline and/or NAA: Creatine ratios in the frontal and basal ganglia regions compared to non-depressed subjects without history of TBI. The frontal cortex and basal ganglia have been implicated in structural imaging studies of the pathogenesis of post-TBI depression. **Method:** Case-control study including five TBI depressed subjects (cases) and five age-matched non-TBI non-

depressed healthy comparison subjects. Metabolic status was assessed using proton MRS. Ratios of N-acetylaspartate (NAA), choline (cho) and creatine (Cr) were calculated in the frontal cortex, basal ganglia and thalamus. **Results:** NAA/Choline or NAA/creatine ratios were significantly reduced in the TBI depressed group compared to healthy comparison subjects in frontal cortex, basal ganglia and thalamus. **Conclusions:** Reduced levels of NAA in frontal regions, basal ganglia, and thalamus in TBI depression suggests neuronal damage or dysfunction which may be associated with the primary brain injury or with depressed mood.

P45. A population-based study of behavior problems in persons with dementia with and without traumatic brain injury

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Background: Traumatic brain injury (TBI) is common in the elderly. Behavior problems emerging after TBI can be distressing. The aim of this study was to assess whether TBI is a risk factor for behavior problems in patients with dementia. **Hypothesis:** Persons with incident dementia who had previously suffered a TBI, when compared to those without TBI, would have a greater number and more severe form of behavior problems. **Method:** A consecutive series of 210 participants with incident dementia ascertained as part of the community-based Cache County Study of Memory Health and Aging were included in these analyses. Fifty-eight of these (27.6%) reported a lifetime past history of TBI. All participants were assessed on the Mini-Mental State Exam and the General Medical Health Rating Scale. Behavioral problems were assessed using the Neuropsychiatric Inventory (NPI), based on caregiver report. **Results:** When dementia participants with and without TBI were compared on the 10 primary NPI domains, a greater percentage of participants with TBI than without TBI endorsed apathy. TBI increased the odds of having apathy by 2.43 ($p < 0.05$). There was no difference in the severity of apathy in those who had it. TBI was not associated with any other NPI domain. **Conclusions:** TBI increases the likelihood, but not severity, of apathy in elderly participants with newly-diagnosed dementia. APOE-4, age and gender do not affect the relationship between TBI and apathy.

P46. Functional neuroanatomical atlas of traumatic brain injury: applications to blast related injuries

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Background: Blast-related injuries are occurring with increasing frequency. Though the scientific knowledge base is limited, the brain may be more vulnerable than previously presumed. The purpose of this exhibit is to provide an overview of potential blast-related brain injury incorporating the physical principles, animal models, and clinical evidence. **Method:** The relevant scientific literature was reviewed and synthesized to

create a user-friendly guide to the mechanisms by which a blast wave can induce brain injury. The clinical literature related to mechanism of traumatic brain injury (TBI) and injury location was summarized to create color-coded functional neuroanatomical maps of neuropsychiatric vulnerabilities. **Results:** Blast-related injuries are most commonly divided by the nature of the forces causing injury. *Primary* blast injury is caused by blast wave-induced changes in atmospheric pressure (barotrauma). *Secondary* blast injury is caused by impacts to the body by objects in motion (ballistic trauma). *Tertiary* blast injury is caused by the body itself being put in motion. The brain may be injured as a result of any or all of these mechanisms. The limited clinical evidence to date suggests a similar range of neuropsychiatric impairments as seen with other traumas (e.g. accidents, assaults). **Conclusions:** Neuropsychiatric symptoms from TBI may cause multiple symptoms and difficulty with daily living. It is imperative that the clinician understand the basics of injury mechanisms as they relate to brain physiology and functional neuroanatomy. The new color-coded atlas presented here serves as visual "external memory" to aid in teaching, clinical case correlation, and radiographic consultation.

P47. Altered cerebellar activation in a verbal working memory task after mild traumatic brain injury (MTBI)

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Background: Convergence of recent findings in comparative anatomy, functional magnetic resonance imaging (fMRI) imaging of motor and cognitive tasks, and fMRI voxel fluctuation analysis suggests a pathway connecting the lateral cerebellum to the contralateral prefrontal cortex via the dentate nucleus and thalamus. We hypothesized that damage to cerebellar-frontal circuitry in mild traumatic brain injury (MTBI) would alter the role of the cerebellum in the modulation of working memory (WM) relative to healthy control subjects. **Method:** 38 healthy participants and 34 participants with MTBI (ACRM Criteria) studied 1 month after injury performed a verbal n-back task while undergoing fMRI. Regions of WM load-dependent patterns of activation were correlated with in-scanner n-back performance. **Results:** N-back performance did not differ between the two groups. Both healthy controls and participants with TBI showed increased activation in typical WM circuitry including the cerebellum while performing the task. In healthy participants, better verbal WM performance was correlated with increased activation in left prefrontal cortex, and bilateral cerebellum (R>L). For participants with MTBI, there were no prefrontal or cerebellar activations that correlated with performance. **Conclusions:** These results suggest that the cerebellum plays an important role in verbal WM performance in healthy controls, and provide further evidence of altered activation and allocation of WM circuitry shortly after MTBI.