### Title

M118. Functional Capacity: A New Predictor of Role Functioning in Individuals at Clinical High Risk for Psychosis




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### Authors

Carrion, Ricardo
McLaughlin, Danielle
Auther, Andrea
et al.



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## M117. THERAPEUTIC DRUG MONITORING WITH CLOZAPINE: ELECTROCHEMICAL SENSING DEVELOPMENT

Mijeong Kang, Christopher Kitchen*,[1] Deanna Kelly, Eunkyoung Kim, Thomas Winkler, George Banis, Yi Liu, Reza Ghodssi, and Gregory Payne
*University of Maryland*

**Background:** Reliable and rapid therapeutic drug monitoring remains a significant challenge for many in outpatient psychiatry and one that may be remedied by efficient application of emerging technology. This may especially by true among patients with treatment refractory schizophrenia. Clozapine is the most effective antipsychotic for treating treatment refractory schizophrenia Routine blood monitoring is recommended in clozapine therapy, but often not done because of the amount of time and cost associated with drawing blood and eventual reporting of test results. Thus, a rapid and precise method for detecting serum concentrations of clozapine would be beneficial.
**Methods:** Our group developed an electrodeposited graphene-chitosan composite film for gold electrodes to detect and amplify the signal of clozapine detection in human serum. Here we examine the technology to separate the clozapine signal from the most significant interfering substance found to date, uric acid. We collected and analyzed human serum from 9 participants taking clozapine and 6 healthy controls and compared the clozapine levels detected by our technique to a commercial lab.
**Results:** Differential pulse voltammetry (DPV) measurements with the graphene-chitosan coated electrode indicate that only 2 peaks appear in the potential region of 0.1–0.4 V (vs Ag/AgCl): clozapine (0.34 V) and uric acid (0.15–0.17 V). The lack of signal overlap using this composite-coated electrode is noteworthy and addresses our prior concerns of uric acid confounding the accurate measurement of clozapine. A near perfect correlation ($r$ = .965, $P$ < .001) was observed in uric acid levels between centralized laboratory analysis and electrochemical measurement suggesting high accuracy. We also are able to detect clozapine with a lower limit of detection of around 228.8 ng/ml, despite it being present at 100-fold lower concentrations compared to uric acid. In our first pass we found a good correlation ($r$ = .729, $P$ = .026) with commercial lab results, suggesting that this technique may be able to detect clozapine within the range of the commercial labs.
**Conclusion:** The graphene-chitosan coated electrodes: (1) allow rapid serum measurement (≈ 20 min) without sample pretreatments; (2) detect clozapine with appropriate selectivity and sensitivity (detection ~228.8 ng/ml); (3) could be used for repeated serum measurements over several weeks; and (4) show a reasonable correlation with centralized laboratory analysis (although it is unclear which method is more accurate). This work demonstrates that electrodeposition enables simple and rapid electrochemical analysis of serum for personalized medicine and future work leading to POC devices could be revolutionary.

## M118. FUNCTIONAL CAPACITY: A NEW PREDICTOR OF ROLE FUNCTIONING IN INDIVIDUALS AT CLINICAL HIGH RISK FOR PSYCHOSIS

Ricardo Carrion*,[1], Danielle McLaughlin[2], Andrea Auther[2], Jean Addington[3], Carrie Bearden[4], Kristin Cadenhead[5], Tyrone Cannon[6], Ming Tsuang[5], Elaine Walker[7], Scott W. Woods[8], and Barbara Cornblatt[3]
*[1]FIMR/Zucker Hillside Hospital/Hofstra North Shore-LIJ; [2]Zucker Hillside Hospital; [3]University of Calgary; [4]University of California, Los Angeles; [5]University of California, San Diego; [6]Yale University; [7]Emory University; [8]Yale University, School of Medicine*

**Background:** Recent studies have recognized that signs of functional disability in schizophrenia are evident in early phases of the disorder, and, as a result, can potentially serve as vulnerability markers of future illness. However, functional measures in the psychosis prodrome have focused exclusively on real-world accomplishment (ie, achievement), rather than on the skills required to carry-out a particular real-world function (ie, capacity). From this perspective capacity provides the foundation for what can actually be achieved. This is comparable to the comparison between IQ (capacity) vs grades at school (achievement). In one of the first reports of its kind, we introduced the Map task, a laboratory-based measure specifically designed to assess a young person's basic capacity to carry-out age-appropriate skills that lead to independent community living (McLaughlin et al., 2016). Poor performance on the Map task was found to be predictive of conversion to psychosis, suggesting that functional capacity in the prodrome may represent a basic biologically-based vulnerability factor. Given that diminished functional capacity is often a key barrier to good functional outcomes in patients with schizophrenia, the current study sought to next evaluate whether deficits in capacity can also predict social and role (ie, academic) functioning in the prodrome.
**Methods:** The Map task was administered to 609 subjects at Clinical High-Risk (CHR) for psychosis and 242 Healthy Controls (HCs) participating in the North American Prodrome Longitudinal Study (NAPLS2). Subjects were required to efficiently complete a set of specified errands in a fictional town.
**Results:** Individuals with poor role functioning at study outcome had a lower Map efficiency score than those with good role outcome. In addition, the Map efficiency score predicted role functioning at outcome (OR = −0.971, 95% CI = 0.946 to 0.997; $P$ = .027), even after accounting for conversion status, baseline IQ, and baseline role functioning). In contrast, the Map Efficiency score did not predict social outcome (OR = 0.989, 95% CI = 0.964–1.015; $P$ = .416), supporting previous findings that social and role functioning are 2 distinct functional domains, with different developmental courses, with each having potential to provide predictors of long-term prognosis.
**Conclusion:** Our findings support the notion that functional capacity may well represent a distinct vulnerability factor related to the multi-faceted long-term disability typically associated with schizophrenia. Poor performance on the Map task was significantly associated with impaired role functioning at study outcome, even after controlling for the contribution of conversion and intellectual performance. Thus, deficits in both role "capacity" and role "achievement" are present before the onset of the illness, and are not an artifact of psychosis onset or intellectual impairments.

## M119. LINGUISTIC CONTENT IN SCHIZOPHRENIA AND BIPOLAR DISORDER: RELATIONSHIPS WITH COGNITION AND SOCIAL FUNCTIONING

Mike Best, Stephanie Woolridge, Lilian Laferriere, and Christopher Bowie*
*Queen's University*

**Background:** Individuals with schizophrenia and bipolar disorder suffer from impairments in social functioning. People with schizophrenia tend to use fewer words overall when speaking compared healthy controls, and fewer words with positive emotional valence, yet it is unknown how this linguistic structure compares to the structure in bipolar disorder and how linguistic structure is related to social functioning.
**Methods:** Thirty-nine individuals with bipolar disorder and 42 individuals with schizophrenia were randomly selected from a larger study. All participants were audio recorded while they completed the Social Skills