

MD/PhD Essay Example

Prompt: Why do you want to pursue a combined MD/PhD degree? | Field: Neuroscience

What this essay does: Uses the 'unanswered clinical question' structure rather than the 'personal inspiration' structure. The research question is named in paragraph one. The necessity of both degrees is argued from evidence rather than asserted as an aspiration. Closes with a specific translational goal, not a generic statement about wanting to help patients.

Every patient I saw during my neurology rotation at Massachusetts General Hospital who carried a diagnosis of treatment-resistant major depressive disorder had already failed at least three adequate trials of antidepressant medication. The psychiatric residents described this as a common pattern: roughly thirty percent of patients with MDD do not respond to first-line pharmacotherapy, and current clinical guidelines offer limited systematic guidance on what to try next. Dr. Angela Torres, the attending psychiatrist supervising my rotation, told me that the problem was fundamentally biological: we did not have reliable markers of which neural circuits were implicated in a given patient's depression, and without that information, treatment selection was largely empirical. That conversation converted a clinical observation into a research question I have been working on since.

My question is whether resting-state fMRI connectivity patterns in the subgenual anterior cingulate cortex can stratify treatment-resistant MDD patients into biologically distinct subtypes with different predicted responses to transcranial magnetic stimulation versus ketamine-based protocols. I am pursuing this question in Dr. Mark Ramirez's computational psychiatry laboratory at Columbia, where I have spent the past two years developing machine learning classifiers on a dataset of 340 patients with resting-state fMRI, clinical response data, and six-month follow-up outcomes. Preliminary results suggest that a four-cluster solution based on functional connectivity within the default mode network and salience network explains a significant proportion of variance in TMS response, and I am preparing a first-author manuscript describing these findings.

Answering this question fully requires capabilities that clinical psychiatry does not provide. Validating a neuroimaging-based classifier as a clinical tool requires prospective trial design, IRB-level patient recruitment protocols, and statistical frameworks for clinical decision support. Those are PhD skills. They are also not sufficient on their own. Implementing a validated classifier in an actual clinical workflow, communicating probabilistic predictions to patients facing treatment decisions, and iterating on the tool based on clinical feedback all require direct clinical experience. I need to understand what it means for a patient to hear that they are in the subtype predicted to respond to ketamine rather than

TMS, and I need to understand that from inside the clinical relationship.

My goal is to develop the first validated neuroimaging protocol for treatment selection in TRS-MDD and to do the clinical trials necessary to establish it as a standard of care. That requires a career as a physician-scientist, not as a researcher who consults with clinicians or a clinician who reads the research. I am applying to MD/PhD programs to build that career from the ground up, in an environment where both halves of the training are taken seriously as preparation for the same eventual work.

