Details of the Project sanctioned under the Human Resource Development scheme of Department of Health Research

1. Project Title : **"Clinical, Neurocognitive & Neuroimaging Correlates of transcranial Direct Current Stimulation (tDCS) in Schizophrenia"**

2. Category of fellowship : **Fellowship Programme To Young Scientists In Newer Areas (Category – A)**

3. PI (Name & Address) : **Dr. Shivakumar V.**
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4. Qualifications : **MBBS, PhD**

5. Mentor or Co.PI
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6. Duration of the project : **3 years**

7. Broad area of Research : **Mental Health**

7.1 Sub Area : **Non-invasive Brain Stimulation in Schizophrenia**

8. Summary of the Project

tDCS, as an add-on treatment modality in schizophrenia is gaining evidence with the preliminary studies and RCTs reporting good effect sizes. Its utility in schizophrenia has been reported in treating auditory hallucinations, negative symptoms, insight

facilitation and cognitive symptoms. Though several studies have strongly credited tDCS with clinical improvement, controversies do exist. Though, tDCS is being widely used for therapeutic purposes in schizophrenia, the exact mechanism of action of tDCS is still elusive. Hence there is a need for comprehensive study model looking at the clinical and cognitive correlates of tDCS and its potential neural basis for better understanding of the pathophysiology of the illness and the mechanism of action of tDCS.

9. Objectives of the Proposal:

1. **To examine the clinical & neurocognitive correlates of add-on tDCS in the treatment of schizophrenia patients with persistent auditory hallucinations**
2. **To investigate the regional cerebral blood flow changes as well as neurochemical variations (glutamate) with add-on tDCS in schizophrenia patients with persistent auditory hallucinations**

10. Innovations in the project: (Give in about 100 words)

Schizophrenia pathogenesis is still an enigma. Years of research has provided little evidence related to pathophysiology and a large gap in knowledge remains. No new and effective treatment strategy has emerged targeting all domains of schizophrenia. This study, apart from focusing on improvement in auditory hallucinations, also evaluates the neural correlates of tDCS using state of the art techniques like MRI. This study is also novel, with respect to the evaluation of cognitive symptoms following tDCS. Further, this study also incorporates objective way of assessing improvement in hallucinations using computerized paradigm (Auditory Signal Detection task).

11. Significance of the outcome of the project: (Give in about 150 words)

Schizophrenia is amongst the top 10 disabling medical diseases and the leading disorder for in-patient care. About 30% of the patients with schizophrenia have symptoms like hallucinations which are resistant to standard treatment with antipsychotics. This study has important translational implications in the field of schizophrenia in terms of understanding and optimizing a novel treatment approach for

treatment-resistant symptoms (especially hallucinations). It provides a comprehensive evaluation of the clinical, cognitive, and neural parameters of tDCS in schizophrenia. This carries a significant role in treatment of schizophrenia, especially persistent hallucinations and cognitive dysfunction. This proposed study, with its robust and comprehensive research design will help in validating the findings of previous studies; this in turn will potentially help in better understanding of neurobiological correlates of auditory verbal hallucinations & the mechanism of action of tDCS, which might form a platform for developing new treatment strategies in schizophrenia.

12. Relevance in Public Health

Elucidating the mechanism of action of tDCS and the neural correlates of auditory hallucinations and cognitive dysfunction will help in better understanding of the illness.

tDCS can serve as a potential treatment alternative for pharmacotherapy resistant and intolerant patients. It can also become a treatment of choice for cognitive dysfunction in schizophrenia.

Signature of the Fellow /Faculty