

TRANSCRANIAL ELECTRIC STIMULATION OF THE CORTICOTHALAMIC PATHWAY: A NEW PREVENTIVE TREATMENT OPTION AGAINST SCHIZOPHRENIA?

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Psychoptic disorders are devastating mental illnesses, which miss a treatment free of detrimental effects. They are associated with sensorimotor and cognitive deficits, dysfunctional neural networks, and abnormal brain oscillations, which are thought to be responsible for the clinical disorganization. Gamma frequency (30–80 Hz) oscillations, naturally implicated in attention-related integrative processes, are excessively amplified during hallucinations, in at-risk mental states (ARMS) for psychosis and first-episode psychosis. So, gamma oscillations may represent a bioelectrical marker for cerebral network disorders with prognostic and therapeutic potential. Abnormally amplified gamma oscillations are reproduced in the corticothalamic system of healthy humans and rodents after a single systemic administration, at a psychotogenic dose, of the glutamate N-methyl-D-aspartate receptor antagonist ketamine. These translational ketamine models of ARMS are thus promising to work out a preventive noninvasive treatment against first-episode psychosis and chronic schizophrenia. Transcranial electric stimulation (TES) may be considered an appropriate preventive therapeutic modality because it can influence cognitive performance and neural oscillations. Clinical and experimental findings indicate that, together, the corticothalamic pathway, the thalamus, and the glutamatergic synaptic transmission form an etiopathophysiological backbone for psychotic disorders represent a potential therapeutic target for preventive TES of dysfunctional brain networks in patients with ARMS for psychosis.

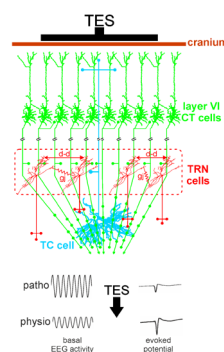


Figure : Transcranial electric stimulation of the corticothalamic pathway.

(Adapted from Pinault, Brain Sci, 2017)

Biography

Didier Pinault had been worked more than 7 years as an Engineer in a private pharmaceutical research group. In 1990, he completed his PhD in neuroscience from the Université Pierre-et-Marie Curie, Paris-VI. Then he had been worked for 7 years at Laval University, Quebec, Canada, to acquire further experience in anatomical and electrophysiological cell-to-network exploration of the sensorimotor corticothalamic system. He is the inventor of the juxtacellular recording-labelling technique. Since 1997, he is an Inserm Researcher devoted to understanding the pathophysiological cell-to-network dynamics of the functional connectivity between the cortex and the thalamus in animal models of absence-epilepsies and for schizophrenia. He got his accreditation to supervise research in 2001. He has published more than 40 papers in peer-reviewed journals.

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