Reactivation of NMDA Receptors by Synaptic Reentry Reinforcement, a Probable Cause of Auditory Hallucination in Schizophrenia

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Letter to Editor

One of the positive symptoms of schizophrenia is auditory hallucination [1]. Studies suggest that frontal and temporal lobes are involved in this disturbance [2]. Another research demonstrates that in schizophrenic patient the level of NMDA (N-methyl-D-aspartate) receptor subunits such as NR2D increases in the prefrontal cortex [3], which may lead to abnormal receptor activation which can cause irregular situations such as delusions and hallucinations [3,4].

On the other hand, "reentry circuits", i.e. neuronal circular pathways which recycle electrical impulses to cause positive feedback, have been used to demonstrate some functional aspects of heart or mind. For example, it has been mentioned that reentry circuits are responsible for some cardiac arrhythmias. A study shows that for strengthening memory, it is needed to reactivate NMDA receptors in the CA1 of hippocampus during first weeks after learning and it is supposed that "repeated post-learning reinforcement of synaptic modifications, termed synaptic reentry reinforcement (SRR)" is necessary for storage of information in the long-term memory [4].

Based on abovementioned points, we hypothesize that reactivation of NMDA receptors by SRR in temporal lobe of schizophrenic patients may be one of the involving factors which produced auditory hallucinations. Surely experimental studies are needed to validate this hypothesis.

References