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### The theory of "fractality of sensations": Possible applications in brain therapy and future research

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The theory of "fractality of sensations" was recently published, which for the first time substantiates that healthy functions of the brain and visual system are tied intimately to the fractal complexity of the temporal and spatial structure of the environmental visual, auditory and other cues, which accompany the person during his life. It follows from the theory that the loss for various reasons of the complex fractal characteristics of the environment stimuli can contribute to the simplification of network connections and the activity of the brain. It, in turn, can result in the distortion in the timing of CNS maturation (e.g., in amblyopia) and biological rhythms regulation and aggravate the age-related neurodegenerative disorders (e.g., in glaucoma, Alzheimer's diseases). An application of fractal flickering, sound pulses and other fractal rhythms seem to be effective in restoring the function of the brain and visual system, in particular, in patients with neurodegenerative diseases and amblyopia. The artificial fractal cues may underlie new therapeutic paradigms for the reactivation of brain plasticity. It determines the relevance of the elaboration of technologies providing the intermittent fractal stimuli of the complex temporal structure. Possible new directions for experimental and applied research based on the fundamental tenets of this theory must determine benefits of and indications for non-linear stimulation, and for the combined use of fractal stimulation and noise therapy. One should also explore the assumption that exposure to artificial visual and auditory stimuli with regular temporal structure may contribute to the decline in brain functions.

#### Biography

Marina Zueva, Professor of Pathophysiology, PhD, graduated from the Lomonosov Moscow State University (Department of Physiology of Higher Nervous Activity), received her PhD and Dr. Biol. Sci. degrees from Moscow Helmholtz Research Institute of Eye Diseases. Currently, she is the Head of the Division of Clinical Physiology of Vision at the Moscow Helmholtz Research Institute of Eye Diseases. She is a member of International Society of Clinical Electrophysiology of Vision (ISCEV), European Association on Vision and Eye Research (EVER), European Society of Retina Specialists (EURETINA), the Society for Research on Biological Rhythms (SRBR). She has published over ten peer-reviewed papers in English (over 80 in Russian) and presented over 60 topics at international conferences.

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