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Agonists and antagonists of specific serotonergic receptors in the treatment of cognitive, depressive and psychotic symptoms in Alzheimer's disease

Alzheimer's disease is a neurodegenerative disease with cognitive, depressive and psychotic symptoms. We summarize the neurotransmitter alterations above all in the hippocampus and frontal/temporal cortices. In these brain areas, hypoactivity of acetylcholine and hyperactivity of noradrenaline at the beginning of the disease and hypoactivity of noradrenaline can be found. Glutamate exerts an excitotoxic effect and the presynaptic inhibitory neurotransmitter GABA shows hypoactivity. In depressive symptoms, a deficiency of monoamines occurs in the brainstem and hippocampus. In psychotic symptoms, hyperactivity of dopamine and serotonin can be detected in the hippocampus and the ventral tegmental area. Neural networks in the corresponding brain areas are suggested. In Alzheimer's disease, 5-HT₄ and 5-HT₇ agonists and 5-HT₃ and 5-HT₆ antagonists have been suggested for the treatment of cognitive symptoms. In pioneer clinical studies, 5-HT₄ agonists and 5-HT₆ antagonists have shown a therapeutic effect, which was higher than placebo. In depressive symptoms, 5-HT reuptake inhibitors have a good therapeutic effect and can be used to treat aggressive behavior. In psychotic symptoms, 5-HT_{2A} antagonists and second generation antipsychotic drugs can be administered, although the adverse effects should be considered. Because in Alzheimer's disease, a neurotransmitter imbalance between GABAergic neurons with hypoactivity and NMDA glutamatergic neurons with hyperactivity can be found, the first clinical studies with combined GABA agonists and NMDA antagonists will be described.



Biography

Felix-Martin Werner studied Human Medicine at the University of Bonn. He has been working as a medical teacher in the formation of geriatric nurses, occupational therapists and assistants of the medical doctor at the Euro Academy in Pößneck since 1999. He has been doing scientific work at the Institute of Neurosciences of Castilla and León (INCYL) in Salamanca (Spain) since 2002. With Professor Rafael Coveñas, he assisted at over 30 national and 12 international congresses of neurology and published over 40 reviews and two books about neural networks in neurological and psychiatric diseases. Since 2014, he has belonged to the Editorial Board of the *Journal of Cytology & Histology*.

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