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Potential role of celecoxib and omega-3 fatty acids as adjuvant therapy with risperidone in experimentally-induced schizophrenia: possible effects on lysosomal membrane integrity and neuroinflammation

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Schizophrenia is a complex psychiatric disorder which markedly diminishes quality of life by its effects on cognitive, behavioral and emotional areas of functioning. The exact mechanism by which schizophrenia evolves is still unknown. Genetic, environmental factors, neurotransmitter, inflammation and oxidative stress are involved in pathophysiology of schizophrenia. β-glucuronidase is a member of the lysosomal glycosidase family that catalyzes breakdown of complex carbohydrates (hydrolysis of β-D-glucuronic acid residues) from the non-reducing end of mucopolysaccharides. The present study aimed to investigate the possible effects of celecoxib and omega-3 fatty acids on inflammation and lysosomal integrity as pathophysiological markers of schizophrenia. In the present study, amphetamine-treated rats received either ripseridone, celecoxib, omega-3 fatty acids, ripseridone plus celecoxib or ripseridone plus omega-3. The effects of treatment on brain β-glucuronidase enzyme activity and inflammatory markers including IL-6, Cox-2 and NF-kB were evaluated. Treatment with celecoxib or omega-3 fatty acids alone significantly reduced neurotoxicity which was indicated by reduction of brain β-glucuronidase enzyme activity. The anti-inflammatory effects of celecoxib and omega3 fatty acids were indicted by reduction of brain IL-6 level and decreased expression of brain Cox-2 and NF-kB. Addition of celecoxib or omega-3 fatty acids to risperidone also potentiated its effects on the measured parameters. In conclusion, celecoxib and omega-3 may be promising candidates as adjuvant therapy with risperidone to enhance its outcomes in schizophrenia.

Recent Publications

- Shakoor S, McGuire P, Cardno AG, Plomin R, Ronald A (2015) A shared genetic propensity underlies experiences of bullying victimization in late childhood and self-rated paranoid thinking in adolescence. Schizophr. Bull. 41(3):754-763.
- El Sisi A E, Sokkar S S, ElSayad M E, Ramadan E S, Osman E Y (2016) Celecoxib and omega-3 fatty acids alone and in combination with risperidone affect the behavior and brain biochemistry in amphetamine-induced model of schizophrenia. Biomedicine & Pharmacotherapy. 82:425-431.
- Goddard A, Leisewitz A, Kjelgaard-Hansen M, Annemarie T et. al. (2016) Excessive pro-inflammatory serum cytokine concentrations in virulent canine babesiosis. PLoS ONE. 11(3):e0150113.
- Messamore E and McNamara R K (2016) Detection and treatment of omega-3 fatty acid deficiency in psychiatric practice: Rationale and implementation. Lipids Health Dis. 15:25.
- Ettinger U, Meyhöfer I, Steffens M, Wagner M, Koutsouleris N (2014) Genetics, cognition and neurobiology of schizotypal personality: a review of the overlap with schizophrenia. Front. Psychiatry 5:18.

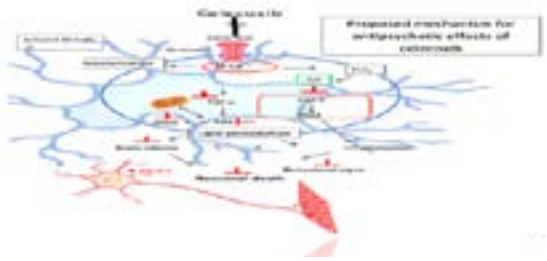

Figure 1: proposed mechanism for the effects of celecoxib

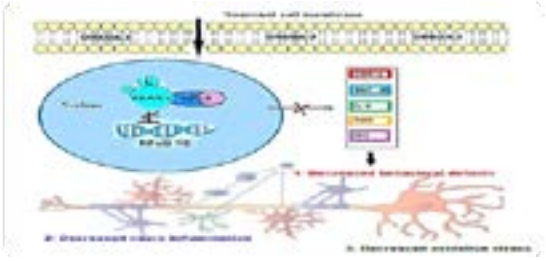

Figure 2: proposed mechanism for the effects of omega-3 FAs

Biography

Enass Y Osman is a Lecturer of Pharmacology and Toxicology, Faculty of Pharmacy, Tanta University, Egypt. Her expertise lies in pharmacotherapy and improvement of patients' compliances especially those with psychiatric disorders. My publications are directed toward introduction of new drugs for treatment of schizophrenic patients for improving their life. The paper is based on previous publications by Abekawa et. al. (2008) who used amphetamine for induction of schizophrenia in animals. Our researches aimed to investigate potential effects of drugs other than classical antipsychotics as adjuvant therapies in schizophrenia.

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