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Afaf El Ansary

King Saud University, Saudi Arabia

Translational study to understand the role of gut microbiome and gut-brain axis in modeling neurological disorders to evaluate recent treatment options: Special reference to autism

Translational medicine concentrates on the interface between experimental basic science on animal models of chronic diseases and clinical medicine. It aims to "translate" knowledge and mechanisms clarified by basic research into new approaches for early diagnosis and the treatment of different diseases. Translation in the reverse direction is also highly pertinent, namely the translation of clinical observations into novel research and treatment strategies. The gastrointestinal microbiota has been linked to several important neurological diseases such as Alzheimer's, Parkinson's, and neurodevelopmental disorders including autism spectrum disorders (ASD). Exposures to environmental toxins are now thought to contribute to the development of these diseases. Progress in understanding and treating brain diseases will require translational research efforts to transfer knowledge through successive fields of research from basic scientific discovery to public health impact. With special reference to autism, a developmentally abnormal gut microbiota may in turn affect both the gut-brain axis and brain development and contribute to the etiology of this disorder. Propionic acid (PA) found as a metabolic product of propionibacteria has been reported to mimic/ mediate the neurotoxic effects of autism. Results from animal studies may guide investigations on human populations toward identifying environmental contaminants that produce or drugs that protect from neurotoxicity. Propionic acid (PA) either orally administered or biologically induced in clindamycin or ampicillin-treated rat pups will be used to induce persistent autistic features and to ascertain the role of overgrowth of propionic acid producing bacteria in inducing autistic features in rodent models. In intoxicated rats, a panel of biomarkers were investigated and compared to healthy untreated rat pups. These biomarkers were selected to measure DNA damage, glutamate excitotoxicity, oxidative stress, neurochemistry, mitochondrial dysfunction, and neuroinflammation as signaling pathways closely related to brain diseases. The selection of these markers was based on our clinical data obtained from patients and recorded high specificity and sensitivity when analyzed using Receiver Operating Characteristics (ROC) and excellent predictive values using predictiveness curves. Modeling of neurological disorders in general, can help in testing the protective or therapeutic efficacy of many selected supplements as beta lactam, bee pollen, prebiotic, probiotic, and other natural products as treatment options that are effective in restoring the normal healthy gut microbiota.

Biography

Afaf El Ansary is a Biochemist, graduated from Biochemistry Department, Ain Shams University, Egypt in 1974. She worked in the National Research Centre, Egypt from 1976-2000, from 2001-2015. She works as a Teaching Staff Member in Biochemistry Department, King Saud University, KSA. Since 2016, she is working as Senior Scientist in the central laboratory, KSU. She was recognized by the Marquis Who's Who in science and engineering, 8th edition, 2005-2006. She is Member in number of national and international societies and she is recorded as reviewer and Editorial Board Member in many international journals. In recent years she focused on the screening of biochemical markers related to autism with special attention to the role of gut-brain axis and she got more than 100 published papers in high impact factor journals related to this research interest. She is Member in Predictive, Preventive and Personalized Medicine Society (Moscow).

elansary@ksu.edu.sa