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Comet assay for testing the neurotoxic effect of orally administered propionic acid and induced gut bacterial imbalance: Protective potency of carnosine and carnitine

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Background: Comet assay is a quick method for assessing DNA damage in individual cells. It allows the detection of single and double DNA strand breaks which represent the direct effect of some damaging agent. This work aims to use comet standard quantification models to compare the neurotoxic effect of orally administered propionic acid (PA) to that produced as metabolite of bacterial overgrowth induced by clindamycin. Additionally, the protective effect of carnosine and carnitine as two natural dietary supplements was assessed.

Methods: Single cell gel electrophoresis (comet assays) were performed on brain cortex and medulla after being removed from the nine studied groups of hamsters, served as control, PAintoxicated, clindamycin- treated together with carnosine and carnitine treated or protected groups.

Results: The obtained data show a significant double strand breaks recorded as tail length; tail moment and % DNA damage in PA and clindamycin-treated brain cortex and medulla compared to control-untreated hamsters. Moreover it proves the neuroprotective effect of carnosine and carnitine. Receiver Operating Characteristics curve (ROC) analysis show satisfactory values of sensitivity and specificity of the comet assay parameters.

Conclusion: Percentage DNA damage, tail length, and tail moment are feasible to be used as biomarkers of PA neurotoxicity when given either orally or as metabolite of induced enteric bacterial overgrowth. Establishing biomarkers for these two exposures is of importance to protect the health of children and could be helpful in controlling the prevalence of autism, a disorder recently related to PA neurotoxicity.

Biography

Amina ELgezeery has done her Ph.D. in Biochemical Human Genetics, Medical Research Institute Alexandria University, Egypt. She is an Associate Professor of Biochemistry Department, King Saud University, Saudi Arabia. She was an Associate Professor at Human Genetics Department, Medical Research Institute Alexandria University, Egypt. She has worked as an Ass. Prof. of Biochemistry at the Biochemistry Department, College of Science, King Saud University, Saudi Arabia. She holds a membership of Scientific Committee of the Genetic Counseling Society, Alexandria, Egypt.

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