LIFE SPAN AND LOCOMOTOR ACTIVITY MODIFICATION BY GLUCOSE AND POLYPHENOL DIET IN DROSOPHILA MELANOGASTER CHRONICALLY EXPOSED TO PARAQUAT: IMPLICATIONS IN PARKINSON’S DISEASE

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Parkinson’s disease is a common progressive neurodegenerative disorder for which at present no causal treatment is available. Therefore, other approaches are critically needed for PD patients. Substantial evidence suggests diet, in particular iron intake, and environmental risk factors such as pesticides as causative of PD. However, how the nutritional status of PD patients might contribute to the development of the disorder is not yet established. In the present study, we have used Drosophila melanogaster to investigate the effect of paraquat and iron alone or in combination and polyphenols (e.g., gallic acid (GA), propyl gallate (PG), epicatechin (EC), epigallocatechin-3-gallate (EGCG)) upon two different glucose feeding regimens on the life span and locomotor activity of the fly. We demonstrated for the first time that life span but not locomotor activity can be modulated by increasing the glucose concentration from 1% to 10% when flies were exposed either to increasing concentrations of PQ, to increasing concentrations of iron or to PQ and iron. Strikingly, locomotor activity but not life span can be modulated by polyphenols. However, when flies were exposed simultaneously to 10% glucose and polyphenols, survival and locomotor activity were almost unaffected upon paraquat exposure. We proposed that a combined therapy with antioxidant and high energetic agents should be provided to pre-clinical genetically individuals at risk to suffer PD to delay or prevent motor symptoms and/or frank PD. These data may contribute to a better understanding of the inherent nutritional status, genetic predisposition and environmental agents as causative factors of PD.