The Effect of EGCG on Oxidative Stress in C. elegans

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Oxidative stress in blue light exposed C. elegans was previously assessed because human adults spend approximately 11 hours per day exposed to excessive blue light from various technologies which could harm individuals' health. It was previously found that blue light elevated oxidative stress in C. elegans; therefore it will likely increase oxidative stress in humans as well, potentially leading to diseases including cancer, cardiovascular, and neurodegenerative diseases. Epigallocatechin gallate (EGCG), a derivative of green tea, was evaluated as a solution because it is a strong antioxidant and bioactive polyphenyl. Four groups of C. elegans were created, and each group was exposed to a different concentration of EGCG (0μM, 50μM, 200μM, or 300μM) before undergoing juglone induced oxidative stress. C. elegans were submerged in dichlorofluorescein diacetate causing oxidative stress byproducts to fluoresce. Oxidative stress was observed with a Zeiss fluorescence microscope then quantified with Image J software and the corrected total cell fluorescence formula. The oxidative stress in C. elegans exposed to 50μM (1,900,416.76 +/- 334,644.96), 200μM (245,312.12 +/- 49,221.15), and 300μM (759,605.50 +/- 185,173.36) of EGCG were all significantly less than those without EGCG (4,850,824.39 +/- 1,025,087.54, df=47, $p<0.05$). Green tea is globally produced, which means EGCG could cost-effectively and equitably be utilized to combat blue light induced oxidative stress, once a precise dose is determined. EGCG could positively impact social and economic development as it would be accessible and versatile healthcare.