Tinted Truths: Revealing the Relationship Between Tartrazine and the Dysregulation of Retrotransposons and p53 Expression in Drosophila melanogaster

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The p53 gene is a tumor suppressor in the human body that is mutated in 50-60% of human cancers. p53 acts to suppress retrotransposons (jumping genes) within the genome which are prevalent in a multitude of diseases and cancers. This study aimed to find a possible link between the consumption of tartrazine (yellow five food coloring) and increased retrotransposons. The purpose was also to see if Curcumin (the active ingredient in turmeric) could suppress retrotransposon activity in the genome, similar to 3TC (a suppressor of retrotransposon activity). The study was done using the UAS-Gal4 system in Drosophila melanogaster (fruit fly). Firstly, a fly cross was done that caused the dysregulation of retrotransposons in the genome of the progeny, which in turn increased p53 expression. The flies were fed with the test compounds throughout their life cycle. The F1 generation female ovaries were dissected to observe the percentage of GFP (indicative of retrotransposon activity) that was found in the genome. After performing a T-Test, it was proven that Tartrazine caused a statistically significant increase in retrotransposon activity and hence p53 activity, while curcumin was similar to the control group. 3TC showed a statistically significant decrease in dysregulation of retrotransposons. This suggests that tartrazine may be causing the derepression of retrotransposons within the genome resulting in p53 activation. This information could help with the prevention of diseases like cancer, Alzheimer's, etc. Hence, tartrazine could be causing the onset of such detrimental diseases and these effects could be mitigated by using curcumin instead.

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