The Effect of 460 Nm Light on Seizure-Like Activity (SLA) in Bang-Sensitive Drosophila as Measured by Seizure Velocity, Distance Traveled and Seizure Duration

Farr, Margaret (School: Saratoga Springs High School)

Epilepsy is a neurological disorder affecting a significant percentage of the human population. It is characterized by seizures that occur when neurotransmitter inhibition fails. One well-identified trigger leading to epileptic seizures is sleep deprivation. Interestingly, exposure to blue light before sleep exacerbates sleep deprivation. For these reasons, it appears that coupling sleep deprivation with blue light exposure could potentially lead to more intense seizures. To test this hypothesis, two strains of bang-sensitive epileptic fruit flies and one strain of wild-type fruit flies were used as test subjects to study seizure-like activity (SLA) as measured by seizure velocity, distance traveled during seizure, and seizure duration. Groups were exposed to varying hours of blue LED light during normal resting periods and were sleep deprived using a mechanical tilt table. Subjects were mechanically shook using an electric sander after sleep periods to induce seizures and the subsequent seizure activity was recorded with a video camera. Data on seizure movement was then generated using Vernier LoggerPro, a physics data application, and was analyzed using a paired two-tailed student t-test on Microsoft Excel. Results suggest that for flies predisposed to seizures, longer blue light exposure leads to greater distance traveled and higher velocity during seizures. This study suggests that for epileptic humans, exposure to blue light before sleep may lead to more intense seizures, but future experimentation is expected to support this claim.

Awards Won:
Fourth Award of $500