Assessing Epilepsy Medicine by Measuring the Planarian Neural Activity Using Suction Electrode and Patch Clamp Amplifier

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Across the world, fifty million people are affected by epilepsy or seizures. A major challenge in treating seizures is assessing the efficacy of anti-convulsants. Previous studies have already used planaria as a model to measure the effect of anti-convulsants by counting their seizure-like movements (pSLM) when exposed to convulsants. These studies visually counted the movements, thus introducing human error. The hypothesis of this study was that pSLM's correlate with neural electrical activity and such activity may be measured quantitatively. This research included 3 steps: 1) pSLM's were visually counted when planaria were placed in separate solutions containing convulsants (Glutamate or Picrotoxin), a mix of convulsant and anti-convulsant (2-PBA), or in a control solution (artificial pond water). 2) The planaria neural electrical activity was measured, while in each respective solution, using a self-made suction electrode and a patch clamp amplifier (EPC 7). 3) Data from tests were compared and analyzed. The results show that planarian neural electrical activities are distinctly regulated by convulsant and anticonvulsant drugs, and can be quantitatively measured. This research shows that measuring planaria neural activities using this method could be an objective and low-cost model to assess the effectiveness of anticonvulsants for epilepsy treatment.

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