Effects of Kaempferol on Microglia Activation in Inflamed Brain Tissue: An Immunohistochemical Analysis

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Traumatic brain injuries (TBIs) are a major public health concern within the United States alone, with approximately 2.5 million cases reportedly annually (CNS, 2021). TBIs contribute to significant long-term disabilities, which can lead to symptoms such as cognitive dysfunction, mood disturbances, memory loss, and even motor dysfunction. Despite this being a well-known public health concern, the supply of protective treatments are limited. Some vary from surgeries that remove skull fragments to reduce pressure to other severe cases that result in patients being coma-induced. This calls for a new, effective treatment that is needed for positive results. One approach to this new medication is the use of Kaempferol: a plant-based flavonoid found in greens and vegetables with antioxidant and anti-inflammatory properties that could help with TBI symptoms. To test this medication, the brain tissues were separated into three groups: Sham (control), Vehicle (placebo solution), and Kaempferol (kaempferol solution), and analysis were conducted as part of this study. Using a cryostat machine, the primary and secondary antibodies of CD68 and IBA-1, Superfrost Plus Microscope Slides, and an Epifluorescence Microscope, the activity of microglia were further analyzed. It demonstrated that vehicle-treated brain tissue had elevated CD68 expression, while kaempferol-treated brain tissue showed a reduction of microglial activity. It can be inferred that this reduction supports motor recovery, sensory integrity, and anti-inflammatory mechanisms that may serve as a support for potential applications for future TBI clinical treatments.

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