Utilization of Epigallocatechin Gallate and Serine/Asparagine Compounds as a Natural Therapeutic for Glycosylation-Inhibited Breakdown of the Zika Virus Ectodomain

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Zika(ZIKV) poses unknown long-term threats to both adults and infants. Much inability to combat it comes from its complex envelope structure and resulting atypical biochemical properties. Therefore, effective treatment that is safe for expectant mothers is needed. Epigallocatechin gallate(EGCg), a green-tea-polyphenol, has shown promise in inhibiting entry but is easily metabolized and too weak to pass the detection threshold. It was hypothesized that by inducing an inhibitory alkaline environment for protein maturation via glycosylation, effectivity of EGCg in reducing antigenic integrity would improve. ZIKV antigen samples were exposed to both Henderson-Hasselbalch-calculated alkaline N-linked-Asparagine/or O-linked-Serine glycosylation simulations of varying concentrations(serially-diluted)with EGCg combined. pH were found most favorable between pI-pKa correlated to efficacy, ranging from 4.98 to 9.15. A CLint test was done to scale in vivo bioavailability. After incubation, an ELISA was done to analyze antigenic identity. All experimental groups of combination improved the control's efficacy in hiding epitopes by atleast 71% as plotted through dosage-response-analysis, particularly the Serine/O-linked pathway at 89%. ANOVA/Tukey tests first showed that experimental combinations had no significant mean difference across concentrations, however, the experimental group showed difference at lower concentrations with F values of .42 at p=.05. Additionally, half-life of the composite proto-drugs increased by 1.9 hours. This states that this innovative two-front hemifusion-and-glycosylation inhibitor is an enhanced, naturally-derived treatment that shows primacy in passing detection thresholds of 60% and could be developed into a formal drug to treat ZIKV infection safely.

Awards Won:

Serving Society Through Science: Second Award of $500