Inhibition of LPS-Induced Inflammation in Macrophages Through Natural Anti-Inflammatory Compounds

Puri, Anusha (School: Mills E. Godwin High School)

Chronic inflammation can lead to the buildup of proinflammatory cytokines and result in a plethora of diseases from arthritis to asthma. This has led to a need for safe and natural anti-inflammatory solutions. The purpose of this project was to find how certain natural anti-inflammatory compounds affected LPS-induced inflammation in macrophages. The independent variable was the anti-inflammatory compound, specifically gingerol and apigenin, both of which are found in produce and used as herbal remedies. The dependent variable was the response of proinflammatory cytokines (IL-6, IL-1ß, TNF-a). The negative control was no inflammation (0 ng/mL LPS) while the positive control was 50 ng/mL of LPS. Mouse macrophages were treated with 1, 5, and 20 µm of each anti-inflammatory compound along with the positive and negative control. The proinflammatory response was measured using RT-PCR. It was hypothesized that both compounds would be effective at suppressing inflammation but that apigenin (20 µm) would be more effective based on previous studies. The data was analyzed using a two-way ANOVA, comparing compound type and concentration (a=0.05). Across all three proinflammatory cytokines, the main effect of compound concentration was significant whereas compound type was not significant, showing that the natural anti-inflammatory compounds' effects were concentration dependent. While both compounds successfully suppressed inflammation, apigenin was not significantly better at suppressing inflammation, so the hypothesis was not supported. Accuracy of the results could be improved by avoiding any possible RNA contamination and including more trials. Future studies include testing other natural compounds or proinflammatory cytokines.

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