The Effect of Monosodium Glutamate on the Degranulation of Lymphocytes in Serum and Red Blood Cells

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MSG is a food additive that causes negative side effects such as nausea and headaches. These symptoms are caused by the degranulation of lymphocytes. Tryptase is a major component of lymphocytes and mast cell granules which mediates histamine activity. The purpose of my experiment is to measure the degranulation of lymphocytes in the blood of a person who is sensitive to MSG using an ELISA assay (enzyme-linked immunosorbent assay). An ELISA assay records and displays the optical density of samples to determine the levels of histamine released. After calculating the average values for each test group and the samples with tryptase inhibitor, I subtracted the average of the samples with inhibitor from the corresponding test group to calculate the total difference. I then subtracted the average of the blanks. There was an increase in the amount of histamine released when serum was exposed to 0.015 M MSG, 0.03 M MSG and somewhat less histamine released at 0.06 M MSG. This suggests that the dose response at which lymphocytes degranulate in the presence of MSG is between 0.03 M and 0.06 M for self-reporting MSG sensitive individuals. The results for erythrocytes produced virtually no histamine release associated with the red blood cells. This is consistent with the principle that the immune response is in the lymphocytes that are isolated in the serum of the blood. Using a tryptase positive control serial dilution from 10 µg/ml to 0.015 µg/ml, I compared the optical density values using a t-test and Cohen's d with a P value at 0.05 to determine the significance of the data. The comparison of the optical densities of the control to 0.15 M MSG and 0.03 M MSG, 0.15 M MSG to 0.06 M MSG, and 0.03 M MSG to 0.06 M MSG were statistically significant with a large effect size.

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