Gut-Skin Axis Theory: A Novel Approach to Alleviating Eczema Symptoms by Identifying Direct Relationships Between the Gut and Skin Bacteria

Shao, Jason (School: Nicolet High School)

This experiment's purpose was to analyze the direct relationship between the gut bacteria E. coli and L. acidophilus and the skin bacteria S. epidermidis. To begin, a preliminary trial was performed in order to find a growth medium/condition that would bring out the full growth potential of the bacteria. When the bacteria were streaked onto nutrient agar, BHI agar, MRS agar, and trypticase soy broth and placed in an aerobic, slightly anaerobic, and anaerobic environment, BHI in a slightly anaerobic environment was found to allow E. coli and S. epidermidis to prosper and indicated promising growth of L. acidophilus. Stage 1, cross-streak trials, involved the E. coli and L. acidophilus being streaked down the middle of a petri dish and S. epidermidis streaked perpendicular to the middle. The TPIS(%), area grown(mm2), and area inhibited(mm2) were recorded. Overall, E. coli did result in higher inhibition numbers, however, due to several variables such as the weak growth of L. acidophilus, the prediction to this stage was inconclusive. To further investigate the relationship between E. coli and S. epidermidis, stage 2 utilized the side-by-side spotting technique to compare the growths of the bacteria when placed at different distances from each other. As the initial distance decreased between the two bacteria, the growth change was less than that of the control groups. To verify these results, more trials would need to be performed. Overall, this research project furthered a stronger understanding of the direct relationship between skin and gut bacteria.