The Impact of Varying Levels of Hydration on Concussion Severity

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The purpose of this project was to determine if increased hypohydration of a sheep brain is directly correlated with brain tissue damage after exposure to a concussion-inducing force. The hypothesis of this experiment was that greater hypohydration increases the severity of the tissue damage. Three experimental groups and one control group were set up, each with three replicates. Each group was dyed using Rit blue dye and then dehydrated to varying degrees before undergoing force testing that applied a concussion-inducing force to the frontal lobe of the sheep brain. The control group did not experience force testing. Samples were taken from the right side of the frontal lobe post-impact and analyzed using Adobe Photoshop software. The tissue analysis focused on the dyed regions of the brain tissue, where darker, more concentrated tissue indicated more tissue compression. The hydrated test group had the highest average percentage of compressed tissue, with a percentage of 52.96%. The mild and severe hypohydration groups both experienced averages lower than the hydrated and control, with 44.29% and 40.84% respectively. A single-factor ANOVA test was run, resulting in a p-value of 0.233. The hypothesis was not supported because the most hydrated group experienced the most tissue damage. This is likely due to the large variability in the data and the many uncontrollable factors of the experiment.

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