ACTN3, ACE, PPARD, and Outside Factors Influencing High School Male Athletes' Choice to Pursue a Sport

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The focus of the study was to examine possible effects of genetics and external factors on teenagers' tendency to choose one sport over another. Trainability of athletes, familial influence, and an individual's dedication to a certain sport are all external factors that may impact athletic ability. Here, the correlation between sport played and genotype in male athletes (ages 14-18) for variants of the genes ACTN3, ACE, and PPARD was evaluated. Saliva samples were collected from 40 test subjects (ten football players, ten soccer players, ten cross country runners, and ten non-athletes). Participants were also asked to complete a survey. DNA was extracted from samples and PCR was performed to amplify genes of interest. Gel electrophoresis was used to examine PCR products. Amplified DNA products were prepared and sent to The Jackson Laboratory for sequencing. Some results were analyzed with 4Peaks for variant identification. Researchers performed an ANOVA test on the survey data and Fisher's Exact test on the allele frequency data. On the survey, participants were asked to rank how strongly they feel their family is sports oriented. A significant difference was found between the response ratings of football players (4.10 +/- 0.31) and the control group of non-athletes (2.70 +/- 0.33) ($p=0.04$). There was no significant difference between sport and genotype for the ACTN3 gene ($p=0.80$) or for the ACE gene ($p=0.06$). PPARD had only a 35% success rate for usable data, so a statistical test was not run. Although no influence between an athlete's sport and their genotype was established, familial pressures do play a role in a high school athlete's decision to play a sport. For future experimentation, if time and funds allow, a larger sample size should be obtained.

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