



Genetics Influence Neurocognitive Performance at Baseline but Not Concussion History in Collegiate Student-Athletes

Kenneth P. Barnes

From the Department of Exercise Science, Elon University, Elon, USA

Abstract:

Objective: This study investigates 4 single-nucleotide polymorphisms [Apolipoprotein E (APOE), APOE promoter, catechol-Omethyl transferase (COMT), and dopamine D2 receptor] that have been implicated in concussion susceptibility and/or cognitive ability in collegiate student-athletes.

Design: Cross-sectional study.

Setting: Neuroscience laboratory at Elon University.

Participants: Two hundred fifty division I collegiate student-athletes (66 women, 184 men) from various sports.

Intervention: All participants completed Immediate Post-concussion Assessment and Cognitive Testing (ImPACT) testing at baseline concussion testing and had a buccal swab taken for DNA for genotyping.

Main Outcome Measures: Self-reported history of concussions and neurocognitive performance were taken from ImPACT.

Results: Individuals carrying an e4 allele in their APOE gene had a significantly slower reaction time ($P=0.001$). Individuals homozygous for the Val allele of the COMT gene showed significantly worse impulse control scores ($P=0.014$). None of the genotypes were able to predict self-reported concussion history in collegiate student-athletes.

Conclusions: These results indicate that certain genotypes may influence performance on cognitive testing at baseline and that the APOE genotypes may not influence concussion susceptibility as suggested by past studies.

Key Words: concussions, mild traumatic brain injury genetics, neurocognitive performance, cognitive function.



Biography

Dr. Kenneth P. Barnes is an orthopedic surgeon in Greensboro, North Carolina and is affiliated with one hospital. He has been in practice between 11-20 years.

Publication of speakers:

1. Langlois JA, Rutland-Brown W, Wald MM. The epidemiology and impact of traumatic brain injury: a brief overview. *J Head Trauma Rehabil.* 2006; 21:375-378.
2. Belanger HG, Curtiss G, Demery JA, et al. Factors moderating neuropsychological outcomes following mild traumatic brain injury: a meta-analysis. *J Int Neuropsychol Soc.* 2005;11:215-227.
3. Finnoff J, Jelsing E, Smith J. Biomarkers, genetics, and risk factors for concussion. *PM R.* 2011;3(10 suppl 2):S452-S459.
4. Mahley RW, Weisgraber KH, Huang Y. Apolipoprotein E 4: a causative factor and therapeutic target in neuropathology, including Alzheimer's disease. *Proc Natl Acad Sci U S A.* 2006;103:5644-5651.
5. Lynch JR, Pineda JA, Morgan D, et al. Apolipoprotein E affects the central nervous system response to injury and the development of cerebral edema. *Ann Neurol.* 2002;51:113-117.

Webinar on Sports Medicine and Physiotherapy, August 29,2020 London, UK

Citation: Dr. Kenneth P. Barnes, Genetics Influence Neurocognitive Performance at Baseline but Not Concussion History in Collegiate Student-Athletes, Webinar on Sports Medicine and Physiotherapy, August 29,2020 London, UK