and 2016-2021, there was a 36.8% increase in days missed for an adductor injury even with a similar proportion of injury severity in both groups. Analysis did not identify any player or injury characteristics including position, weather condition, or field type significantly associated with RTP. The current findings suggest that a high risk of re-injury has contributed to employment of a longer rehabilitation period before RTP to prevent re-injury. These lengthened timelines might be justified given the significant decrease in adductor re-injury rate between 2010-2015 and 2016-2021 seasons (p = 0.0040).

Category: Sports Medicine

The Cytokine Profile of Mesenchymal Stem Cells Changes with Culture Expansion

Abstract ID# 23268
All Authors:
Jacob G Calcei MD UNITED STATES
Tracey L Bonfield PhD UNITED STATES
Ryan James Furdock MD UNITED STATES
David Richard Fletcher BS UNITED STATES
Evan Rudo BS UNITED STATES
James E. Voos MD

Summary:
Culture-expanding human, bone marrow-derived mesenchymal stem cells alters their cytokine profile, impacting their regenerative potential.

Data:
Introduction: Biologic treatments for articular cartilage injury and degenerative joint disease are increasing in demand by active patients. Human bone marrow derived mesenchymal stem cells (BM-MSCs) have garnered interest as a treatment for their ability to differentiate into cells of chondrogenic lineage and their production of cytokines and/or growth factors. Culture expansion of BM-MSCs has the potential to enhance these capabilities. During expansion, BM-MSCs undergo multiple rounds of purification and multiplication, termed “passages”, which may to alter potency and clinical efficacy. We sought to evaluate the change in cytokine profile during cell expansion. Methods: Nine BM-MSC cell lines from 3 human donors underwent an institutional culture expansion protocol. Levels of OA-related cytokines (IL-1ß, IL-6, IL-8, IL-10, Stem cell Factor [SCF], Stem Cell Derived Factor-alpha [SDF-a]) were evaluated at three stages of culture expansion: passage 2 (P2), passage 3 (P3), and passage 4 (P4) utilizing Luminex multiplexing technology. Results: BM-MSC culture expansion altered cytokine profiles in vitro. BM-MSC specific cytokines had defined trends during passage from P2 to P3 and then to P4 (Figure 1). Passage from P2 to P3 demonstrated a decrease in SDF-a, IL-6 and SCF (P<0.05). Although the number of samples evaluated were fewer, the trend continued to be less at P4 (P<0.05). For IL-8 and IL-1ß, the transition from P2 to P3 resulted in an increase in cytokine production (P<0.05), but by P4 trended downward. Discussion and Conclusion: BM-MSC culture expansion causes changes in OA-relevant cytokines. Further study of the variation in cytokine profile at other stages of BM-MSC preparation (e.g., bone marrow aspirate, P0, P1, through P4) will clarify differences between cytokine profiles of currently used OA therapies, such as bone marrow aspirate concentrate, and expanded BM-MSCs. This study provides initial insights that may guide the process of culture-expansion when using BM-MSCs to treat degenerative joint disease.