

In Vitro Effects of Autologous Conditioned Plasma (ACP)

Arthrex Research and Development

Introduction

ACP is currently being used to extract platelet concentrate from peripheral blood and apply growth factors within the concentrate at an orthopaedic surgical site. The purpose of this study was to elucidate that ACP has the ability to increase cell proliferation in a cell culture model.

Methods and Materials

Human tenocytes, osteoblasts, chondrocytes, and myocytes were plated at a concentration of 5000 cells/well (2800 cells/cm²) in tissue culture plates. Cells were plated at a low concentration to ensure that they would have enough room to expand. Three different treatments were given to the cells – (1) a negative control group of 2% or 5% fetal bovine serum (FBS); (2) a positive, proliferative control group of 10% or 15% FBS; and (3) ACP. After a 5-day culture period, cells were treated with tritiated thymidine and counted with a scintillation counter. Results are reported as average \pm standard deviation in disintegrations per minute (DPM). This measurement is an indicator of cell proliferation.

Results and Conclusion

After 5 days of culture, ACP-treated tenocytes (Figure 1), osteoblasts (Figure 2), chondrocytes (Figure 3), and myocytes (Figure 4) demonstrated increased proliferation over positive and negative controls ($p < 0.05$). This study showed that ACP has the ability to increase cell proliferation in an *in vitro* model for different relevant cell types.

Figure 1.

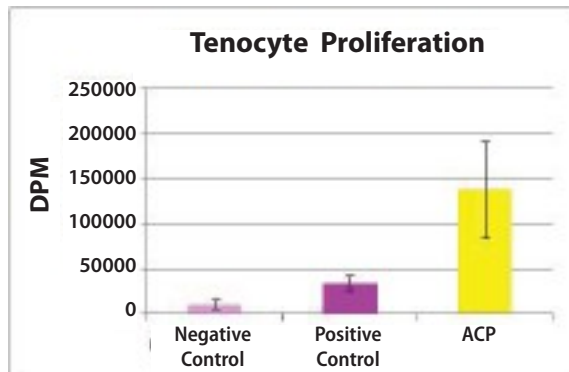


Figure 2.

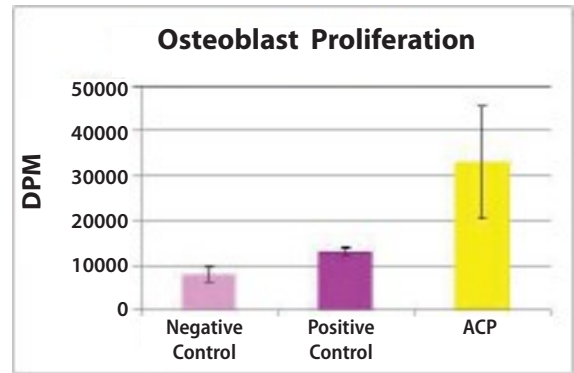


Figure 3.

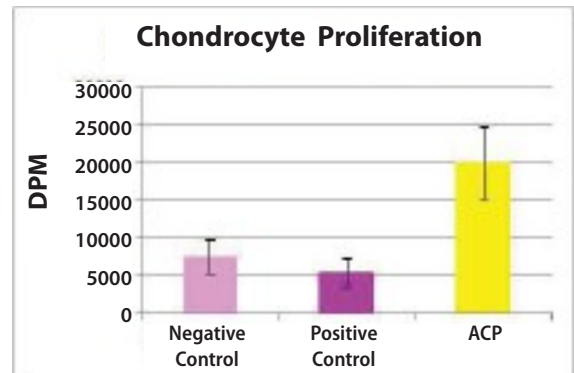
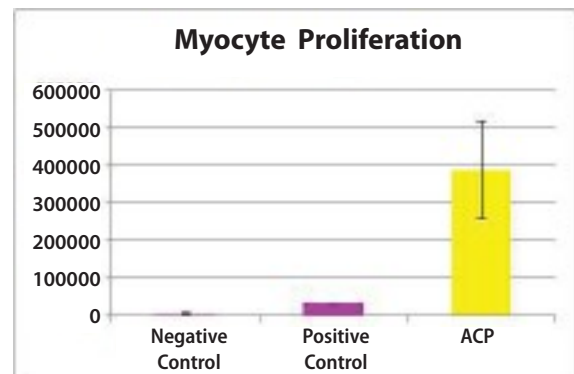


Figure 4.



The Double Syringe (ACP) System is used to facilitate the safe and rapid preparation of autologous platelet-rich-plasma (PRP) from a small sample of blood at the patient's point of care. The PRP can be mixed with autograft and allograft bone prior to application to an orthopaedic surgical site as deemed necessary by the clinical use requirements.