



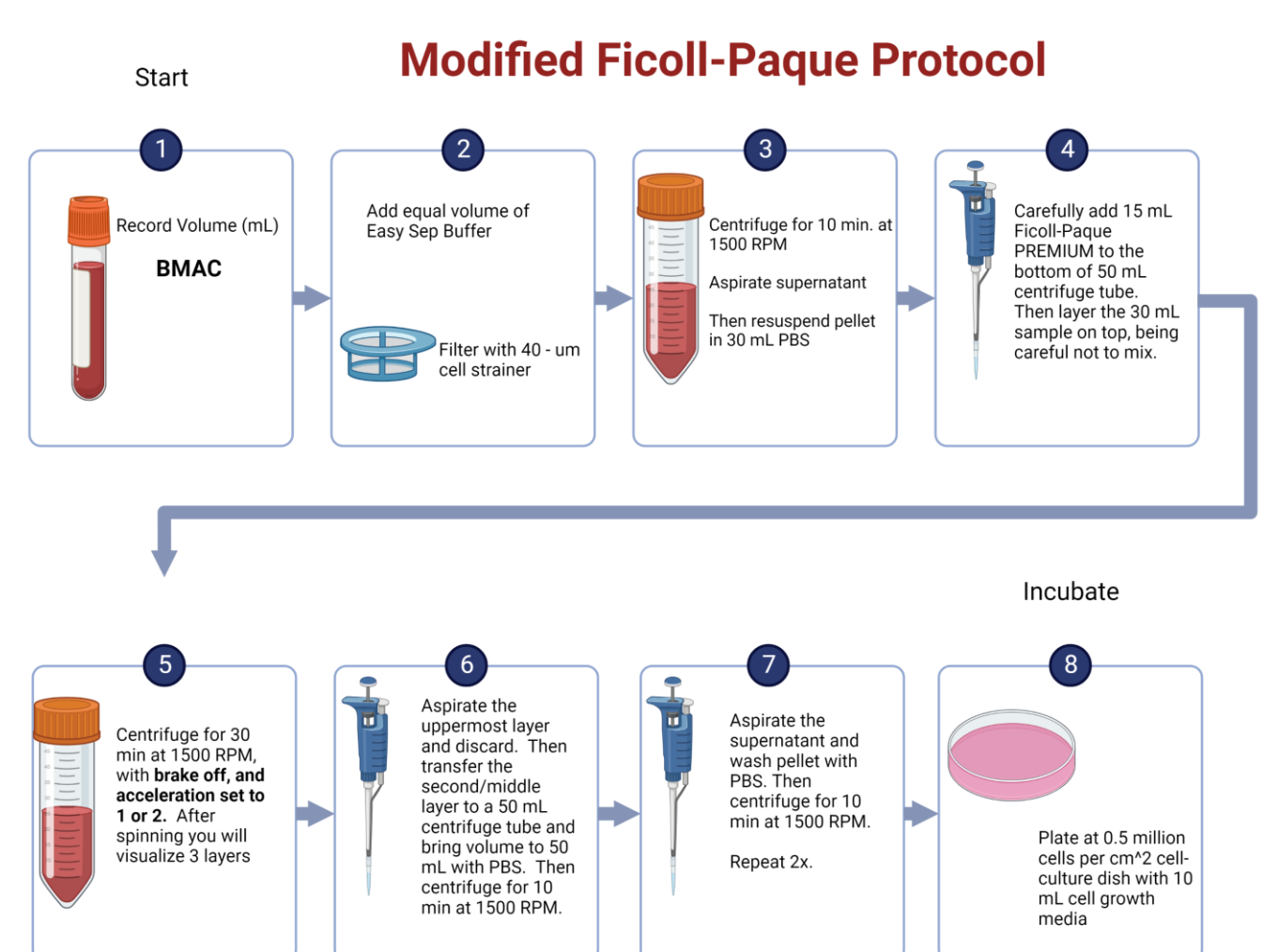
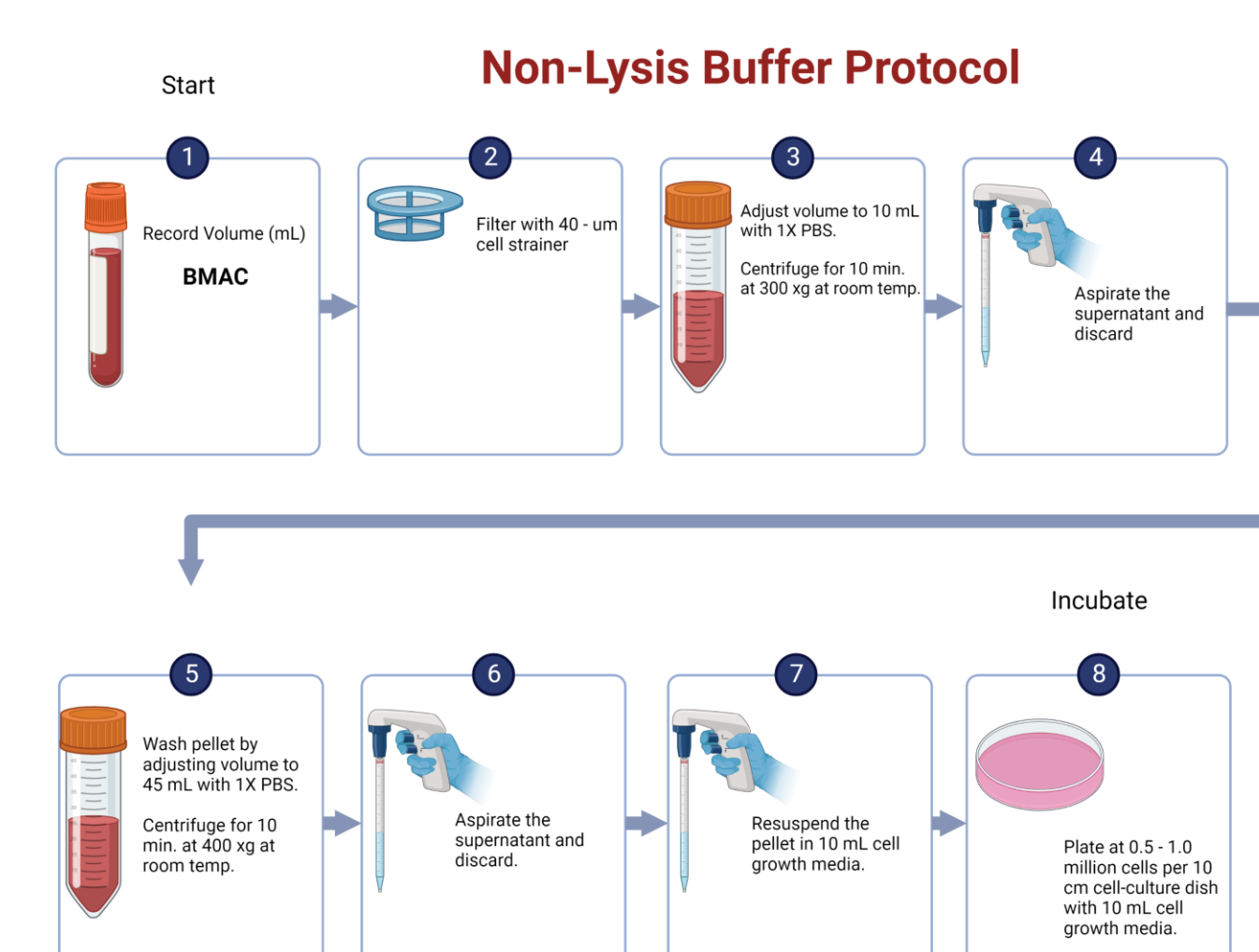
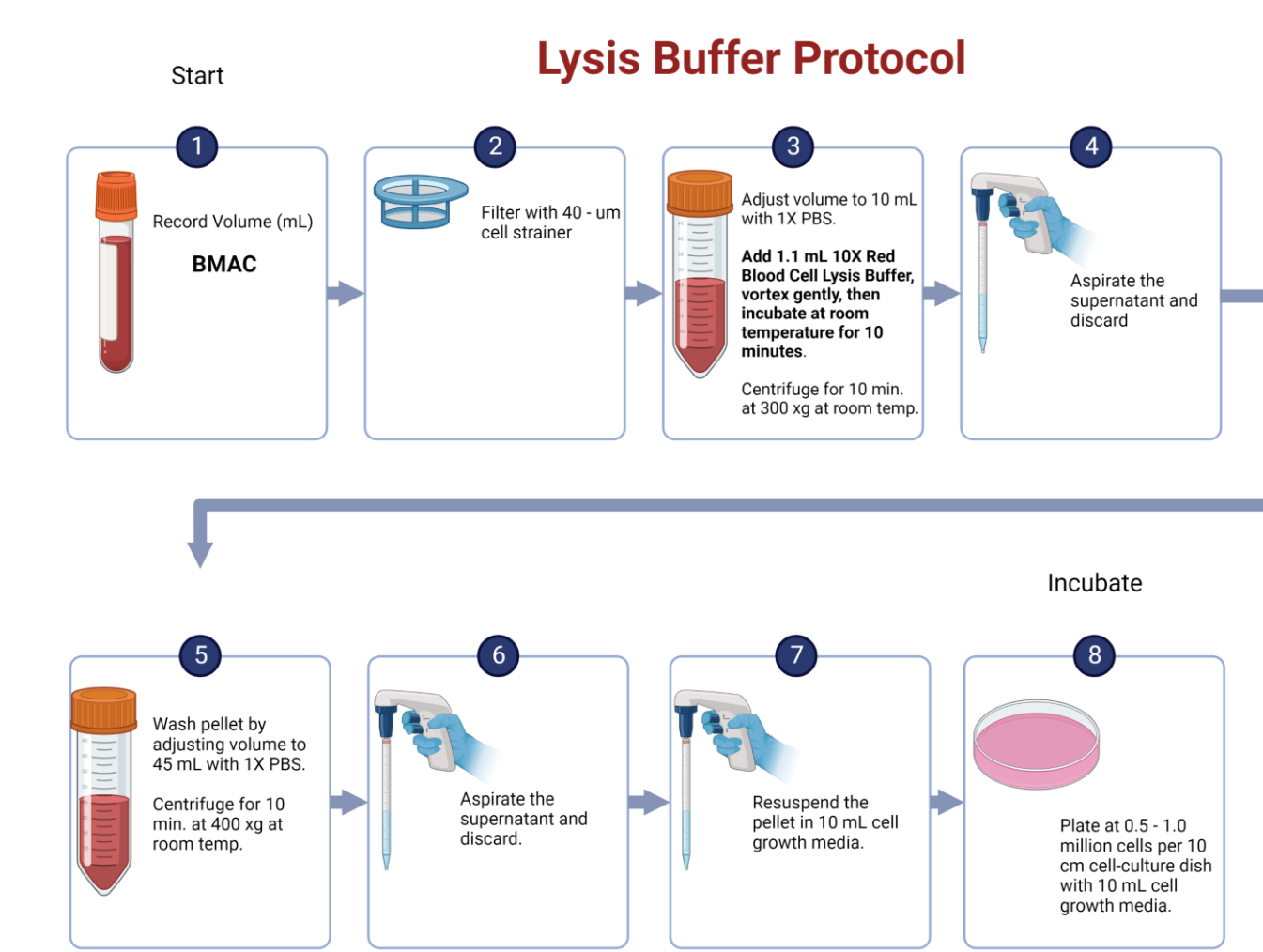
BACKGROUND

Bone marrow is a reservoir for many stem cells and progenitor cells that give rise to musculoskeletal lineage cells. However, also found in the bone marrow are stem cells that give rise to fibroblast-like cells, which modulate hematopoiesis through direct cell-to-cell contact and the secretion of regulatory molecules. These regulatory cells can modulate hematopoiesis in both positive and negative ways. The specific stem cells which give rise to fibroblast-like cells are called colony-forming unit-fibroblast (CFU-F).

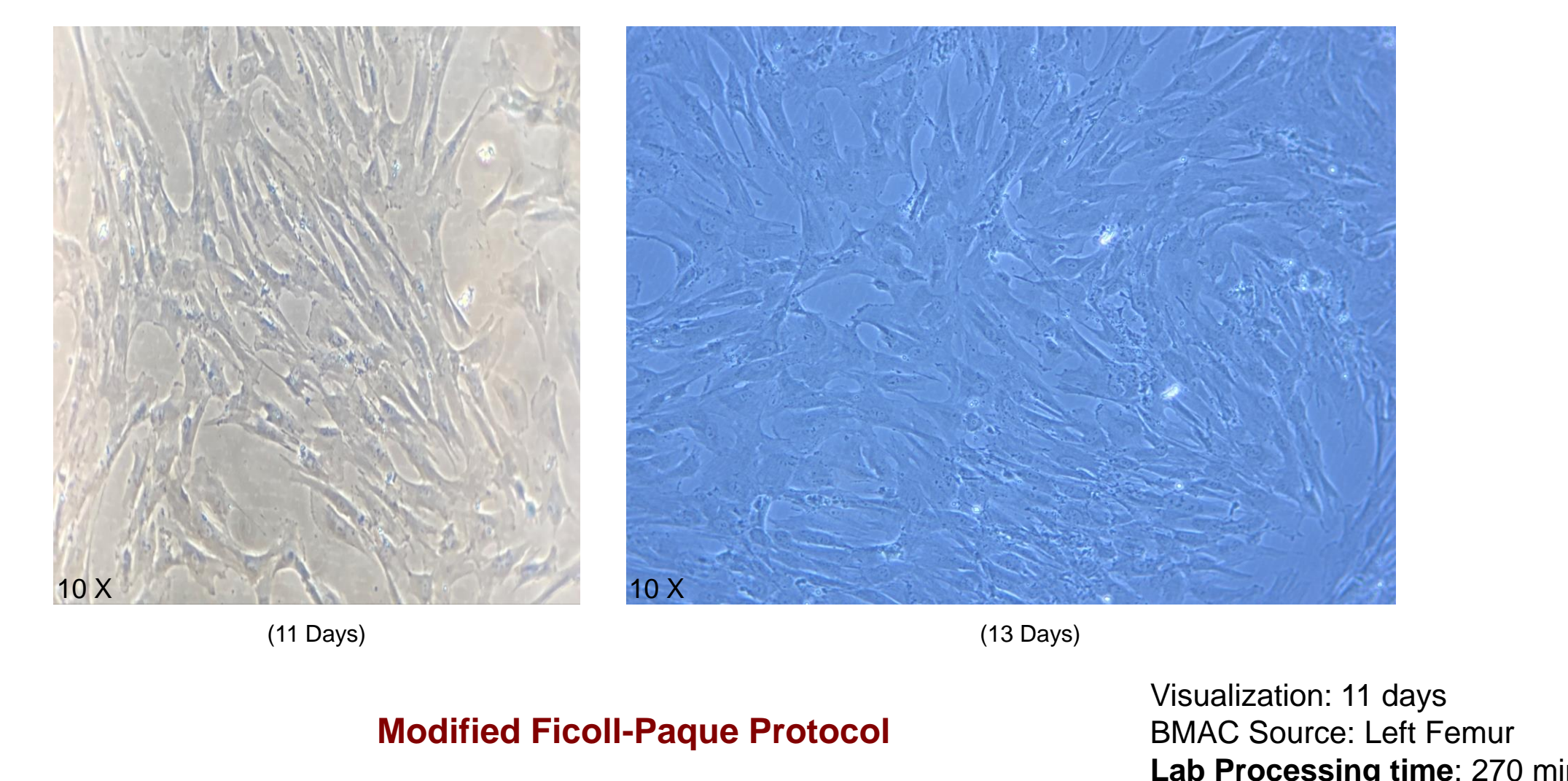
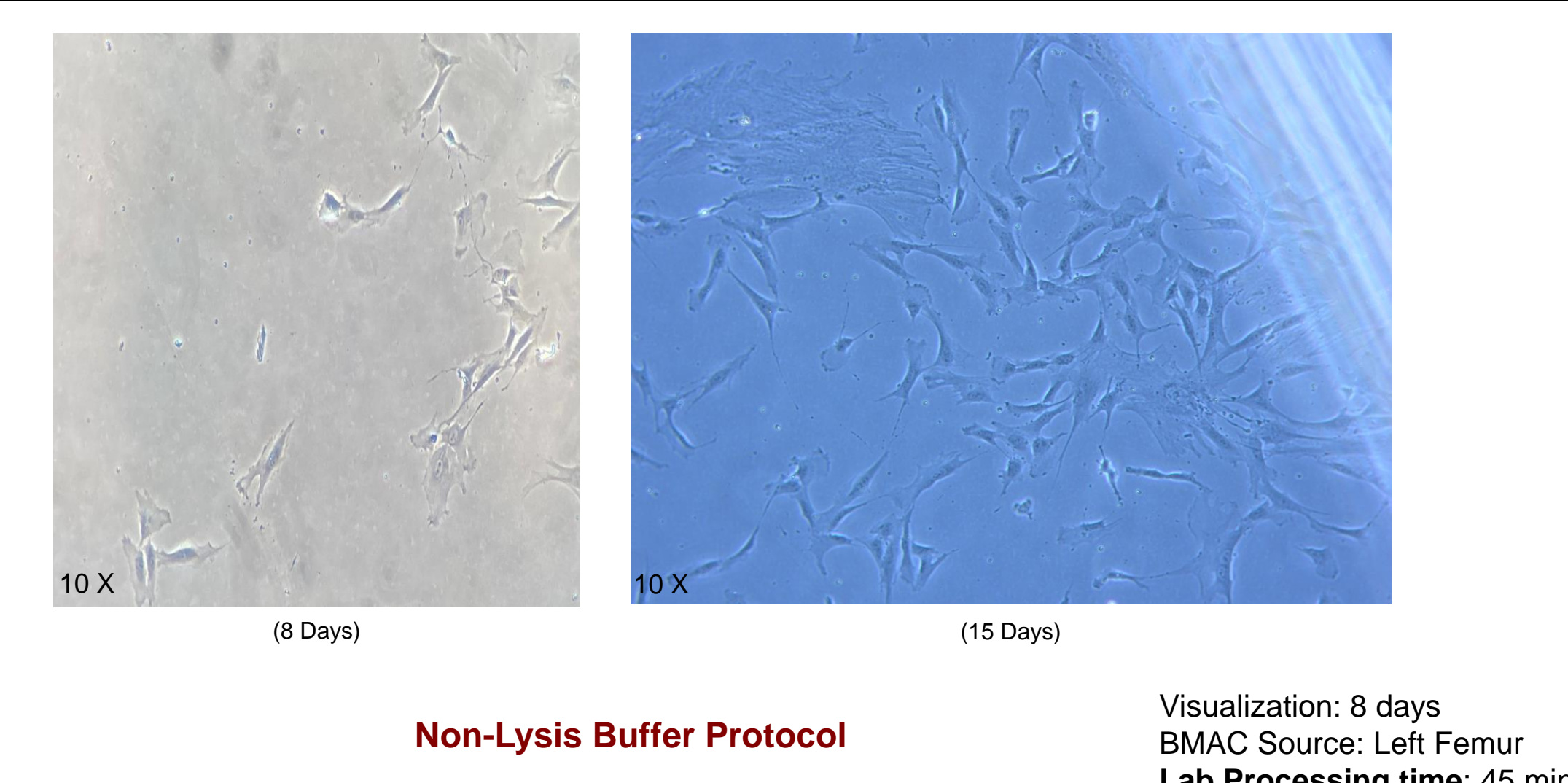
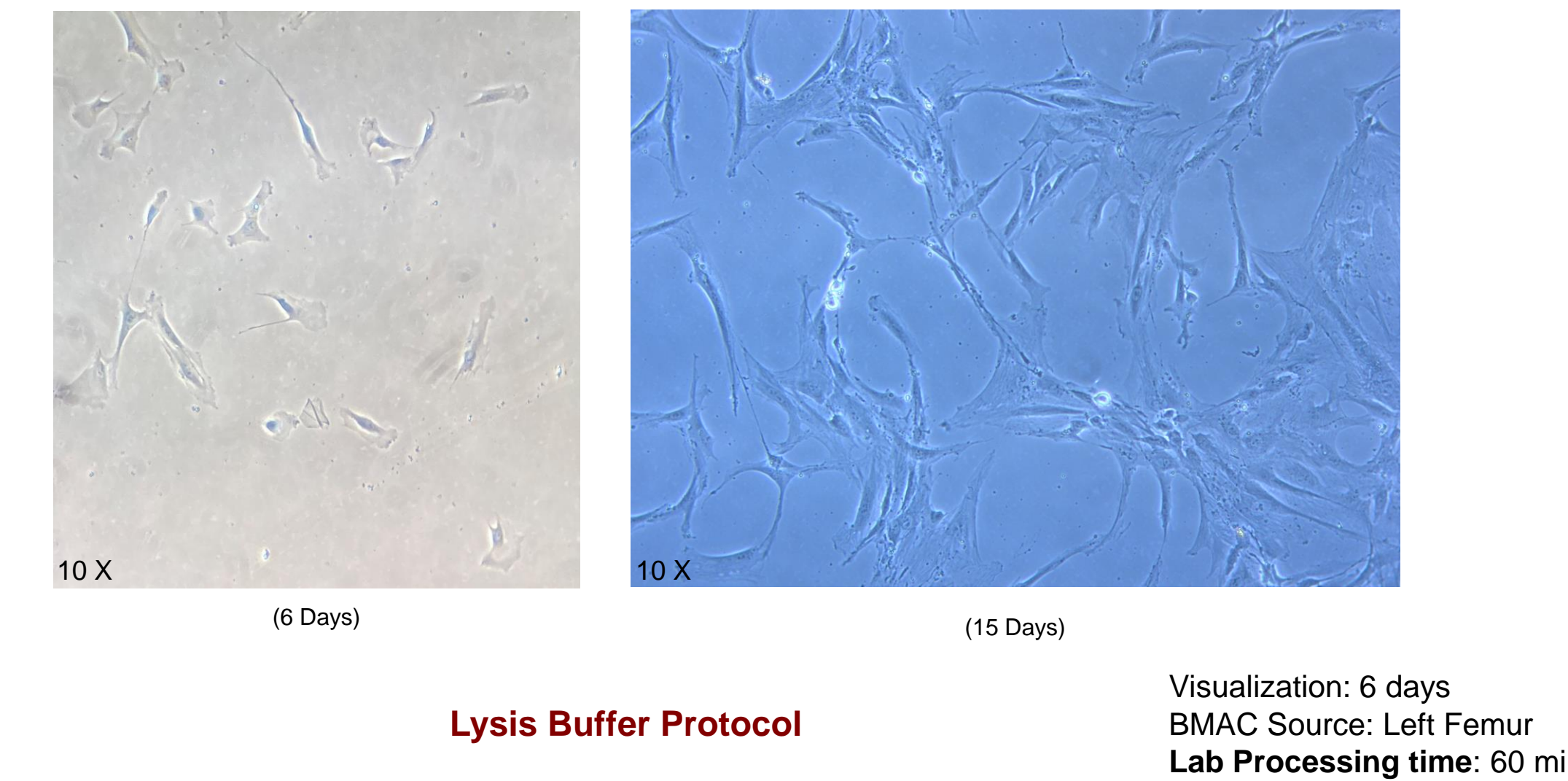
As a potent reservoir for mesenchymal stem cells and growth factors, with implications in orthopedic injury/repair/reconstruction, and connective tissue pathologies, further research is warranted into bone marrow aspirate concentration (BMAC) because of its unique composition. In recent years, there has been increased interest in BMAC, and with the explosion of research, more ideas are being made public in the scientific literature. BMAC is currently being used in orthopedic treatment modalities at many prestigious medical centers, such as the Joint Preservation Center at the Cleveland Clinic and by the talented surgeons at LSU Health Shreveport Department of Orthopedic Surgery. However, there is still a vast amount of primary and complex knowledge that is not genuinely understood about BMAC. As such, we are trying to further explore the basics of this clinical tool by comparing extraction methods for these mesenchymal stem cells.

This experiment aimed to compare three different techniques for preparing and analyzing stem cells from bone marrow aspirate samples.

METHODS



RESULTS



CONCLUSIONS

The Ficoll-Paque Protocol is the gold standard for mesenchymal stem cell extraction. Though complex and time intensive, it provides repeatable results. However, if you need to extract CFU-Fs more judiciously, then the RBC-Lysis Buffer Protocol produces quality results. Furthermore, with the added benefit of 48-hour earlier visualization of stem cell colonies compared to the Non-Lysis Buffer Protocol, the RBC Lysis Buffer Protocol proved to be an effective mesenchymal stem cell extraction method. Because this was a pilot study, there were not enough samples to get a statistically significant difference between the protocols. To come to a more valid conclusion, further samples will have to be studied in the future.

Using these techniques to seed an “LSU Health Shreveport Stem Cell Library” for future research that includes biometric and readily available clinical/lab data could open unknown opportunities. A Stem Cell Library could provide opportunities for prospective students, clinicians, and researchers here at LSU Health Shreveport to push science, medicine, and clinical knowledge forward. All while expanding our capacity in regenerative medicine and orthopedic research because there is a “holy grail” waiting to be found in cartilage. Finally. This project proves that We can make it happen.

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