

Patient Guide to Bone Marrow Aspirate Concentrate (BMAC) and Platelet-Rich Plasma (PRP) Injections for Joint Disease

Douglas J. Rowles, MD, ND

Orthopedic Sports Surgery and Naturopathy

What Are BMAC and PRP Injections?

Bone Marrow Aspirate Concentrate (BMAC) and Platelet-Rich Plasma (PRP) injections are regenerative treatments designed to help manage joint pain and promote healing in conditions like osteoarthritis or tendon injuries. These therapies use your body's own cells to support tissue repair and reduce inflammation.

- **BMAC:** A concentrate derived from your bone marrow, rich in stem cells and growth factors, which may help repair damaged joint tissues.
- **PRP:** A concentration of platelets from your blood, packed with growth factors that promote healing and reduce inflammation.

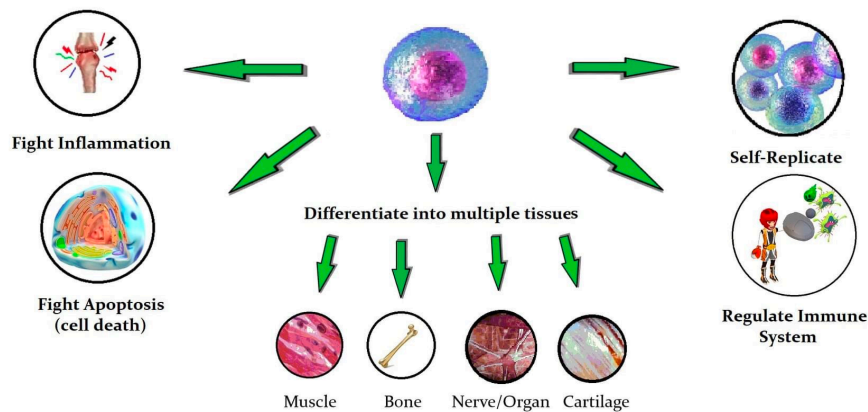


What Are Stem Cells?

Stem cells are unique cells in your body with the ability to develop into different types of cells, such as cartilage or bone cells. They act like your body's repair system, helping to regenerate damaged tissues and reduce inflammation. In BMAC, stem cells from your bone marrow are concentrated to enhance their healing potential

What Is A Stem Cell?

A Mesenchymal Stem Cell is a Primitive Cell with the Ability To:



Benefits of BMAC and PRP Injections

- **Non-surgical:** Minimally invasive procedures with shorter recovery times compared to surgery.
- **Natural healing:** Uses your own cells, reducing the risk of adverse reactions.
- **Pain relief:** May reduce joint pain and improve function in conditions like osteoarthritis.
- **Potential to delay or avoid surgery:** Can help manage symptoms, potentially postponing or avoiding the need for joint replacement.

What to do before BMAC

- **Hydration:** Proper hydration is critical to obtain a sufficient amount of bone marrow as well as supports an optimal concentration of stem cells. The recommendation is to drink half one's body weight of water in ounces beginning 3 days prior to the procedure.
- **Medication Issues:** Avoid anti-coagulation medicines such as Aspirin, Coumadin, eliquis, as well as supplements such as Turmeric and Curcumin. There can cause excess bleeding from the procedure.

What to Expect During the Procedure

- **Position:** Laying comfortably on your back with your legs slightly flexed
- **Anesthesia Options:** Local anesthetic, nitrous oxide gas, and IV sedation are available
- **Preparation:** A small amount (40 ml) of bone marrow (for BMAC) is drawn from your pelvis, or blood (for PRP) is taken from your arm.
- **Processing:** The sample is processed in a centrifuge to concentrate the stem cells or platelets.
- **Injection:** The concentrate is injected into the affected joint.
- **Duration:** The procedure typically takes less than 1 hour, including preparation and recovery time.



Recovery and Aftercare

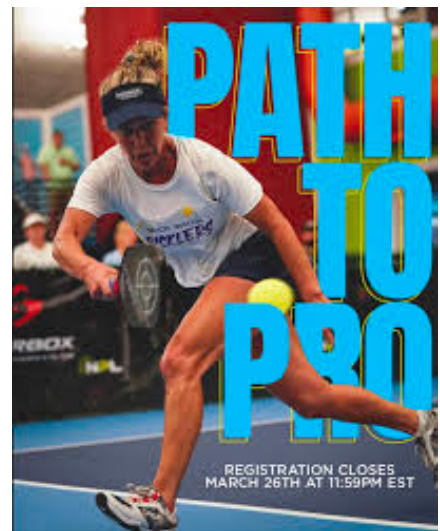
- **Rest:** Avoid strenuous activity for 1-2 weeks is usually recommended though it varies based on specific joints and patient issues.
- **Physical therapy:** A tailored program may be recommended to optimize joint function.
- **Follow-up:** Your doctor will monitor progress and may suggest additional injections.
- **Possible side effects:** Temporary soreness, swelling, or bruising at the injection site, although these are unusual.

Are BMAC and PRP Right for You?

These treatments may benefit patients with:

- Osteoarthritis of most
- Tendon or ligament injuries
- Chronic joint or muscular pain unresponsive to conservative treatments

Consult your doctor to determine if BMAC or PRP is suitable for your condition.



Below is a list of vitamins and supplements that may support optimal results before and after stem cell joint injections, based on their roles in reducing inflammation, supporting stem cell function, and promoting tissue repair. Always consult a healthcare provider before starting any supplements, as dosages and suitability depend on individual health conditions.

Vitamins and Supplements

1. Vitamin D

- **Description:** A fat-soluble vitamin that supports bone health, immune function, and stem cell proliferation and differentiation. It may enhance stem cell therapy outcomes by promoting cellular health.
- **Role:** Enhances stem cell function and reduces inflammation.

2. Vitamin C

- **Description:** A water-soluble antioxidant that supports collagen synthesis, immune function, and wound healing. It protects stem cells from oxidative stress and enhances their proliferation.
- **Role:** Supports tissue repair and stem cell health.

3. Vitamin E

- **Description:** A fat-soluble antioxidant that protects cell membranes and supports stem cell survival by reducing oxidative damage.
- **Role:** Promotes stem cell proliferation and protects against cellular damage.

4. Vitamin B12

- **Description:** A water-soluble vitamin essential for DNA synthesis, nerve function, and red blood cell production. It supports stem cell function and differentiation.
- **Role:** Enhances stem cell activity and overall cellular health.

5. Folic Acid (Vitamin B9)

- **Description:** A water-soluble vitamin crucial for DNA synthesis and cell division. It supports stem cell proliferation and tissue regeneration.
- **Role:** Promotes stem cell function and repair processes.

6. Omega-3 Fatty Acids

- **Description:** Essential fats found in fish oil or flaxseed oil that reduce inflammation and support cellular health. They create a favorable environment for stem cell activity.
- **Role:** Reduces inflammation and enhances stem cell outcomes.

7. Glucosamine and Chondroitin

- **Description:** Supplements that support cartilage health and reduce cartilage loss. They may enhance stem cell function and protect joint tissue.
- **Role:** Supports joint health and stem cell differentiation

8. Resveratrol

- **Description:** A plant-derived compound with antioxidant and anti-inflammatory properties. It protects cartilage and supports stem cell differentiation and multiplication.
- **Role:** Reduces inflammation and enhances stem cell function.

9. Coenzyme Q10 (CoQ10)

- **Description:** An antioxidant that supports mitochondrial function and enhances the effectiveness of other antioxidants. It may reduce inflammation and support cellular energy.
- **Role:** Supports stem cell health and reduces oxidative stress.

10. Copper

- **Description:** A mineral involved in red blood cell formation, connective tissue health, and nervous system function. It supports stem cell proliferation.
- **Role:** Enhances stem cell function and tissue repair.

11. Collagen supplementation may support recovery after stem cell joint injections by:

- 1. Promoting Tissue Repair:** Collagen provides structural support for cartilage, tendons, and ligaments, potentially aiding the regeneration process stimulated by stem cells.
- 2. Reducing Inflammation:** Collagen peptides may help modulate inflammation, creating a favorable environment for stem cell activity.
- 3. Enhancing Joint Strength:** Supplementing with collagen could improve joint matrix integrity, complementing stem cell-driven tissue growth.

Important Notes Post-Procedure:

- **Hydration:** Critical for the health and repair of damaged cartilage and most other tissues. The recommendation is to drink half one's body weight in ounces of water per day.
- **Avoid Anti-Inflammatory Supplements/Medications:** Nonsteroidal anti-inflammatory drugs (NSAIDs) like ibuprofen, as well as supplements like turmeric/curcumin, should be avoided for at least 1 month post-injection, as they may interfere with the regenerative process.
- **Dosage and Timing:** Work with a healthcare provider to determine appropriate dosages and timing, as excessive amounts (e.g., high-dose curcumin) can be harmful.
- **Dietary Support:** A balanced diet rich in antioxidants (e.g., blueberries, leafy greens) and anti-inflammatory foods can complement these supplements.

Frequently Asked Questions

- **How many injections will I need?** The number varies based on your condition; some patients benefit from a single injection, while others may need a series.
- **Is it painful?** Mild discomfort may occur, but local anesthesia is used to minimize pain.
- **How soon will I see results?** Improvements may be noticed within days to weeks, with optimal results after 2-3 months.
- **How long will the pain relief last?** Early research suggests significant improvement lasting past the 2 year point

Evidence of efficacy



- Multiple ongoing trials
- Appears to improve pain and function in most studies and systematic reviews
- Xing D et al. Mesenchymal stem cells injections for knee osteoarthritis: a systematic overview. Rheumatology 2018: => **4 systematic reviews of high methodological quality and low risk of bias showed moderate confidence could be placed in safety of MSCs therapy for knee OA, but with low confidence in efficacy outcomes due to limitations of the current evidence.**
- McIntyre JA, Jones IA, Han B, Vangsness CT, Jr. Intra-articular mesenchymal stem cell therapy for the human joint: a systematic review. Am J Sports Med 2018: => **28 studies reviewed show MSC therapy is safe. Clinical and in some cases radiological improvements for both OA and chondral defects but quality of literature was poor preventing firm conclusions.**
- Yobo M et al. Clinical efficacy and safety of mesenchymal stem cell transplantation for osteoarthritis treatment: meta-analysis. PLOS One 2017: => **11 trials, all show potential efficacy**
- Pas Hi et al. Stem cell injections in knee osteoarthritis: a systematic review of the literature BJSM, 2017: => **5 RCTs all improved pt outcomes up to 2 yrs f/up**
- Wolfstadt JI, et al. Current concepts: the role of mesenchymal stem cells in the management of knee osteoarthritis. Sports Health, 2015 Adapted from: <https://www.rushortho.com/patients-visitors/medical-resources/bone-marrowaspirate-stem-cell-concentrate>

Pricing Questions?

- * We offer a concierge-like service where you will be followed through time.
- * You will be evaluated for natural alternatives to your current medical problems.
- * Stem cell treatment is currently not typically covered by insurance.
- * Multiple injections can be done off of one sample of your bone marrow without additional charges.
- * Three choices of anesthesia are available, including “twilight sedation” and nitrous (laughing) gas.
- * 25% discount offered to all Military Veterans, Police/Law Enforcement, Firefighters, and School Teachers.
- * Please schedule an in-person or telephone consultation.