

Supplementary Table 1: Clinical Trials - MSC application in RC repair (ClinicalTrials.gov)

Sponsor	Methods	Participants	Interventions	Comparison	Outcome	Notes
Stanford University (NCT03688308)	NA	Adults 50-75 years; n=80	Arthroscopic rotator cuff repair with BMAC.	Arthroscopic rotator cuff repair without administration of BMAC.	Primary: Tendon healing rate Secondary: ASES score, CMS, MSC retention analysis via imaging, UCLA score	Included if chronic tear (>3 months) is 1.5-3cm in size. Excluded if cortisone and/or hyaluronic acid in last 3 months; or PRP injection in last year.
Hospital Znojmo (NCT03068988)	Phase I	Adults 18-60 years; n=50	Surgical repair of supraspinatus with MSC application at tendon footprint.	Rotator cuff surgery without MSC application.	Primary: Tendon re-rupture rate Secondary: ASES score, constant score, VAS,	Included if chronic supraspinatus tendon tear greater than 50% of its width.
Rush University Medical Center (NCT02484950)	NA - Prospective, randomized, double-blinded, controlled study.	Adults 18-70 years; n=100	Standard arthroscopic rotator cuff repair with MSC augmentation at tendon-bone junction.	Standard arthroscopic rotator cuff repair without MSC application.	Primary: ASES score Secondary: CMS, Functional outcomes (Rowe score), MRI eval., SANE score, Simple Shoulder Test, SF-12, VAS	Included if patient is determined to have a full thickness rotator cuff tear (1-3 cm) or partial tear converted to a full-thickness tear. Excluded if subacromioclavicular involvement.
InGeneron, Inc. (NCT04077190)	NA - Prospective, randomized, multi-site, safety and efficacy study	Adults 30-75 years; n=15	Ultrasound guided injection of autologous adipose-derived MSCs (single injection).	Ultrasound guided injection of cortisone (single injection).	Primary: ASES score, Safety, SF-36	No exclusion criteria.
InGeneron, Inc. (NCT02918136)	NA - Prospective, randomized, multi-site, safety and efficacy study	Adults 30-75 years; n=18	Ultrasound guided injection of autologous adipose-derived MSCs (single injection).	Ultrasound guided injection of cortisone (single injection).	Primary: Safety	Included if diagnosed with partial-thickness tear. Excluded if corticosteroid injection at RCI site within last 3 months
Seoul National University Hospital (NCT02298023)	Phase 2- Double-blinded placebo-controlled randomized trial	Adults 19-90 years; n=24	Ultrasound guided injection of allogenic adipose-derived MSC in fibrin glue carrier.	2 comparison groups: Only fibrin glue group and no intervention group.	Primary: VAS Secondary: ASES score, DASH score, UCLA score	Included if chronic tear (3 months) and recurrent pain in spite of conservative treatment such as physical therapy, medication, and/or steroid injection.
University of Sao Paulo (NCT03362424)	Phase 2 - Randomized prospective study	Adults >35 years; n=44	Surgical RCI repair with MSC application.	Surgical RCI repair without MSC application.	Primary: MRI (Sugaya classification) Secondary: ASES score, UCLA score, VAS	Excluded if tear requires open surgery.
Second Affiliated Hospital, School of Medicine, Zhejiang University (NCT03279796)	Phase 2- Randomized control trial	Adults 18-90 years; n=200	Injection of autologous adipose-derived MSCs once a week, three times.	Injection of dexamethasone mixed with saline once a week, three times.	Primary: VAS Secondary: ASES score, CMS, DASH score, Safety	Included if clinically diagnosed as rotator cuff tear or lateral epicondylitis (tennis elbow). Excluded if patient received injection therapy within 6 weeks.
Hospital San Carlos, Madrid (NCT01687777)	Phase 2	Adults 55-80 years; n=10	Reconstructive surgery of supraspinatus tendon utilizing a type 1 collagen scaffold (OrthoADAPT) transplanted with MSCs.	Reconstructive surgery of supraspinatus tendon utilizing a type 1 collagen scaffold (OrthoADAPT) without MSCs.	Primary: CMS Secondary: MRI	Included if chronic tear (>3 months) and conservative therapy has been nonbeneficial.
Regenexx, LLC (NCT01788683)	NA - Prospective, randomized, controlled trial.	Adults 18-65 years; n=50	Ultrasound guided injection of BMAC into area of damaged tendon (single injection).	Exercise therapy per specified rotator cuff strengthening program.	Primary: DASH Score Secondary: Incidence of re-injection and/or surgery, Mean DASH scores, Mean Pain Scales, Safety, Ultrasound eval.	Included if patient unremitting pain in the affected shoulder for at least 3 months
InGeneron, Inc (NCT03752827)	NA - Prospective, randomized, double-blinded, active-controlled, multi-site, safety and effectiveness study	Adults 40-75 years; n=246	Adipose-derived MSC injection into the area of the supraspinatus tendon tear.	Ultrasound guided corticosteroid injection into the subacromial space.	Primary: MRC Muscle Scale, VAS Secondary: Mean improvement in VAS, Mean improvement in WORC Index, MRI eval.	Included if chronic tear (>3 months) and patient diagnosed with a partial-thickness rotator cuff tear, defined as ≥50% partial-thickness tear of the supraspinatus tendon.

(ASES score) American Shoulder and Elbow Surgeons Score, (BMAC) Bone marrow aspirate concentrate, (CMS) Constant-Murley Score, (DASH score) The Disabilities of the Arm, Shoulder and Hand score, (SANE score) Single Assessment Numeric Evaluation score, (SF-12/36) 12/36-Item Short Form Health Survey, (UCLA score) University of California, Los Angeles Shoulder score (VAS) Visual analog scale, (MRC Muscle Scale) Medical Research Council for Muscle Strength Scale, (MSC) Mesenchymal stem cell, (WORC Index) Western Ontario Rotator Cuff Index