

Klinische Einsatzmöglichkeiten von Mesenchymalen Stromazellen

1. Schafer R, Bieback K. Characterization of mesenchymal stem or stromal cells: tissue sources, heterogeneity, and function. *Transfusion* 2016;56:2S-5S.
2. Kern S, Eichler H, Stoeve J, Kluter H, Bieback K. Comparative analysis of mesenchymal stem cells from bone marrow, umbilical cord blood, or adipose tissue. *Stem Cells* 2006;24:1294-1301.
3. Fekete N, Rojewski MT, Furst D et al. GMP-compliant isolation and large-scale expansion of bone marrow-derived MSC. *PLoS.One.* 2012;7:e43255.
4. Siegel G, Kluba TF, Hermanutz-Klein UF et al. Phenotype, donor age and gender affect function of human bone marrow-derived mesenchymal stromal cells.
5. Dominici M, Le BK, Mueller I et al. Minimal criteria for defining multipotent mesenchymal stromal cells. The International Society for Cellular Therapy position statement. *Cytotherapy.* 2006;8:315-317.
6. Krampera M, Galipeau J, Shi Y, Tarte K, Sensebe L. Immunological characterization of multipotent mesenchymal stromal cells--The International Society for Cellular Therapy (ISCT) working proposal. *Cytotherapy.* 2013;15:1054-1061.
7. Galipeau J, Krampera M, Barrett J et al. International Society for Cellular Therapy perspective on immune functional assays for mesenchymal stromal cells as potency release criterion for advanced phase clinical trials. *Cytotherapy.* 2016;18:151-159.
8. Viswanathan S, Shi Y, Galipeau J et al. Mesenchymal stem versus stromal cells: International Society for Cell & Gene Therapy (ISCT(R)) Mesenchymal Stromal Cell committee position statement on nomenclature. *Cytotherapy.* 2019;21:1019-1024.
9. Bourin P, Bunnell BA, Casteilla L et al. Stromal cells from the adipose tissue-derived stromal vascular fraction and culture expanded adipose tissue-derived stromal/stem cells: a joint statement of the International Federation for Adipose Therapeutics and Science (IFATS) and the International Society for Cellular Therapy (ISCT). *Cytotherapy.* 2013;15:641-648.
10. Giri J, Galipeau J. Mesenchymal stromal cell therapeutic potency is dependent upon viability, route of delivery, and immune match.
11. Tao H, Han Z, Han ZC, Li Z. Proangiogenic Features of Mesenchymal Stem Cells and Their Therapeutic Applications. *Stem Cells Int.* 2016;2016:1314709.
12. Harrell CR, Markovic BS, Fellabaum C et al. The role of Interleukin 1 receptor antagonist in mesenchymal stem cell-based tissue repair and regeneration. *Biofactors* 2019
13. Cassatella MA, Mosna F, Micheletti A et al. Toll-like receptor-3-activated human mesenchymal stromal cells significantly prolong the survival and function of neutrophils. *Stem Cells* 2011;29:1001-1011.
14. Qi Y, Jiang D, Sindrilaru A et al. TSG-6 released from intradermally injected mesenchymal stem cells accelerates wound healing and reduces tissue fibrosis in murine full-thickness skin wounds. *J.Invest Dermatol.* 2014;134:526-537.
15. Fontaine MJ, Shih H, Schafer R, Pittenger MF. Unraveling the Mesenchymal Stromal Cells' Paracrine Immunomodulatory Effects. *Transfus. Med Rev.* 2016;30:37-43.
16. Bieback K, Kuci S, Schafer R. Production and quality testing of multipotent mesenchymal stromal cell therapeutics for clinical use. *Transfusion* 2019;59:2164-2173.
17. Yuan QL, Zhang YG, Chen Q. Mesenchymal Stem Cell (MSC)-Derived Extracellular Vesicles: Potential Therapeutics as MSC Trophic Mediators in Regenerative Medicine. *Anat.Rec.(Hoboken.)* 2019
18. Yun CW, Lee SH. Potential and Therapeutic Efficacy of Cell-based Therapy Using Mesenchymal Stem Cells for Acute/chronic Kidney Disease. *Int.J.Mol.Sci.* 2019;20:
19. Menard C, Pacelli L, Bassi G et al. Clinical-grade mesenchymal stromal cells produced under various good manufacturing practice processes differ in their immunomodulatory properties: standardization of immune quality controls. *Stem Cells Dev.* 2013;22:1789-1801.
20. Galleu A, Riffo-Vasquez Y, Trento C et al. Apoptosis in mesenchymal stromal cells induces in vivo recipient-mediated immunomodulation. *Sci.Transl.Med* 2017;9:
21. Isakova IA, Lanclos C, Bruhn J et al. Allo-reactivity of mesenchymal stem cells in rhesus macaques is dose and haplotype dependent and limits durable cell engraftment in vivo. *PLoS.One.* 2014;9:e87238.
22. Brennan MA, Renaud A, Amiaud J et al. Pre-clinical studies of bone regeneration with human bone marrow stromal cells and biphasic calcium phosphate. *Stem Cell Res.Ther.* 2014;5:114.
23. Li Z, Han S, Wang X et al. Rho kinase inhibitor Y-27632 promotes the differentiation of human bone marrow mesenchymal stem cells into keratinocyte-like cells in xeno-free conditioned medium. *Stem Cell Res.Ther.* 2015;6:17.

24. Nemeth K, Leelahavanichkul A, Yuen PS et al. Bone marrow stromal cells attenuate sepsis via prostaglandin E(2)-dependent reprogramming of host macrophages to increase their interleukin-10 production. *Nat.Med* 2009;15:42-49.
25. National Library of Medicine and sponsor or principal investigator of the clinical study. *ClinicalTrials.gov* is a database of privately and publicly funded clinical studies conducted around the world. <https://clinicaltrials.gov/> . 2020. 31-1-2020. Ref Type: Online Source
26. Shi X, Chen Q, Wang F. Mesenchymal stem cells for the treatment of ulcerative colitis: a systematic review and meta-analysis of experimental and clinical studies. *Stem Cell Res.Ther.* 2019;10:266.
27. Panes J, Garcia-Olmo D, Van AG et al. Expanded allogeneic adipose-derived mesenchymal stem cells (Cx601) for complex perianal fistulas in Crohn's disease: a phase 3 randomised, double-blind controlled trial. *Lancet* 2016;388:1281-1290.
28. Panes J, Garcia-Olmo D, Van AG et al. Long-term Efficacy and Safety of Stem Cell Therapy (Cx601) for Complex Perianal Fistulas in Patients With Crohn's Disease. *Gastroenterology* 2018;154:1334-1342.
29. Bislenghi G, Wolthuis A, Van AG et al. Cx601 (darvadstrocel) for the treatment of perianal fistulizing Crohn's disease. *Expert.Opin.Biol.Ther.* 2019;19:607-616.
30. Ciccocioppo R, Klersy C, Leffler DA et al. Systematic review with meta-analysis: Safety and efficacy of local injections of mesenchymal stem cells in perianal fistulas. *JGH Open* 2019;3:249-260.
31. Oliveira AG, Gon+alves M, Ferreira H, Neves M. Growing evidence supporting the use of mesenchymal stem cell therapies in multiple sclerosis: A systematic review.
32. Zhang Y, Chen W, Feng B, Cao H. The Clinical Efficacy and Safety of Stem Cell Therapy for Diabetes Mellitus: A Systematic Review and Meta-Analysis.
33. Torres CA, Daniele C, Gamez C et al. Stem/Stromal Cells for Treatment of Kidney Injuries With Focus on Preclinical Models. *Front Med (Lausanne)* 2018;5:179.
34. Resnick IB, Barkats C, Shapira MY et al. Treatment of severe steroid resistant acute GVHD with mesenchymal stromal cells (MSC). *Am.J.Blood Res.* 2013;3:225-238.
35. Ball LM, Bernardo ME, Roelofs H et al. Multiple infusions of mesenchymal stromal cells induce sustained remission in children with steroid-refractory, grade III-IV acute graft-versus-host disease. *Br.J.Haematol.* 2013;163:501-509.
36. Morata-Tarifa C, Mac+jas-S+ínchez MDM, Guti+@rrez-Pizarraya A, Sanchez-Pernaute RA. Mesenchymal stromal cells for the prophylaxis and treatment of graft-versus-host disease-a meta-analysis.
37. Chen X, Wang C, Yin J et al. Efficacy of Mesenchymal Stem Cell Therapy for Steroid-Refractory Acute Graft-Versus-Host Disease following Allogeneic Hematopoietic Stem Cell Transplantation: A Systematic Review and Meta-Analysis. *PLoS.One.* 2015;10:e0136991.
38. Gjerde C, Mustafa K, Hellem S et al. Cell therapy induced regeneration of severely atrophied mandibular bone in a clinical trial. *Stem Cell Res.Ther.* 2018;9:213.
39. Gomez-Barrena E, Padilla-Eguiluz N, Rosset P et al. Early efficacy evaluation of mesenchymal stromal cells (MSC) combined to biomaterials to treat long bone non-unions. *Injury* 2020
40. Gomez-Barrena E, Rosset P, Gebhard F et al. Feasibility and safety of treating non-unions in tibia, femur and humerus with autologous, expanded, bone marrow-derived mesenchymal stromal cells associated with biphasic calcium phosphate biomaterials in a multicentric, non-comparative trial. *Biomaterials* 2019;196:100-108.
41. Sokolove J, Lepus CM. Role of inflammation in the pathogenesis of osteoarthritis: latest findings and interpretations. *Ther.Adv. Musculoskelet.Dis.* 2013;5:77-94.
42. Harrell CR, Markovic BS, Fellabaum C, Arsenijevic A, Volarevic V. Mesenchymal stem cell-based therapy of osteoarthritis: Current knowledge and future perspectives. *Biomed.Pharmacother.* 2019;109:2318-2326.
43. Kosaric N, Kiwanuka H, Gurtner GC. Stem cell therapies for wound healing. *Expert.Opin.Biol.Ther.* 2019;19:575-585.
44. Basu A, Munir S, Mulaw MA et al. A Novel S100A8/A9 Induced Fingerprint of Mesenchymal Stem Cells associated with Enhanced Wound Healing. *Sci.Rep.* 2018;8:6205.
45. Volkman R, Offen D. Concise Review: Mesenchymal Stem Cells in Neurodegenerative Diseases. *Stem Cells* 2017;35:1867-1880.
46. Siegel G, Krause P, Wöhrle S et al. Bone marrow-derived human mesenchymal stem cells express cardiomyogenic proteins but do not exhibit functional cardiomyogenic differentiation potential. *Stem Cells Dev.* 2012;21:2457-2470.

47. TraumaRegister DGU®. Annual Report 2019 - TraumaRegister DGU®. Hofer, C and Lefering, R. http://www.traumaregister-dgu.de/fileadmin/user_upload/traumaregister-dgu.de/docs/Downloads/Annual_report_2019.pdf . 1-9-2019. Sektion NIS of the German Trauma Society (DGU) / AUC -Akademie der UnfallchirurgieGmbH. 16-4-2020. Ref Type: Online Source
48. Huber-Lang M, Wiegner R, Lampl L, Brenner RE. Mesenchymal Stem Cells after Polytrauma: Actor and Target. *Stem Cells Int.* 2016;2016:6289825.
49. Amann EM, Gross A, Rojewski MT et al. Inflammatory response of mesenchymal stromal cells after in vivo exposure with selected trauma-related factors and polytrauma serum. *PLoS.One.* 2019;14:e0216862.
50. Tanriverdi AK, Polat O, Elcin AE et al. Mesenchymal stem cell transplantation in polytrauma: Evaluation of bone and liver healing response in an experimental rat model. *Eur.J.Trauma Emerg.Surg.* 2019
51. Wiegner R, Rudhart NE, Barth E et al. Mesenchymal stem cells in peripheral blood of severely injured patients. *Eur.J.Trauma Emerg.Surg.* 2018;44:627-636.
52. Bellani G, Laffey JG, Pham T et al. Epidemiology, Patterns of Care, and Mortality for Patients With Acute Respiratory Distress Syndrome in Intensive Care Units in 50 Countries. *JAMA* 2016;315:788-800.
53. Luo L, Shaver CM, Zhao Z et al. Clinical Predictors of Hospital Mortality Differ Between Direct and Indirect ARDS. *Chest* 2017;151:755-763.
54. Qu W, Wang Z, Hare JM et al. Cell-based therapy to reduce mortality from COVID-19: Systematic review and meta-analysis of human studies on acute respiratory distress syndrome. *Stem Cells Transl.Med.* 2020
55. Leng Z, Zhu R, Hou W et al. Transplantation of ACE2(-) Mesenchymal Stem Cells Improves the Outcome of Patients with COVID-19 Pneumonia. *Aging Dis.* 2020;11:216-228.
56. Sengupta V, Sengupta S, Lazo A et al. Exosomes Derived from Bone Marrow Mesenchymal Stem Cells as Treatment for Severe COVID-19.
57. Rogers CJ, Harman RJ, Bunnell BA et al. Rationale for the clinical use of adipose-derived mesenchymal stem cells for COVID-19 patients. *J.Transl.Med.* 2020;18:203.
58. Mesoblast Limited. Mesoblast partners with the cardiothoracic surgical trials network established by the U.S. national institutes of health's national heart, lung and blood institute to conduct randomized controlled trial of remestemcel-L for patients with acute respiratory distress syndrome due to COVID-19 . <http://investorsmedia.mesoblast.com/static-files/e63bf0d5-7dd5-46c0-8381-c2e24bacb130> . 2020. 16-4-2020. Ref Type: Online Source
59. Wuchter P, Vetter M, Saffrich R et al. Evaluation of GMP-compliant culture media for in vitro expansion of human bone marrow mesenchymal stromal cells. *Exp.Hematol.* 2016;44:508-518.
60. Schmitt M, Muller LP, Keysser G et al. [Mesenchymal stroma cells (MSCs) for the treatment of rheumatic disease]. *Dtsch.Med Wochenschr.* 2013;138:1852-1855.
61. Bieback K, Wuchter P, Besser D et al. Mesenchymal stromal cells (MSCs): science and f(r)iction. *J.Mol.Med (Berl)* 2012;90:773-782.
62. Wuchter P, Bieback K, Schrezenmeier H et al. Standardization of Good Manufacturing Practice-compliant production of bone marrow-derived human mesenchymal stromal cells for immunotherapeutic applications. *Cytotherapy.* 2015;17:128-139.
63. Mesoblast Limited. mesoblast Clinical Trials. <https://www.mesoblast.com/product-candidates/clinical-trials> . 2020. 12-2-2020. Ref Type: Online Source
64. Galipeau J, Sensebe L. Mesenchymal Stromal Cells: Clinical Challenges and Therapeutic Opportunities. *Cell Stem Cell* 2018;22:824-833.
65. Paul-Ehrlich-Institut Bundesinstitut für Impfstoffe und biomedizinische Arzneimittel. ATMP. <https://www.pei.de/DE/arzneimittel/atmp/atmp-node.html> . 21-11-2019. 5-2-2020. Ref Type: Online Source
66. Pharmazeutische Zeitung-Die Zeitschrift der deutschen Apotheker. Mesenchymale Stromazellen|Obnitix®|42|2019. <https://www.pharmazeutische-zeitung.de/arzneistoffe/daten/2019/mesenchymale-stromazellenobnitixr422019/> . 14-1-2020. 11-2-2020. Ref Type: Online Source
67. Koci Z, Turnovcova K, Dubsky M et al. Characterization of human adipose tissue-derived stromal cells isolated from diabetic patient's distal limbs with critical ischemia. *Cell Biochem.Funct.* 2014;32:597-604.
68. Liu M, Lei H, Dong P et al. Adipose-Derived Mesenchymal Stem Cells from the Elderly Exhibit Decreased Migration and Differentiation Abilities with Senescent Properties. *Cell Transplant.* 2017;26:1505-1519.

69. Rennert RC, Sorkin M, Januszyk M et al. Diabetes impairs the angiogenic potential of adipose-derived stem cells by selectively depleting cellular subpopulations. *Stem Cell Res.Ther.* 2014;5:79.
70. Bonig H, Kuci Z, Kuci S et al. Children and Adults with Refractory Acute Graft-versus-Host Disease Respond to Treatment with the Mesenchymal Stromal Cell Preparation "MSC-FFM"-Outcome Report of 92 Patients. *Cells* 2019;8:
71. MEDIPOST. CARTISTEM®. <http://www.medi-post.com/cartistem/> . 2020. 22-4-2020. Ref Type: Online Source
72. Takeda. Fachinformation Alofisel. <https://www.takeda.com/siteassets/de-de/home/fachkreise/fachinformationen/fachinformation-alofisel-5millionen-zellen-ml-injektionssuspension.pdf> . 1-5-2018. 12-2-2020. Ref Type: Online Source
73. Mendicino M, Bailey AM, Wonnacott K, Puri RK, Bauer SR. MSC-based product characterization for clinical trials: an FDA perspective. *Cell Stem Cell* 2014;14:141-145.
74. Barckhausen C, Rice B, Baila S et al. GMP-Compliant Expansion of Clinical-Grade Human Mesenchymal Stromal/Stem Cells Using a Closed Hollow Fiber Bioreactor. *Methods Mol.Biol.* 2016;1416:389-412.
75. Rojewski MT, Lotfi R, Gjerde C et al. Translation of a standardized manufacturing protocol for mesenchymal stromal cells: A systematic comparison of validation and manufacturing data. *Cytotherapy.* 2019;21:468-482.
76. Veronesi E, Murgia A, Caselli A et al. Transportation conditions for prompt use of ex vivo expanded and freshly harvested clinical-grade bone marrow mesenchymal stromal/stem cells for bone regeneration. *Tissue Eng Part C.Methods* 2014;20:239-251.
77. Moon GJ, Cho YH, Kim DH et al. Serum-mediated Activation of Bone Marrow-derived Mesenchymal Stem Cells in Ischemic Stroke Patients: A Novel Preconditioning Method. *Cell Transplant.* 2018;27:485-500.
78. Lee DE, Ayoub N, Agrawal DK. Mesenchymal stem cells and cutaneous wound healing: novel methods to increase cell delivery and therapeutic efficacy. *Stem Cell Res.Ther.* 2016;7:37.
79. Fekete N, Gadelorge M, Furst D et al. Platelet lysate from whole blood-derived pooled platelet concentrates and apheresis-derived platelet concentrates for the isolation and expansion of human bone marrow mesenchymal stromal cells: production process, content and identification of active components. *Cytotherapy.* 2012;14:540-554.
80. Fekete N, Rojewski MT, Lotfi R, Schrezenmeier H. Essential components for ex vivo proliferation of mesenchymal stromal cells. *Tissue Eng Part C.Methods* 2014;20:129-139.
81. Harrell CR, Jovicic N, Djonov V, Volarevic V. Therapeutic Use of Mesenchymal Stem Cell-Derived Exosomes: From Basic Science to Clinics. *Pharmaceutics.* 2020;12:
82. Kordelas L, Rebmann V, Ludwig AK et al. MSC-derived exosomes: a novel tool to treat therapy-refractory graft-versus-host disease. *Leukemia* 2014;28:970-973.
83. Ferrara JL, Levine JE, Reddy P, Holler E. Graft-versus-host disease. *Lancet* 2009;373:1550-1561.
84. Yu J, Parasuraman S, Shah A, Weisdorf D. Mortality, length of stay and costs associated with acute graft-versus-host disease during hospitalization for allogeneic hematopoietic stem cell transplantation. *Curr.Med Res.Opin.* 2019;35:983-988.