

Additional Table 2 Preclinical *in vivo* trials using MSCs transplantation after SCI and obtained results in the interpretation of the authors*

Cell type	SCI model	Activation astrocytes/glia scar	Microglia/inflammation	Oligodendrocytes/Schwann cells	Tissue retention	Neuroprotection	Axonal outgrowth	Reference
BM-MSCs-exosomes	Rat, T10, contusion, iv. injection	↓ C3/GFAP – IHC (1 dpi); ↓ TNF- α , IL-1 β , IL-6 – WB (1 dpi); ↓ CSS6 – IHC (28 dpi)	↓ CD68 – IHC (1, 28 dpi); ↓ TNF- α , IL-1 β , IL-6 – WB (1 dpi)	–	↓ Lesion volumes (28 dpi)	↓ TUNEL-cells (1 dpi); ↓ Bax, casp-3, casp-9, ↑ Bcl-2 – WB (1 dpi)	↑ NF200 – IHC (1, 28 dpi), WB (1 dpi)	Liu et al. (2018)
AD-MSCs	Rat, T8, contusion, application on the top of injury at 14 dpi	↓ GFAP – IHC, PCR-RT (74 dpi, 60 dpt)	↓ Iba1 – IHC, PCR-RT (74 dpi)	↑ Olig2 – PCR-RT (74 dpi); ↑ mpz, pmp22 – PCR-RT (74 dpi)	↓ Area of abnormal cavities; ↑ spared tissue (74 dpi)	↑ HSP1b – PCR-RT (74 dpi)	–	Mukhamedshina et al. (2018)
UCB-MSCs	Mice, T12, compression, application on the top of injury at 1 dpi	–	↑ CD11b ⁺ /CD45 ⁺ – FACS (9dpi); ↑ TNF- α , Arginase I – PCR-RT (9 dpi); ↑ CCL2 – ELISA (3 dpi)	↑ Myelin sparing (35 dpi)	–	↑ Safety motor neurons (35 dpi)	–	Caron et al. (2016), Papa et al. (2018)
BM-MSCs	Rat, ischemia by balloon occlusion of the thoracic aorta, ia. injection	–	↓ The ratio of Bax to Bcl-2, ↑ TNF- α , ↓ TNFRSF1A – PCR-RT (1 dpi)	–	↑ The area of vacuolation (1 dpi)	↓ TUNEL-large neuron cells (1 dpi)	–	Takahashi et al. (2018b)
AD-MSCs; BM-MSCs	Mice, T9–10, contusion, is. injection at 3 dpi	–	–	–	–	↑ CD31 (only in AD-MSCs group) – IHC (1, 2 wpt)	↑ PKC γ axons (only in AD-MSCs group) – IHC (2, 4, 6 wpt)	Takahashi et al. (2018a)
UCB-MSCs	Rabbits, T6–7, 7-day compression, iv. injection at 1 dpi post decompression and repeated injection with 3–7 day intervals	↓ GFAP – IHC (8 wpt)	↓ Iba-1 – IHC (8 wpt)	–	–	↓ TUNEL-cells (8 wpt)	↑ NF-200 – IHC (8 wpt)	Yang et al. (2018)
WJ-MSCs	Rat, T8, compression, it. injection at 7 dpi or repeated injection with 7 day intervals	↓ GFAP in dose-depend manner – IHC (9 wpi)	↓ Irf5, CD86, Mrc1, Cd163 in case repeated injection 1,5 mil cells – PCR-RT (9 wpi)	–	↑ White matter sparing, ↑ gray matter sparing in case repeated injection 1, 5 mil cells (9 wpi)	↑ Casp3 – PCR-RT (9 wpi)	↑ GAP43 in dose-depend manner – IHC (9 wpi)	Krupa et al. (2018)
BM-MSCs	Mice, T9, compression, iv. or ip. injection at 7 dpi	–	–	↑ Number of myelinated fibers, ↑ myelin area – toluidine blue (8 wpt)	↑ Spared white matter – (8 wpt)	↑ BDNF, NGF, NT-3, NT-4 – IHC (8 wpt);	↑ Axon area, ↑ fiber area, ↑ g-ratio – toluidine blue (8 wpt)	Ramalho et al. (2018)
UCB-MSCs-exosomes	Mice, T11–12, contusion, iv. injection at 30 mpi	–	↓ The ratio of F4/80 ⁺ /iNOS ⁺ cells, ↑ F4/80 ⁺ /Arg1 ⁺ cells, ↓ the total number of macrophages – IHC (7 dpi); ↓ TNF- α , IL-6, IFN- γ , G-CSF, MCP-1, MIP-1 α , ↑ IL-4, IL-10 – Milliplex (2 dpi)	–	↓ Cavity volume – (8 wpi)	–	–	Sun et al. (2018)
BM-MSCs-Exosomes	Rat, T10, contusion, iv. injection at 3 hpi	↓ GFAP – IHC (14 dpi)	↓ CD32, CD86, CD200R, CD163, RT1B – FC (14 dpi); ↓ Iba1 – IHC (14 dpi)	–	–	–	–	Ruppert et al. (2018)
BM-MSCs	Tree shrews, T10, hemisection, is. injection at 9 dpi	↓ GFAP – IHC (28 dpi)	↓ IL-1b – IHC (28 dpi); ↑ Merk, PI3K – PCR-RT (28 dpi)	–	↑ Spared tissue (28 dpi)	↓ TUNEL-cells (28 dpi); ↑ area of the soma in motoneurons (28 dpi); ↑ CNTF, STAT3 – PCR-RT (28 dpi)	–	Xiong et al. (2017)
BM-MSCs	Rat, T10, transection with removing 1.5–2 mm segment, insertion of scaffolds	–	↓ CD68, TNF- α /CD68, IL-1 β /CD68 – IHC (1 wpi)	–	↓ Cavity formation (8 wpt)	↑ vWF – IHC (1 wpi)	↑ nerve fibers (NF, GAP-43) – IHC (4 wpt)	Zeng et al. (2011, 2016)
AD-MSCs	Dog, L1, compression, iv. injection once a day for 3 successive days	↑ GFAP – WB (7 dpi); ↓ pSTAT3 – WB (7 dpi)	↓ COX-2, IL-6, TNF- α – WB (7 dpi)	↑ GalC – WB (7 dpi)	↓ Hemorrhagic area (7 dpi); ↓ damaged lesion size (7 dpi)	↓ 3-NT, 4-HNE, PC – ELISA (7 dpi); ↑ β -tubulin – WB (7 dpi)	–	Kim et al. (2015)
BM-MSCs	Mice, T11–12, contusion, is. injection	↑ GFAP – IHC (28 dpi)	↑ Iba1, ↑ arginase-1 – IHC (28 dpi);	–	↓ Lesion volumes (28 dpi)	↑ Laminin – IHC (28 dpi)	–	Neirinckx et al. (2015)
BM-MSCs	Rat, T10, compression, it. injection at 7 dpi	↓ and ↑ GFAP in central and peripheral part of injury, respectively – IHC (1 wpt); ↑ GFAP – PCR-RT (28 dpi)	↑ Irf5, Mrc1, ↓ Nfkb1 – PCR-RT (28 dpi); ↓ TNF- α , IL-4, IL-1 β , IL-2, IL-6, IL-12, ↑ MIP-1 α (10–28 dpi), ↑ RANTES (14 dpi) – Milliplex	↑ Olig2 – PCR-RT (28 dpi)	↑ Spared white and gray matter (1 wpt)	↑ VEGFa, Sort1, CNTF, ↑ FGF2, ↑ casp-3 – PCR-RT (28 dpi)	↓ GAP-43 – IHC (1 wpt); ↑ GAP-43 – PCR-RT (28 dpi)	Urdzková et al. (2014)
BM-MSCs	Rat, T8–9, contusion, iventr. injection at 1, 2, 4 wpi	↓ GFAP – IHC (4 wpt)	–	↑ Schwann cells associated with axons in the astrocyte-devoid lesion (4 wpt)	↓ Cavity volume (4 wpt)	–	↑ Axon density (NF200) – IHC (4 wpt)	Nakano et al. (2013)
AD-MSCs; BM-MSCs; WJ-MSCs; UCB-MSCs	Dog, L1, compression, is. injection at 1 wpi	↓ GFAP – WB (8 wpt)	↓ COX-2, IL-6 – ELISA (8 wpt)	↓ Demyelinated areas (8 wpt)	↓ lesion size (8 wpt)	↑ Tuj1, NF160, NeuN, GALC – WB (8 wpt)	–	Ryu et al. (2012)
BM-MSCs	Rat, T9–10, contusion, is. injection at 3 dpi	–	↓ OX-42/iNOS/CD16, ↑ OX-42/arginase-1/CD206 – IHC (7 dpi); ↑ CD45 ⁺ /CD11b ⁺ /GR-1 – FC (7 dpi); ↓ TNF- α , IL-6, ↑ IL-4, IL-13 – WB & ELISA (7 dpi)	↑ Myelinated areas (5 wpi)	↓ Total cavitation area (5 wpi)	–	↑ GAP-43 ⁺ , RT97 ⁺ -fibers (5 wpi)	Nakajima et al. (2012)

*The table includes the data for research articles over the period of 2011–2018, where the efficacy of transplantation of MSCs or their exosomes in a model of SCI was evaluated under two or more criteria specified in the table. The shading shows the criteria for which there is data in the relevant articles. MSCs: Mesenchymal stem cells; SCI: spinal cord injury; dpi & dpt/wpi & wpt: days/weeks post injury and transplantation; respectively; hpi/mpi: hours or minutes post injury; ↑: increase; ↓: decrease; ↕: no significant changes; is.: intraspinal; iv.: intravenous; iventr.: intraventricular; it.: intrathecal; ip.: intraperitoneal; ia.: intraarterial injections.