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| **ACUTE MYOCARDIAL INFARCTION – AMI** |
| **Cell type and orign** | **Cell number (x106)** | **Injection route** | **Clinical trial info** | **N****(cell *vs* control)** | **Endpoint** | **Reported results** | **Ref** |
|  |  |  |  |  |  |  |  |
| AutologousBMMCAutologousCBPC | 245NI | IC |

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| --- |
| Single centerRandomizedOpen-label |
|  |

 | 9 (9:0)11 (11:0) | LVEF | Positive | Assmus et al. 2002 |
| AutologousBMMC | 28 | IC | Single centerRandomizedPlacebo-controlled | 20 (10:10) | LVEF | Positive | Strauer *et al.*2002 |
| AutologousBMMC | 2460 ± 940 | IC | RandomizedPlacebo -controlled | 60 (30:30) | LVEF | Positive | Wollert et al.2004 |
| AutologousBMMC | 236 ± 174 | IC | Phase IIIMulticenterRandomizedPlacebo-controlled | 204 (101:103) | LVEF | Positive | Schachinger *et al. 2006*Dill *et al.2008* |
| AutologousBMMC | 68 | IC | MulticenterRandomized | 100 (50:50) | LVEF | no effect | Lunde *et al.*2006 |
| AutologousBMMC | 304 ± 128 | IC | MulticenterRandomizedPlacebo-controlled | 67 (33: 34) | LVEF | no effect | Janssens *et al.*2006 |
| AutologousBMMC | 2340 ± 1200 | IC | Single centerRandomized | 45 (31: 14) | LVEF | no effect | Grajek *et al.* 2010 |
| AutologousBMMC | 50-500 | IC | Phase IIMulticenterRandomizedOpen labeled | 150 (95: 55) | LVEF | no effect | Surder *et al.* 2013 2016 |
| AutologousBMMC | 150 | IC | MulticenterRandomizedPlacebo- controlled | 67(43: 24) day 353 (36: 17)day 7 | LVEF | no effect | Traverse *et al.* 2012 |
| AutologousBMMC | 150 | IC | MulticenterRandomizedPlacebo-controlled | 87 (58: 29) | LVEF | no effect | Traverse *et al.* 2011 |
| AutologousBMMC | 59.8 ± 59.9 | IC | Phase IIMulticenterRandomizedPlacebo - controlled | 98 (54: 44) | LVEF | no effect | Choudry *et al.* 2015 |
| AutologousBM CD34+ | ≥ 10 | IC | Phase IIMulticenterRandomizedPlacebo – controlled | 161 (78: 83) | LVEF | no effect | Quyyumi *et al.* 2017 |
| AutologousBMMC | 2000 ± 700 | IC | MulticenterRandomizedPlacebo -controlled | 50 (38: 12) low dose47 (33: 14)high dose25 (25: 0)low irradiated31 (31: 0) high irradiated | LVEF | no effect | Wollert *et al.* 2017 |
| AllogenicCSC | 10; 20; 35 | IC | MulticenterRandomizedPlacebo – controlled | 49( 33: 16) | Safety | Safe | Fernández-Avilés *et al.* 2018 |
| AutologousBMMC | 100 | IC | MulticenterRandomizedPlacebo -controlled | 121 (66: 55) | LVEF | no effect | Nicolau *et al.* 2018 |
| AutologousBMMC | 25-500 | IC | MulticenterRandomizedOpen-label | 375 (185: 190) | Mortality MACE | Inconclusive | Marthur *et al.* 2020 |
|  **CHRONIC ISCHEMIC HEART DISEASE – cIHD** |
| AutologousBMMC | 25.5 ± 6.3 | TE | Single centerRandomizedPlacebo -controlled | 21 (14: 7) | LVEF | Positive | Perin *et al.* 2003 |
| Autologous G-CSFCPC | 29 | IC | Phase ISingle centerRandomized | 32 (23: 9) | Global and regional LV functional LV Volumes | Positive | Honold *et al.* 2012 |
| AutologousBMMC | 100 | TE | Phase IISingle centerRandomizedPlacebo – controlled | 92 (61: 31) | Myocardial perfusionLVESVMax. oxygen consumption | no effect | Perin *et al.* 2012 |
| Autologous and AllogeneicBM-MSC | 20100200 | TE | Phase I/IIMulticenterDose-escalation studyRandomizedOpen-label | 10:0 10:010:0 | SafetyRemodelling | Positive | Hare *et al. 2012*Suncion et al.2014 |
| AllogeneicBM-MSC | 2575150 | TE | Phase IIMulticenterDose-escalation RandomizedPlacebo-controlled | 20 (15: 5)20 (15: 5)20 (15: 5)  | Safety MACE | no effect | Perin *et al.* 2015 |
| AutologousBM-MSC | NI | IM | MulticenterRandomizedPlacebo-controlled  | 55 (37: 18) | LVESV | Positive | Mathiasen *et al.* 2015 |
| AutologousIxmyelocel-T | NI | TE | Phase IIbMulticenterRandomizedPlacebo - controlled  | 226 (160: 66) | All-cause death, Cardiovascular admission to hospital, Unplanned clinic visits to treat acute decompensated heartfailure | Positive | Patel *et al.* 2016 |
| AutologousBM-MSC | ≥ 600 | IM | MulticenterRandomizedPlacebo -controlled  | 315 (157: 158) | Remodelling | Positive | Teerlink *et al.* 2017 |
| AutologousCSC c-kit | 1or 0.5 | IC | Phase IRandomizedOpen-label | 33 (20: 13) | Safety  LV function | Positive | Chugh *et al.* 2012 |
| AutologousCDC | 12.5 | IC | Phase IMulticenterDose-escalationRandomizedOpen-label | 25 (17: 8) | Safety | Positive | Makkar *et al.* 2012 |
| AutologousADRC | 0.4; 0.8; 1.2 (cells/kg) | TE | Phase IMulticenterRandomizedPlacebo - controlled | 27 (21: 6) | Safety | Positive | Perin *et al.* 2014 |
| AutologousCDC | 12.5 - 25 | IC | Phase IRandomizedPlacebo -controlled | 25 (17: 8) | Safety | Positive | Malliaras *et al.* 2014 |
| AutologousIxmyelocel-T | 35 to 295 | mTC | Phase IIMulticenterRandomizedSOC | 30 (21: 9)  | Safety MACE | Positive | Henry *et al.*2014 |
| AutologousCDC | 25 | IC | Phase I/IIMulticenterRandomizedDouble-blindPlacebo - controlled  | 69 (49: 20) (recent MI)65 (45: 20) (chronic MI) | SafetyInfarct size | Positive | Chakravarty *et al. 2017* |
| AutologousSca-1+-ESC | 4 | EDP | Case report | 1 (1: 0) | Immunologic reaction LV function | Safe | Menasché *et al.* 2015 |
| AutologousSca-1+-ESC | 8.2 | EDP | Phase ISingle centerOpen label | 6 (6: 0) | Safety | Positive | Menasché *et al.* 2018 |
|  **Refractory Angina** |
|  |  |  |  |  |  |  |  |
| AutologousBMMC | 21.5 | IM | Case report | 1 (1: 0) | Safe | Positive | Gowdak *et al.* 2005 |
| AutologousBM CD34+ G-CSF mobilized | * 1. (cells/kg)

0.5(cells/kg) | IM | Phase IIMulticenterRandomizedPlacebo-controlled  | 78 (53: 25) 78 (53: 25) | Weekly angina frequency | Positive | Losordo *et al.* 2017 |
| AutologousBM CD34+ G-CSF mobilized | 0.1 or 0.5 (cells/kg) | IM | Phase IIMulticenterRandomizedPlacebo - controlled  | 78 (50: 28) | Safety Frequency of angina symptoms | Interrupted | Povsic *et al.* 2016 |
| AutologousBM CD34+ G-CSF mobilized | 0.01 or 0.1 or 0.5 (cells/kg) | IM | Phase IIIMulticenterRandomizedDouble-blindPlacebo - controlled Open labelSOC | 304 (187: 8928 SOC) | Total exercise timeFrequency of angina symptomsAll-cause mortality | Interrupted | Henry *et al.* 2018 |
|  **IDIOPATHIC DILATED CARDIOMYOPATHY – IDC** |
|  |  |  |  |  |  |  |  |
| AutologousBMMC | 259 ± 135  | IC | Phase ISingle centerOpen-label | 33 (33: 0) | Absolute change in regionalLV wall motion of the target area | Positive | Fischer-Rasokat *et al.*2009 |
| AutologousBMMC | 176-295 | IC | Phase IMulticenterRandomizedPlacebo -controlled | 115 (61: 54) | LVEF | no effect | Martino *et al.2*015 |
| AutologousBMMC | 28 ± 16(cells/ mL) | IC | Phase IRandomizedOpen-label | 44 (24: 20)  | NYHA functional classLEVFMortality | Positive | Seth *et al.*2006 |
| AutologousBMMC | 168 ± 96 | IC | Phase IRandomizedOpen-label | 81 (41: 40) | NYHA KCCQLEVFMortality  | Positive | Seth *et al.*2010 |
| AutologousBMMC | 106 | mTC | Phase IRandomizedOpen-label | 30 (20: 10) | LEVF | no effect | Sant`anna *et al.*2014 |
| AutologousPB-GCSF CD34+ | 123 ± 23  | IC | Phase IRandomizedOpen-label | 55 (28: 27) | LVEFNT-proBNP | Positive | Vrtovec *et al.*2011 |
| AutologousPB-GCSF CD34+ | 103 ± 27105 ± 31  | ICTE | Phase IRandomizedOpen label | 20 (20: 0)20 (20: 0) | LVEF | TE had better results than IC | Vrtovec *et al.*2013 |
| AutologousPB-GCSF CD34+ | 113 ± 26  | IC | Phase IRandomizedOpen label | 110 (55: 55) |   LVEF | Positive | Vrtotec *et al.*2013 |
| AutologousIxmyelocel-T | 35 to 295 | IM | Phase IIMulticenterRandomized | 29 (18: 11)  | Safety MACE | no effect | Henry *et al.*2014 |
| Autologous MSCAllogeneic MSC | 100 | TE | Single centerRandomized | 16 (16: 0) 18 (18:0) | Safety MACENYHA class  | Positive (allogenic) | Hare *et al.*2016 |

AMI: acute myocardial infarct; cIHD: chronic ischaemic heart disease; IDC: idiophatic dilated cardiomyopathy; BMMC: bone marrow mononuclear cells; CBPC: circulating blood progenitor cells; G-CSF: granulocyte colony-stimulating factor; CPC: circulating progenitor cells; BM-CD34+: CD34+ cells derived from bone marrow; G-CSF: granulocyte colony-stimulating factor; CSC: cardiac stem cell; BM-MPC: bone marrow mesenchymal precursor cells; MSC: mesenchymal stem cell; ixmyelocel-T: mixture of bone marrow CD90+ cells and CD45+/CD14+ cells; CSC c-kit+: cardiac stem cell c-kit+; CDC: cardiac-derived cell; Sca-1+ ESC: Embryonic stem cell - cardiac progenitor Sca-1+ cells; PB-GCSF CD34+: peripheral blood- GCSF mobilized D34+ cells; IC: intracoronary; TE: transendocardial; mTC: mini-thoracotomy; EDP: epicardically-derived patch; SOC: standard of care; LVEF: left ventricular ejection fraction; LV: left ventricule; LVESV: left ventricular end systolic volume; MACE: major adverse cardiac effects; NI: not indicated; NYHA: New York Heart Association; KCCQ: Kansas City Cardiomyopathy Questionnaire; NT- proBNP: N-terminal (NT)-pro hormone BNP; NI: not indicated.