

**Table 1. Mesenchymal stem/stromal cell (MSC) transplantation clinical studies.** Summarisation of clinical studies and ongoing clinical trials assessing the therapeutic benefit of MSC transplantation in patients with COVID-19, including studies assessing the therapeutic potential of MSCs in patients with acute respiratory distress syndrome (ARDS), without COVID-19.

Citation	N	Subjects	MSC source & dose	MSC timing	Recipient site	Results
<b>Leng et al., 2020</b>	MSC transplant: n = 7; CON: n = 3	COVID-19 pneumonia	Clinical grade ACE2 <sup>-</sup> MSCs at 1 x 10 <sup>6</sup> cells/kg	The time when symptoms and/or signs were still getting worse, even as the expectant treatments were being conducted	Systemic	<ul style="list-style-type: none"> <li>- ↑ IL-10 vs. CON</li> <li>- ↓ TNF-α vs. CON</li> <li>- ↔ IP-10</li> <li>- Trend for ↑ VEGF vs. CON</li> <li>- Inflammation, AAT, MYO and CK reduced in critically severe patient with a reduction in ground-glass opacity and pneumonia infiltration</li> </ul>
<b>Liang et al., 2020</b>	Case study	Critical COVID-19	Allogenic hUCMSCs at 5 x 10 <sup>7</sup> cells 3 times	Admitted 2 days after symptoms onset and MSCs were transplanted on the 9 <sup>th</sup> , 12 <sup>th</sup> & 15 <sup>th</sup> days after admission. In combination with antibiotics and thymosin α1	Systemic	<p>No side effects were observed.</p> <p><b>After 2<sup>nd</sup> administration:</b></p> <ul style="list-style-type: none"> <li>- ↓ Bilirubin, WBC and neutrophil count, CRP &amp; ALT/AST</li> <li>- ↑ lymphocyte count</li> <li>- ↑ CD3<sup>+</sup>, CD4<sup>+</sup> &amp; CD8<sup>+</sup> T cells</li> <li>- Trachea cannula removed</li> </ul> <p><b>After 3<sup>rd</sup> administration:</b></p> <ul style="list-style-type: none"> <li>- Pneumonia relieved</li> <li>- Removed from ICU 2 days following</li> <li>- Negative throat swab</li> </ul>
<b>Zhang et al., 2020</b>	Case study	COVID-19 pneumonia - History of diabetes	Wharton's jelly-derived hUCMSCs at 1 x 10 <sup>6</sup> cells/kg	Admitted 5 days after symptoms onset and MSCs were transplanted on the 17 <sup>th</sup> day of admission	Systemic	<p><b>Post-transplant:</b></p> <ul style="list-style-type: none"> <li>- COVID-19 symptoms disappeared 2 to 7 days</li> <li>- ↓ Ground glass opacity and pneumonia infiltration day 6</li> </ul>

						<ul style="list-style-type: none"> <li>- ↑ CD3<sup>+</sup>, CD4<sup>+</sup> &amp; CD8<sup>+</sup> T cells</li> <li>- ↓ CRP, IL-6 &amp; TNF-α</li> </ul>
<b>Chen et al., 2020</b>	MSC transplant: n = 17; CON: n = 44	H7N9-induced ARDS	Allogenic menstrual-blood-derived MSCs at 1 x 10 <sup>6</sup> cells/kg	3 patients treated with 3 infusion at the early stage of infection; 6 patients were treated with 3 infusions at the late stage of infection; 8 patients accepted 4 infusions of at late stage of infection	Systemic	<b>At admission:</b> <ul style="list-style-type: none"> <li>- No differences, except ↓ PCT vs. CON</li> </ul> <b>At discharge:</b> <ul style="list-style-type: none"> <li>- ↑ mortality rate of CON</li> <li>- ↓ PCT, ALT, sCr, CK, PT &amp; D-dimer vs. CON</li> </ul> <b>At follow-up (5yr; n = 4):</b> <ul style="list-style-type: none"> <li>- ↑ Hb</li> <li>- ↓ PT</li> </ul>
<b>Sengupta et al., 2020</b>	N = 23	COVID-19: cohort a (mild COVID-19): n = 1; cohort b (hypoxaemia & COVID-19): n = 20; cohort c (intubated COVID-19): n = 3	Bone-marrow derived MSCs exosome agent – ExoFlow – 15 mL	Not specified	Systemic	<ul style="list-style-type: none"> <li>- 71% patients recovered and/or were discharged after 5.6 days post-infusion</li> <li>- 13% remained critically ill</li> <li>- 16% died</li> <li>- 80% improved PaO<sub>2</sub>/FiO<sub>2</sub> ratio within 3 days</li> <li>- ↓ CRP, ferritin &amp; D-dimer on day 5</li> <li>- ↑ CD3<sup>+</sup>, CD4<sup>+</sup> &amp; CD8<sup>+</sup> T cells on day 5</li> </ul>

**Note:** CON = control; ACE2 = Angiotensin converting enzyme 2; IL-10 = Interleukin-10; TNF-α = Tumor necrosis factor α; IP-10 = Interferon gamma-induced protein 10; VEGF = Vascular endothelial growth factor; AST = Aspartate amino transferase; MYO = Myoglobin; CK = Creatine kinase; hUCMSC – human umbilical cord mesenchymal stem cells; WBC = white blood cell; CRP = C-reactive protein; ALT = Alanine aminotransferase; ICU = intensive care unit; ARDS = Acute respiratory distress syndrome; PCT = Procalcitonin; sCr = serum creatinine; PT = Prothrombin time