

Stem cells from bone marrow save the day

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New research, published in BioMed Central's open access journal *Stem Cell Research & Therapy*, investigates the therapeutic use of human stem cells from bone marrow against acute lung injury and identifies TNF- α -induced protein 6 as a major molecular component of stem cell action.

Acute lung injury is a major complication of critically ill patients resulting in pulmonary edema, hypoxia and, in the worst cases, organ failure. Consequently up to 40% of all sufferers die because their bodies' immune systems overreact in an attempt to repair the original lung damage.

Researchers based in Louisiana showed that therapy with human multipotent stromal cells (hMSC) isolated from bone marrow was able to significantly reduce acute lung injury in mice after 48 hours. At 24 hours the therapy could be seen to be working, reducing the amount of pulmonary edema and protein in the lungs. While injury increased the number of white blood cells (neutrophils) ten fold, this could be reduced by treatment with hMSC.

When the researchers looked in more detail, they found that hMSC treatment reduced over half of the inflammatory proteins tested, including IL-1 α , IL-1 β , IL-6 and RANTES. hMSC treatment also increased the amount of the anti-inflammatory proteins TNF- α -induced protein 6 (TSG6) and Interleukin 1 receptor antagonist (IL-1RN).

Dr Sullivan, from the Center for [Stem Cell Research](#) and Regenerative Medicine at Tulane University School of Medicine, said, "Our research

reveals an important mechanism behind the anti-inflammatory activity of stem cells in lung injury because blocking the activity of TSG6 using siRNA prevented most of the anti-inflammatory effects of hMSC.

"Stem cell therapy shows great promise in the treatment of acute and life threatening conditions, such as acute lung injury and acute respiratory distress syndrome. Understanding the mechanisms by which hMSC dampen inflammation will likely provide strategies to improve the therapeutic potential of hMSCs for treatment of [lung injury](#). Since it is a simple procedure to collect [stem cells](#) from [bone marrow](#), we hope that our research paves the way forward into clinical trials."

More information: The Human multipotent stromal cells attenuate lipopolysaccharide-induced acute lung injury in mice via secretion of tumor necrosis factor--induced protein 6, Svitlana Danchuk, Joni H Ylostalo, Fokhrul Hossain, Randy Sorge, Austin Ramsey, Ryan W Bonvillain, Joseph A Lasky, Bruce A Bunnell, David A Welsh, Darwin J Prockop and Deborah E Sullivan, *Stem Cell Research & Therapy* (in Press)

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