Durham, NC – With more soldiers returning from combat suffering devastating injuries, doctors are turning to a reconstructive surgery that uses tissue transplantation along with immuno-suppression therapy. This approach has had encouraging results; however, rejection of transplanted tissue from an unmatched donor remains a critical complication. A new study found in the latest issue of ***STEM CELLS Translational Medicine*** reports that researchers may have found a way around that.

"We demonstrated in mice that a single infusion of adipose-derived stromal cells (ASC) – which are stem cells taken from fat in a minimally invasive procedure – from an unmatched donor combined with an extremely low dose of bone marrow cells resulted in stable long-term tolerance of the skin graft without undo consequences such as graft versus host disease," said Thomas Davis, Ph.D., a contractor from the Henry M. Jackson Foundation who is working at the Naval Medical Research Center's Regenerative Medicine Department. Dr. Davis is lead author of the study.

He added, "As we move forward, we are cautiously optimistic, appreciating that the transition from these laboratory models to proof-of-principle preclinical studies is challenging and not straightforward. If successful, the technology has diverse therapeutic applications in clinical transplantation in both military and civilian settings."

The research team wanted to try using ASCs because these cells have proven to be more potent than bone marrow and cord-blood derived stem cells when it comes to inhibiting the body's rejection of transplantations from an unmatched donor. They conducted the study by doing skin grafts in mice. One group of grafted mice received no stem cell transfusions; one group received human-derived ASCs after the graft occurred; and another group received a combination of human ASCs and stem cells harvested from the mouse's own bone marrow, also after placement of the graft.

"More than 200 days later, the combination of human ASC and limited numbers of blood marrow stem cells effectively prevented rejection, with no evidence of graft versus host disease," Dr. Davis reported.

Navy Capt. Eric A. Elster, M.D., professor and chair of the surgery department at Uniformed

Services University of the Health Sciences, helped lead the study. “ASC constitutively produced high levels of anti-inflammatory/immunoregulatory factors,” he said. “While further work is needed to validate this approach in other laboratory models before clinical trials can begin, the ability to use ASC, which are non-donor specific and clinically feasible, to induce tolerance opens a new horizon in transplantation.”

“The implications of this research are broad,” said Anthony Atala, MD, editor of STEM CELLS Translational Medicine and director of the Wake Forest Institute for Regenerative Medicine. “If these findings are duplicated in additional models and in human trials, there is potential to apply this strategy to many areas of transplantation.”