

# Novel Methods for Increasing Peripheral Blood Circulation

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## Technology description

### Summary

Human blood is in short supply. Blood saving techniques and artificial blood are the two principal approaches to remedy shortfalls in the blood supply. Clinicians facing significant blood loss in patients with significant trauma or surgical intervention choose plasma expanders. In emergencies, the first priority is to re-establish a patient's blood volume, which may be accomplished with a transfusion of plasma expanders. Once the blood volume is addressed, the next priority is to restore the oxygen carrying capacity of the blood, which requires a transfusion of blood. There are more than 200 million transfusions of plasma expanders in the U.S. annually and a novel plasma expander would be a valuable addition to the clinician's toolbox.

### Description

Researchers collaborating at UC San Diego have developed a group of novel plasma expanders with superior properties relative to existing plasma expanders in terms of superior maintenance of functional capillary density and blood pressure. Properly administered, this technology will effectively maintain proper perfusion and the associated cellular and tissue integrity, even in the presence of high degrees of hemodilution, (e.g., when the concentration of red blood cells in the blood is reduced by 50-80 percent from normal). Whenever human blood falls below 7 g/dl of hemoglobin concentration, the concentration of red blood cells is too low to provide adequate viscosity in the microcirculation of capillaries, leading to a condition of reduced shear stress, capillary collapse, and microvascular dysfunction. For patients suffering from a reduction in red-blood cell concentration, administering this technology will help maintain the blood's functional plasma viscosity for adequate tissue perfusion while restoring the capillary blood flow by restoring capillary pressure, resulting in the prevention of vasoconstriction by microscopic blood vessels.

### Application area

This technology provides the materials and methods for maintaining or increasing peripheral blood flow in mammals.

Institution

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