ARTIFICIAL OXYGEN CARRIERS: PROSPECTS OF APPLICATION

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The current state of the problem of creating blood substitutes with a gas transport function makes it possible to note that these infusion media, modulating the most important oxygen transport function of blood, in the 21st century begin to occupy a worthy place in infusion-transfusion therapy along with the performance of a number of other measures by anesthesiologists and surgeons aimed at maximizing savings of the patient's own blood, which makes a decisive contribution to the salvation of critically ill patients.

Over recent years, the use of artificial oxygen carriers has been receiving much attention. The reasons for this have been the increasing cost of collecting and processing blood, public concerns about the safety of blood products, complications from blood transfusions, military requirements for increased volumes of blood during military conflicts and a fall in the number of new donors. Artificial oxygen carriers are synthetic solutions with the ability to bind, transport, and unload oxygen in the body. Oxygen carriers based on perfluorocarbons or hemoglobin-based oxygen carriers are alternatives to allogenic red blood cells.

The potential advantages offered by oxygen carriers include universal compatibility, one to three years of shelf life compared with 42 days for blood cells, the ability to be produced in large quantities, a manufacturing process that can reduce the risk of infectious agents, reduced dependence on donor blood supplies and an alternative for patients who will not accept transfusions of red blood cells, such as Jehovah's Witnesses.

Literature data indicate great prospects for blood substitutes with oxygen transfer function for the treatment of a large group of patients exposed to steadily increasing various extreme influences, in terms of: preventing the development of irreversible changes in cells cerebral cortex and other vital organs, with subsequent restoration of working capacity and worthy quality of life; reducing the need for donor blood, reducing the risk transmission of various viral and bacterial infections, opportunities to provide care to patients with rare groups blood or in case of difficulties in the selection of donor blood, refusal of patients from allogeneic blood transfusion.

Search for blood substitutes with gas transmission function actively continues in different countries. In recent years, encouraging reports have appeared on the creation of artificial blood and artificial erythrocytes that do not have a group or Rh identity, based on advances in biology and other fundamental sciences, as well as new technical capabilities. A modern approach is the use of nanotechnology and, in particular, the development of molecular devices such as respirocytes that function as artificial erythrocytes.

Further studies are needed in order to show the safety and efficacy of these substances for clinical practice.