

Artificial blood developed for the battlefield

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Bags of blood collected during donation. Image: Wikipedia.

(PhysOrg.com) -- US scientists working for the experimental arm of the Pentagon have developed artificial blood for use in transfusions for wounded soldiers in battlefields. The blood cells are said to be functionally indistinguishable from normal blood cells and could end forever the problem of blood donor shortages in war zones and difficulties in transporting blood to remote and inaccessible areas.

The blood is made from [hematopoietic stem cells](#) from discarded human umbilical cords, which are turned into large quantities of [red blood cells](#) by a method called "blood pharming" that mimics the functions of bone marrow. Pharming is a method of using genetically engineered plants or animals to create medically useful substances in large quantities. Using this process the cells from one umbilical cord can produce about 20 units of blood, which is enough for over three transfusions for injured soldiers in the field.

The blood is being manufactured for the Defense Advanced Research Projects Agency (DARPA) by Ohio company Arteriocyte, which has already submitted samples of O-negative blood to the US [Food and Drug Administration](#) (FDA) for evaluation and safety testing. The company received funding of \$1.95 million in 2008 to find a way of making large quantities of [artificial blood](#).

Don Brown of Arteriocyte said the method works but the production needs to be scaled up to produce enough blood. Scaling up would also bring the costs per unit (around a pint) down from the current \$5,000 to \$1,000 or less. The scaling up could involve improving the technology to produce more units from each umbilical cord, or finding a way to make the culture chambers that mimic bone marrow more efficient and therefore cheaper.

Mr Brown said that in war zones it can take three weeks for donated blood (which mostly comes from donations made in the US) to reach patients. It must be used within a week or two to avoid the risk of [organ failure](#) or infection that can occur if the blood is stale. There are mobile blood banks in the field, but if there are many injured soldiers, there is often not enough fresh blood available.

Human trials of the "pharmed" blood are expected to start in 2013, but the blood could be available for military use within five years. It could also eventually be used in hospitals to make up for shortages of blood. The [artificial blood](#) is O-negative, which can be used on all patients, regardless of their blood type.

More information: www.arpa.mil/DSO/thrusts/bio/t...lood_pharm/index.htm

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