

Artificial Blood
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BIO 282
04/11/2005



Every 3.7 seconds 2 to 3 pints of blood are being used in the US. Every year 4 million Americans receive transfusions. Unfortunately blood supplies cannot keep up with this demand, causing delays on non-emergency surgeries. This brings about the importance of artificial blood.

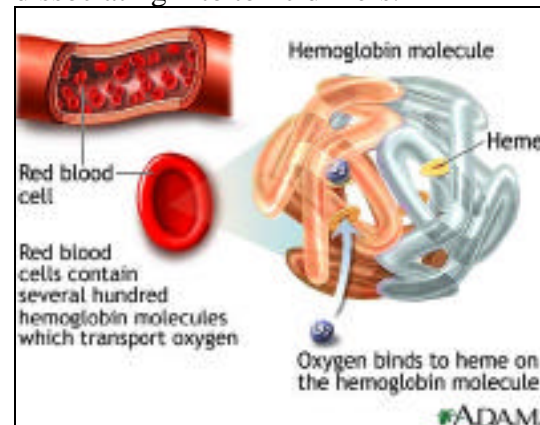
After many years of research, experiments have focused on two ways of creating artificial blood. One method is by perfluorocarbon emulsions. The other is stroma free hemoglobin. This hemoglobin solution shows the most success due to its oxygen carrying capacity. When attempting to create this hemoglobin scientist face many problems. This includes creating a substance which is universal to any blood type, free of infection, inexpensive, and easy to produce in large quantities.

In trials the hemoglobin comes from either humans or animals. The human hemoglobin is obtained from expired donated blood, while the animal hemoglobin comes from cows.

To obtain a stroma free hemoglobin, red blood cells must be broken and the hemoglobin extracted from the cells. Since hemoglobin rapidly dissociates into dimers composed of an alpha and a beta subunits, developing a stroma free hemoglobin means creating a hemoglobin that does not dissociate. There have been two ways to obtain this. One way is a chemical procedure, which involves binding of the alpha subunits by a bifunctional agent (such as diaspirin), which links the hemoglobin molecules

and stabilizes them. The second procedure uses genetical engineering. Here the hemoglobin is genetically altered by the addition of a single amino acid. This allows two alpha subunits to covalently bond, which will prevent the dissociation.

Currently two major companies are showing great success. The leader of the two is Biopure. Biopure has created an artificial blood called oxyglobin. It is created by treating hemoglobin with glutaraldehyde, a chemical to bind the hemoglobin together. This stabilizes the hemoglobin, stopping it from dissociating into toxic dimers.



Currently throughout the world there are many laboratory tests being done on artificial blood. Once completed this blood will be of great use, especially to accident victims. Since this blood will be universal to all blood types its can be used for emergencies. Also, ideally this blood will have a long shelf life than donated blood. As science continues to advance the search for artificial blood grows closer.

<http://www.emedicine.com/med/topic3198.htm>

<http://www.dcmsonline.org/jax-medicine/1998journals/december98/artificialblood.htm>

<http://www.cem.msu.edu/~cem181fp/blood/intro.htm>