Oxalis

Replenishing the global supply

Problem

The world's blood supply is unpredictable and prone to shortages

Not enough donations
Today's healthcare system relies heavily on donations to meet demand, but less than 5% of eligible people actually donate.

Short shelf life
Donated blood has a shelf life of only 42 days (6 weeks), and that is also considering that it needs to be stored in a refrigerated room at 6°C.

Blood is expensive
It costs a hospital $200-300 USD to buy one unit (0.5L) of blood, and that doesn't even include transportation or storage costs, which ultimately falls back onto patients.

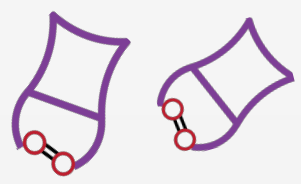
Vision

Make it easier for patients to receive the medical supplies they need; whenever that might be.

Synthesizing Red Blood Cell Substitutes with Aptamer-Based Oxygen Transporters (ABOT)

Step 1
We create many single DNA strands called aptamers. They tangle up into a formation and act like puzzle pieces by selectively attaching to only certain molecules.

Step 2
Each evolution will result in new variants that are potentially capable of attaching to heme (which is needed so that it can then attach to oxygen). We keep the variants that perform the best and discard the rest. We repeat these steps until we have a working aptamer.



Step 3
We take the best aptamers of the bunch and sequence (save) them so that they can be manufactured and given as red blood cell substitutes later on.

Step 4
After manufacturing, all the aptamers and heme are mixed and then freeze-dried for long-term storage and light shipment. However, before the final infusion to patients, this powdery substance will need to be rehydrated with a blood volume expander (which is mostly made of water).

Impact

A paradigm shift in the blood sector

No more donations needed
Our substitute eliminates low blood supply situations that occur nowadays due to a lack of donations.

Longer shelf-life
Our substitute can be stored for over 6 months in a room-temperature environment in its dried form.

Cheap when scaled up
By using the technologies we propose, it can be manufactured for as little as $10 USD per unit equivalent of blood (~20x cheaper).

"Your idea seems to be a good one, and likely has real potential. [...] From what I can see [...] [aptamers] have not been used as an alternative to a heme-based protein [...] for use as an oxygen therapeutic agent."

- Peter Keipert, Ph.D., Experimental Medicine

"It sounds really exciting, [...] seems super cool [...] and all the steps seem decently executable.

- Colin Cook, Ph.D., Biomedical Engineering

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