

Project Summary:

Purpose/Hypothesis

Platelet storage longevity has yet to be developed to its full potential. Platelets, while currently are approved by the FDA for storage for up to 7 days, are usually only kept for 5 due to the threat of bacterial contamination. If, however, this obstacle were overcome, platelet storage could be extended greatly. This study, therefore, aimed to test methods which could be utilized to extend platelet storage by eliminating or reducing the possibility of bacterial contamination.

It was hypothesized that lymphocytes, which are responsible for fighting infection in vivo, may be applied for the same purpose to prevent platelet contamination in vitro. It was further believed that transfer factors and antibodies which aid in immune function in vivo, will have similar effects in vitro. As both are present in large quantities in human colostrum, it was believed that colostrum would be an appropriate source of each.

Method

1. Lymphocytes were isolated from a whole blood sample.
2. Colostrum and lymphocytes were applied to platelets as appropriate.
3. One sample included platelets only, another included platelets and lymphocytes, the third was composed of platelets and colostrum, and finally there was a sample with platelets, lymphocytes and colostrum
4. The samples were assessed every 24h for 13 days.
5. The experiment was performed in triplicates.
6. Presence of bacteria was determined by culturing swabs taken from the samples.

Observations/Results

- o Platelets (with no additions) did not grow any bacteria up to day 12
- o Samples including colostrum were much more prone to bacterial growth than the other samples, beginning to grow bacteria by day 9
- o Colostrum samples which included lymphocytes had fewer bacteria
- o Platelet and platelet plus lymphocyte samples produced gas in the agar plate on day 12 despite containing no bacteria
- o All bacteria which appeared from the various samples were identical
- o Colostrum increased bacterial growth, possibly due to its nutrient-rich nature

Conclusions

- o Platelets alone without modification can potentially be stored for up to 6 days longer than the shelf-life that is commonly put into practice at present
- o Lymphocytes have the potential to decrease bacterial growth (having done so in the colostrum samples), extending platelet shelf-life
- o Colostrum increased bacterial growth and therefore is not a solution to the problem of bacterial contamination, however isolating the components which were expected to provide effect (transfer factors, and antibodies) may increase efficacy