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Editorial

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A Call to Reinvent Platelet Products

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Platelet storage is a well-preserved routine procedure in blood banking. Platelet concentrates (PCs) are stored under continuous agitation in gas-permeable bags to allow sufficient gas exchange between platelets and the ambient air. The storage temperature is kept at 22°C to maintain sufficient platelet function and to avoid bacterial growth at the same time. In most jurisdictions PCs can be stored for 4–5 days [1, 2].

Albeit continuous progress has been made to improve PC production and storage, these principles have not been fundamentally changed over decades. The introduction of platelet additive solution as storage media and pathogen reduction for PCs are two examples of the latest improvements. Thereby, pathogen reduction technologies have a significant impact because they allow to extend the shelf life up to 7 days (40–80% increase compared to day 4/5) which contributes to patient and donor safety, wastage reduction, and higher cost-effectiveness [3].

The prolongation of platelet storage period would create a huge impact in Transfusion Medicine because PC availability would increase throughout holiday seasons, and also wastage could be reduced. Furthermore, other innovations of PC products that improve patient treatment and management are most welcome. This will be mandatory for transfusion medical research as a driver for new advances in the field.

One potential way to achieve prolonged platelet storage is to decrease the storage temperature. Irene Marini and colleagues [4] first review in vitro hemostatic functions of cold-stored platelets and show the diverse aspects and challenges associated with cold storage of PCs. Thereafter, Zeller-Hahn et al. [5] pinpoint the obstacles of increased platelet responsiveness after short-term refrigeration in an original work.

Both articles provide evidence that cold storage has consequences for platelet integrity and function. Prudent and colleagues [6] recapture proteome analysis tools to show that also pathogen reduction with amotosalen/UVA treatment has structural consequences for platelets by increasing phosphoprotein expressions indicating in vitro platelet activation. While we know, that this only mildly affects in vivo performance of transfused platelets, it may limit the perspective to further prolong storage time of pathogen-reduced PCs.

Importantly, bacterial contamination of whole blood is a substantial problem in blood-derived components. Gravemann et al. [7] demonstrate that especially whole blood-derived PCs can accumulate bacteria during production. This issue will need further assessment and is the best argument to include pathogen reduction in many future PC production lines.

Finally, PCs could serve as diagnostic tools to uncover vessel obstructions or organ damage. Von Behren et al. [8] apply indocyanine green labeling and provide a proof of concept for Good Manufacturing Practice conform production of labeled platelets for diagnostic purposes.

The set of articles in this special issue represents a snapshot of possibilities, perspectives and challenges related to the production, storage, and new indications of platelet products. In this manner, they serve as an appeal to constantly improve and reinvent PCs, which are still an integral part of transfusion medicine's routine and scientific interest.

Conflict of Interest Statement

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