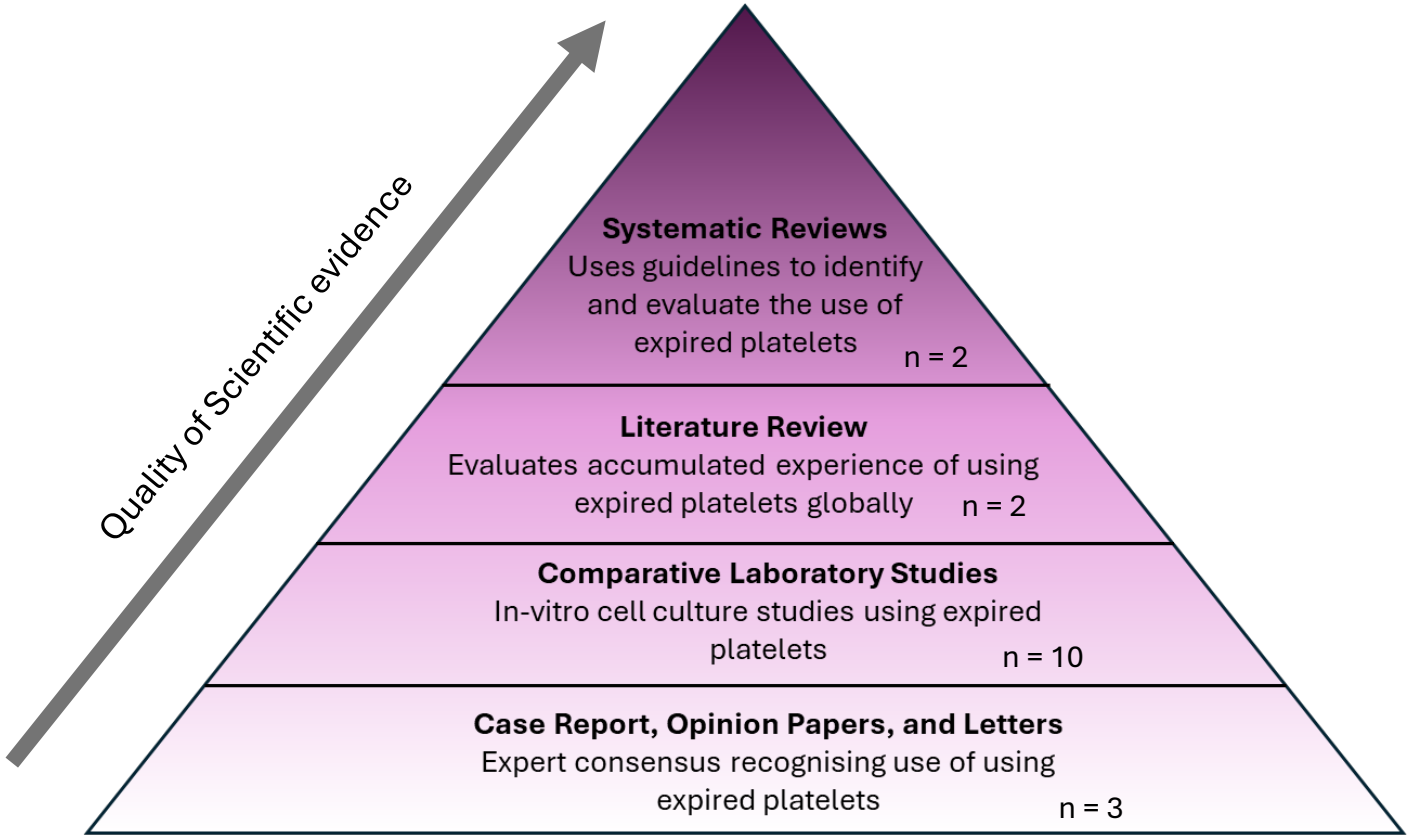
Hierarchy of Scientific Evidence for in-vitro studies



Case reports, opinion papers, and letters

- **Van der Valk et al (2018)** suggest that 50 – 60% of prepared platelets cannot be used for patients but can still be used to make platelet lysate.
- **Weber et al (2022)** recommend using outdated platelets for cell culture purposes to avoid interfering supply to patients.
- **Goubran et al (2025)** recommend repurposing platelets into lysate for cell culture in Section 5.

Comparative laboratory studies

- **Jonsdottir-Buch et al (2013)** showed that platelet lysate from expired platelets were comparable to fresh platelets in supporting growth of mesenchymal cells.
- **Glovinski et al (2016)** showed that outdated platelets are an efficient source of platelet lysate in supporting growth of mesenchymal cells.
- **Dessels et al (2018)** showed that both fresh and outdated platelets can be used to prepare platelet lysate, but initial count matters.
- **Delila et al (2020)** demonstrated that platelet lysate from outdated (5 days post collection) platelets were rich in growth factors.
- **Shanbag et al (2020)** showed cell culture performance in mesenchymal stem cells was unaffected between platelet lysates produced from outdated platelets stored for up to 4 months.
- **Widyanigram et al (2021)** showed that platelet lysate from outdated platelets (5 days post collection) were rich in neurotrophic factors, which supported corneal endothelial cells.
- **Kachroo et al (2021)** showed that outdated platelet concentrates can be used to culture chondroprogenitors.
- **Mentari et al (2022)** demonstrated that outdated platelets stored >5 days can be used to produce platelet lysate without affecting culture performance in breast cancer cells (T47D).
- **Lee et al (2023)** proved that outdated platelets can be used to produce platelet lysate with low batch-to-batch variability.
- **Wendland et al (2025)** showed that both lyophilised platelet lysate and platelet lysate form outdated platelet concentrates were effective in supporting mesenchymal stem cells

Literature review

- Table 1A of the literature review by **Burnouf et al (2016),** several studies successfully used expired platelet concentrates to prepare platelet lysate, without any negative impact on its safety and performance in cell culture applications.
- Section 2.1.2. of the literature review by **Weber et al (2025)** states that the use of outdated platelet concentrates is not only justified scientifically but also morally, to avoid competition with clinical supply chains.

Systematic Reviews

- Table 3 of a scoping review by **Immalaraju et al. (2025)** reported that two out of five studies included in the review used expired or out-dated platelet units. The use of expired platelets did not affect the safety and performance of platelet lysate as a cell culture supplement.
- Table 4 of a systematic review and meta-analysis by **Polembella et al (2022)** showed that one study only used expired platelet units and it did not affect the safety and performance of the resulting lysate.

Conclusion

- Over 17 scientific studies demonstrate the feasibility of using outdated/expired therapeutic grade platelet concentrates for the safe and effective preparation of platelet lysate as a cell culture supplement.
- Platelet concentrates can be stored up to four months without affecting cell culture performance (-80°C). Some degradation of bioactive components is observed but does not affect the potency as a cell culture supplement.
- Platelet count and quality of preparation matters more than storage time after expiry
- Using outdated platelets does not interfere with patient supply and reduces waste burden

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