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Platelet-rich fibrin as a drug delivery system: a scoping review

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202380004

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 01 August 2023 and was last updated on 01 August 2023.

INTRODUCTION

Review question / Objective The aim of this scoping review is to explore the existing literature on platelet-rich fibrin as a drug delivery system. The main objective is to evaluate the current body of literature. The specific objectives are to identify and summarize the authors, year, location, study design, drugs mixed with platelet-rich fibrin, pharmaceutical forms, and the type of drugs mixed. To achieve this, the proposed scoping review will address the following question: Can platelet-rich fibrin sustain drug release over time and demonstrate a unique response in cells, microorganisms, and tissues compared to other drug delivery systems?

Background Platelet-rich fibrin is a second generation of blood concentrates. It can be easily obtained by simply collecting peripheral blood in a 10ml plain tube without any anticoagulant (red cap - silica coating on the walls of the tube to speed up clotting). The tube is then rapidly placed in a table centrifuge, running at 3000RPM for 12 minutes (865G). (1) This process results in three distinct layers: a layer with only plasma and no cells at the top of the tube, a layer with red blood cells at the bottom, and in the middle part, the fibrin clot. (2) Additionally, an injectable form of platelet-rich fibrin can be obtained. In brief, 10ml of peripheral blood is collected in a plain tube (white cap - no silica), rapidly placed in a table centrifuge, and run at 700RPM for 3 minutes (60G). The upper layer is then collected with a syringe and can be directly injected. (3)
Platelet-rich fibrin serves as a potential carrier system and can be mixed with various types of growth factors, antibiotics, peptides, and others. (3) Utilizing drug delivery systems for direct tissue targeting can help reduce unnecessary antimicrobial usage and facilitate the delivery of other types of drugs, such as enhancing bone or cartilage tissue regeneration. (4)
This scoping review protocol will be built based on PRISMA-P. (5).

Rationale Platelet-rich fibrin can be easily produced, making it cost-effective. Additionally, it

can be combined with various types of molecules, thereby enhancing healing, regeneration, and antimicrobial activity.

METHODS

Strategy of data synthesis The data will be summarized in a spreadsheet created on Google Docs. All the results will be presented in a narrative analysis.

Eligibility criteria All types of revisions, letters, and short communications will be excluded from this review. Additionally, studies involving other types of platelet concentrates or those that include an agent to prevent natural clotting of platelet-rich fibrin will also be excluded.

Source of evidence screening and selection The databases that will be searched include: MEDLINE (Pubmed), EMBASE, Cochrane Library, Science Direct, Web of Science, Scopus, and BVS/ LILACS. Additionally, grey literature will be explored through Google Scholar, PROQUEST, Biblioteca Digital Brasileira de Teses e Dissertações, and OMNIS library of Pontifícia Universidade Católica. Two researchers will conduct the database search. J.A.C.S. will be the main researcher responsible for the search process, while R.M.P. will be consulted only if there are any uncertainties regarding the inclusion of a particular paper.

Data management Data from the databases will be extracted and imported into the ZOTERO bibliographic software. Duplicate entries will be removed during the importing process. The screening process will begin by evaluating titles and abstracts, and papers will be categorized into three folders: "added," "uncertain," and “excluded."In the "uncertain" folder, papers will be fully read to make a final decision, and afterward, they will be moved to either the "excluded" or "added" folder. In the "excluded" folder, sub-folders will be created to report the main reasons for exclusion, providing a clear record of the selection process.

Language restriction Portuguese and English.

Country(ies) involved Brazil.

Keywords Platelet-Rich Fibrin; Drug Delivery Systems; Blood Platelets; Scoping Review.

Dissemination plans The results will be disseminated through publication in a peer-reviewed journal. This ensures that the findings undergo rigorous evaluation and scrutiny by experts in the field before they are made publicly available.

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