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The application of biomaterials loaded with traditional Chinese medicine monomers for neuronal regeneration after spinal cord injury: a systematic review of pre-clinical studies

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Preliminary searches.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 30 January 2024 and was last updated on 30 January 2024.

INTRODUCTION

Review question / Objective In animal models, does the application of biomaterials loaded with traditional Chinese medicine monomers demonstrate improved outcomes for spinal cord injuries?

Rationale Spinal cord injury (SCI) is a prevalent clinical ailment that results in acute spinal cord compression, limbsensory deficits, and impaired motor function, stemming from diverse causes. SCI carries a high disability rate and has a detrimental impact on a patient's quality of life, in addition to placing a heavy burden on their families and society as a whole. In recent years. Biomaterials loaded with Traditional Chinese medicine (TCM) monomers were used to promoting injured neural repair after SCI. But, systematic evaluations of biomaterials loaded with TCM monomers in pre-clinical studies of SCI are scarce. Therefore, this systematic review aims to explore the outcomes of biomaterials loaded with TCM monomers in SCI treatment based on studies conducted in experimental animal models.

Condition being studied Spinal cord injury (SCI) is a prevalent clinical ailment that results in acute spinal cord compression, limbsensory deficits, and impaired motor function, stemming from diverse causes.

METHODS

Search strategy Potentially eligible papers were identified using the following terms as topic words, keywords, free-text terms, or Medical Subject Heading terms: "curcumin," "resveratrol," "tanshinone," "tetramethylpyrazine," "baicalin," "berberine," "rhodioloside," "total flavonoids of astragalus," "astragaloside," "total flavonoids of astragalus," "emodin," "panax notoginseng saponins," "paclitaxel," "rosmarinic acid," "spinal cord injuries,". Because there are many types of biomaterials, in order to comprehensively search the literature, there is no restriction on biomaterials

in the search strategy. The researchers screened them one by one to get the final results.

Participant or population Animals with spinal cord injury.

Intervention Biomaterials loaded with TCM monomers.

Comparator Placebo or no treatment.

Study designs to be included Animal experimental research.

Eligibility criteria All enrolled studies followed the criteria: (1) Animals: animals with SCI; (2) Intervention: biomaterials loaded with TCM monomers; (3) Control: placebo or no treatment; (4) Outcome: behavioral and biological indicators of neural function repair; (5) Study type: control studies. Studies were excluded if (1) Studies involving animals with polytrauma and co-morbidities. (2) Studies that do not include animal experiments. (3) Manuscript designs including reviews, systematic reviews, meta-analyses, case reports, guidelines, clinical studies, and conference proceedings; (4) Studies without a separate control group; (5) Non-available full-text.

Information sources Chinese Biomedical Literature, Wanfang, China National Knowledge Infrastructure, Web of Science, Embase, and PubMed.

Main outcome(s) Behavioral and biological indicators of neural function repair.

Quality assessment / Risk of bias analysis Using SYRCLE's Risk of Bias tool for animal research, two reviewers conducted independent assessments of the quality of the articles that were included in the analysis [11]. The following ten criteria were used to assess possible bias in the enrolled studies: (1) sequence generation, (2) baseline characteristics, (3) allocation concealment, (4) random housing, (5) blinded animal intervention, (6) random outcome assessment, (7) blinded outcome assessment, (8) incomplete outcome data, (9) selective outcome reporting, and (10) other types of bias. A third reviewer was consulted to settle any disagreements of opinion that may have arisen. Each study was graded to either be of "low," "high," or "unclear" risk.

Strategy of data synthesis The data extracted from each eligible study were qualitatively synthesized within the main body of the article. Meta-analysis was not employed in this due to heterogeneity observed in the animal types, models, TCM monomers, and biomaterials utilized in the primary studies. Therefore, we systematically examined and reviewed the extracted data, presenting the results in a narrative form to assess the efficacy of biomaterials loaded with TCM monomers in promoting injured neural repair after SCI.

Subgroup analysis None.

Sensitivity analysis None.

Language restriction No.

Country(ies) involved China.

Keywords Spinal cord injury; Biomaterials; Traditional Chinese medicine monomers.

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