INPLASY

Therapeutic Potential of Genistein in Ischemic Stroke :A systematic review on In vivo and In vitro studies

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ADMINISTRATIVE INFORMATION

Support - Universiti Teknologi MARA.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202490010

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 3 September 2024 and was last updated on 3 September 2024.

INTRODUCTION

Review question / Objective 1. To systematically review and analyze the effects of genistein on ischemic stroke outcomes in both in vivo and in vitro studies. 2. To idenftify the specific pathways influenced by genistein in ischemic stroke models.

Rationale Ischemic stroke is a leading factor of death and disability, and the treatment strategies currently available are rather scarce. Genistein, a phytoestrogen, which has been known to possess antioxidant, anti-inflammatory and tyrosine kinase inhibition properties has been tested in preclinical studies for the treatment of ischemic stroke. However, these previous studies are quite heterogeneous with regard to type of model used, doses and end points, limiting the possibility to make clear conclusions. This SLR aims at evaluating the effectiveness of genistein through both animal models and cell culture studies so as to identify comprehensive information on the subject. These findings will assist in understanding the effectiveness of genistein in the treatment of the condition as well as offer directions for further studies in this field. This SLR is expected to compile these findings, establish trends and offer a coherent review of the effectiveness and actions of genistein in ischemic stroke with a view of guiding subsequent research and possible potential clinical applications.

Condition being studied Focusing on the effects of genistein in ischemic stroke, we examine its impact on various outcomes across both in vivo and in vitro studies. The study evaluates different genistein doses, durations, and routes of administration, particularly in relation to stress/exposure conditions such as free radical-induced cerebral ischemia. We analyze the involvement of specific pathways, influenced by genistein. The study aims to elucidate the mechanisms of action for genistein, such as its role in reducing oxidative stress and delaying disease onset and compares these effects across different models to determine the overall effectiveness in improving stroke-related outcomes, including infarct size and lesion volume.

METHODS

Search strategy Search Strategy: ("genistein" OR "soy isoflavone") AND ("stroke" OR "cerebral ischemia" OR "brain ischemia" OR "ischemic stroke")
Database: Web of Science (WoS), Scopus, PUBMED and Science Direct.

Participant or population For in vivo studies: Animal models of ischemic stroke (e.g., murine models).
For in vitro studies: Cell cultures exposed to ischemic conditions.

Intervention Administration of genistein at various doses and durations.

Comparator No treatment or placebo group in the same experimental model.
Comparison with other interventions in similar experimental setups (if applicable).

Study designs to be included The review will include both in vivo (animal studies) and in vitro (cell culture studies) experimental designs to comprehensively assess the effects of genistein. In vivo studies will involve various animal models subjected to ischemic stroke, while in vitro studies will include cell culture models exposed to ischemic conditions. Both types of studies will be included to provide a complete understanding of genistein's efficacy and mechanisms in these different experimental settings.

Eligibility criteria
Inclusion Criteria:
Only peer-reviewed journal articles will be included.
Studies published in English will be included.
Studies published from 2009 onwards will be included to ensure the review covers the most current research.
For in vivo studies, only those using established animal models of ischemic stroke will be included.
For in vitro studies, only those using validated cell lines relevant to ischemic stroke will be included.
Studies must report at least one of the following outcomes: infarct size, lesion volume, cellular apoptosis, oxidative stress markers, inflammatory response, or cell viability for in vitro.
Exclusion Criteria:
Review articles, conference abstracts, editorials, commentaries, and book chapters will be excluded.
Studies that do not specifically investigate the effects of genistein in the context of ischemic stroke will be excluded.
Studies lacking sufficient methodological details (e.g., unclear genistein dosing, undefined ischemic conditions) will be excluded.
Studies using non-standard or unconventional models of ischemic stroke that are not widely accepted in the field will be excluded.

Information sources Database: Web of Science (WoS), Scopus, PUBMED and Science Direct.

Main outcome(s) 1. Mechanisms of action, including pathways involved
2. Outcome: Neurological Function, Infarct Size and Volume, Cellular Apoptosis, Inflammatory Response, Oxidative Stress Markers, Cell Viability (in vitro).

Quality assessment / Risk of bias analysis The quality of the primary studies will be assessed using the ARRIVE 2.0 guidelines, focusing on the 10 essential items to ensure comprehensive and transparent reporting. Each item will be scored on a scale from 0 to 2, with the total score used to classify the studies as 'Excellent,' 'Average,' or 'Poor' based on their adherence to the guidelines. This systematic assessment will help ensure that only studies with robust and reliable methodological quality are included in the analysis.

Strategy of data synthesis The data synthesis will primarily involve a qualitative approach. A narrative synthesis will be conducted to summarize and interpret findings from the included in vivo and in vitro studies, focusing on key outcomes such as infarct size, oxidative stress markers, and cell viability.

Subgroup analysis No formal subgroup analysis will be conducted as part of this review.

Sensitivity analysis Not reported.

Language restriction This review will include only studies published in English due to resource limitations in translating non-English studies.

Country(ies) involved Malaysia.

Keywords Genistein, Ischemic Stroke, In Vivo, In Vitro, Therapeutic Potential.

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