Title

Lithium and disease modification: A systematic review and meta-analysis in Alzheimer's and Parkinson's disease

Abstract

The role of lithium as a possible therapeutic strategy for neurodegenerative diseases has generated scientific interest. We systematically reviewed and meta-analyzed pre-clinical and clinical studies that evidenced the neuroprotective effects of lithium in Alzheimer's (AD) and Parkinson's disease (PD). We followed the PRISMA guidelines and performed the systematic literature search using PubMed, EMBASE, Web of Science, and Cochrane Library. A total of 32 articles were identified. Twenty-nine studies were performed in animal models and 3 studies were performed on human samples of AD. A total of 17 preclinical studies were included in the meta-analysis. Our analysis showed that lithium treatment has neuroprotective effects in diseases. Lithium treatment reduced amyloid-β and tau levels and significantly improved cognitive behavior in animal models of AD. Lithium increased the tyrosine hydroxylase levels and improved motor behavior in the PD model. Despite fewer clinical studies on these aspects, we evidenced the positive effects of lithium in AD patients. This study lends further support to the idea of lithium's therapeutic potential in neurodegenerative diseases. © 2024 Elsevier B.V.

Authors

Singulani M.P.; Ferreira A.F.F.; Figueroa P.S.; Cuyul-Vásquez I.; Talib L.L.; Britto L.R.; Forlenza O.V.

Author full names

Singulani, Monique Patricio (57188453700); Ferreira, Ana Flávia Fernandes (56706807900); Figueroa, Paulina Sepúlveda (57224832466); Cuyul-Vásquez, Iván (57209860226); Talib, Leda Leme (6506267691); Britto, Luiz Roberto (7005912602); Forlenza, Orestes Vicente (6603840032)

Author(s) ID

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Affiliations

Laboratory of Neuroscience LIM27, Departamento e Instituto de Psiquiatria, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (HCFMUSP), São Paulo, Brazil; Centro de Neurociências Translacionais (CNT), Faculdade de Medicina da Universidade de São Paulo (FMUSP), São Paulo, Brazil; Instituto Nacional de Biomarcadores em Neuropsiquiatria (INBioN), Conselho Nacional de Desenvolvimento Científico e Tecnológico, São Paulo, Brazil; Laboratory of Cellular Neurobiology, Department of Physiology and Biophysics, Instituto de Ciências Biomédicas da Universidade de São Paulo (USP), São Paulo, Brazil; Department of Preclinical Science, Faculty of Medicine, Universidad de La Frontera, Temuco, Chile; Departamento de Procesos Terapéuticos, Facultad de Ciencias de la Salud, Universidad Católica de Temuco, Temuco, Chile; Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Chile

Authors with affiliations

Singulani M.P., Laboratory of Neuroscience LIM27, Departamento e Instituto de Psiquiatria, Hospital das Clínicas da Faculdade de Medicina da Universidade de São

Paulo (HCFMUSP), São Paulo, Brazil, Centro de Neurociências Translacionais (CNT), Faculdade de Medicina da Universidade de São Paulo (FMUSP), São Paulo, Brazil, Instituto Nacional de Biomarcadores em Neuropsiquiatria (INBioN), Conselho Nacional de Desenvolvimento Científico e Tecnológico, São Paulo, Brazil; Ferreira A.F.F., Laboratory of Cellular Neurobiology, Department of Physiology and Biophysics, Instituto de Ciências Biomédicas da Universidade de São Paulo (USP), São Paulo, Brazil; Figueroa P.S., Department of Preclinical Science, Faculty of Medicine, Universidad de La Frontera, Temuco, Chile; Cuyul-Vásquez I., Departamento de Procesos Terapéuticos, Facultad de Ciencias de la Salud, Universidad Católica de Temuco, Temuco, Chile, Facultad de Ciencias de la Salud, Universidad Autónoma de Chile, Chile; Talib L.L., Laboratory of Neuroscience LIM27, Departamento e Instituto de Psiquiatria, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (HCFMUSP), São Paulo, Brazil, Centro de Neurociências Translacionais (CNT), Faculdade de Medicina da Universidade de São Paulo (FMUSP), São Paulo, Brazil, Instituto Nacional de Biomarcadores em Neuropsiquiatria (INBioN), Conselho Nacional de Desenvolvimento Científico e Tecnológico, São Paulo, Brazil; Britto L.R., Laboratory of Cellular Neurobiology, Department of Physiology and Biophysics, Instituto de Ciências Biomédicas da Universidade de São Paulo (USP), São Paulo, Brazil; Forlenza O.V., Laboratory of Neuroscience LIM27, Departamento e Instituto de Psiquiatria, Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (HCFMUSP), São Paulo, Brazil, Centro de Neurociências Translacionais (CNT), Faculdade de Medicina da Universidade de São Paulo (FMUSP), São Paulo, Brazil, Instituto Nacional de Biomarcadores em Neuropsiquiatria (INBioN), Conselho Nacional de Desenvolvimento Científico e Tecnológico, São Paulo, Brazil

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Index Keywords

Alzheimer Disease; Animals; Humans; Lithium; Lithium Compounds; Neurodegenerative Diseases; Neuroprotective Agents; Parkinson Disease; aluminum chloride; amyloid beta protein; amyloid beta protein[25-35]; dermatan sulfate; galactose; gluconic acid; immunotoxin; immunotoxin 192 immunoglobulin saporin; lithium; lithium benzoate; lithium carbonate; lithium chloride; lithium citrate; lithium pyrroloquinoline; lithium salicylate proline; neuroprotective agent; okadaic acid; streptozocin; tau protein; tyrosine 3 monooxygenase; unclassified drug; lithium; lithium derivative; neuroprotective agent; aged; Alzheimer disease; Cochrane Library; cognition; Embase; female; human; locomotion; male; Medline; meta analysis; neuroprotection; nonhuman; Parkinson disease; preclinical study; Preferred Reporting Items for Systematic Reviews and Meta-Analyses; protein blood level; Review; systematic review; Web of Science; animal; degenerative disease

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aluminum chloride, 7446-70-0, 7784-13-6; amyloid beta protein, 109770-29-8; dermatan sulfate, 24967-94-0; galactose, 26566-61-0, 50855-33-9, 59-23-4; gluconic acid, 133-42-6, 526-95-4, 66664-08-2; lithium, 7439-93-2; lithium carbonate, 554-13-2; lithium chloride, 7447-41-8; lithium citrate, 919-16-4; okadaic acid, 78111-17-8; streptozocin, 18883-66-4; tyrosine 3 monooxygenase, 9036-22-0; Lithium, ; Lithium Compounds, ; Neuroprotective Agents,

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Correspondence Address

O.V. Forlenza; Instituto de Psiquiatria, Hospital das Clinicas da Faculdade de Medicina da USP, São Paulo, SP, 05403-903, Brazil; email: forlenza@usp.br

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