



Raportul Asociației Române de Balneologie - 2025

Dragi colegi,

Anul **2025** a reprezentat o etapă de maturizare instituțională și de intensificare a eforturilor orientate spre integrarea cercetării balneologice în standardele contemporane ale medicinei bazate pe dovezi, valorificarea resurselor naturale terapeutice ale României și susținerea dialogului interdisciplinar între mediul academic, clinic, administrativ și economic.

Activitățile derulate au reflectat angajamentul constant față de excelența științifică, educația medicală continuă, cooperarea internațională și adaptarea la provocările actuale ale sistemului de sănătate, contribuind la creșterea vizibilității și relevanței balneologiei în contextul politicilor de sănătate publică și al dezvoltării durabile.

Reflectând asupra acestor realizări, ne îndreptăm cu optimism și determinare către **Obiectivele pentru anul 2025:**

- * **Congresul 2026:** Un eveniment de anvergură, ce urmează a fi organizat în perioada 23-25 Aprilie la **Covasna**, și care să adune experți atât naționali cât și internaționali în domeniul balneologiei, pentru a discuta cele mai recente descoperiri și tendințe în domeniu.
- * **Publicarea și Diseminarea Cercetărilor:** Ne propunem să publicăm cel puțin 15 articole în jurnale de prestigiu ISI, continuând să contribuim la dezvoltarea balneologiei.
- * **Proiecte de Cercetare:** Implementarea cu succes a proiectelor de cercetare aflate în derulare și inițierea de noi proiecte, cu accent pe studiul și exploatarea factorilor naturali.
- * **Colaborări Strategice:** Intensificarea colaborărilor cu universități, institute de cercetare și alte asociații profesionale, pentru a promova inovația și excelența în balneologie.
- * **Extinderea Prezenței Internaționale:** Participarea activă la conferințe și simpozioane internaționale, pentru a împărtăși cunoștințele și experiențele noastre și pentru a învăța de la colegii noștri din întreaga lume.
- * **Dezvoltarea Resurselor Umane:** Promovarea formării continue și dezvoltării profesionale a membrilor noștri, pentru a asigura un nivel înalt de expertiză și inovație în domeniul nostru.
- * **Sustenabilitate și Responsabilitate Socială:** Integrarea principiilor de sustenabilitate în toate activitățile noastre, contribuind astfel la protecția mediului și la promovarea unui turism balnear responsabil.

În încheiere, doresc să vă mulțumesc din toată inima pentru angajamentul și pasiunea demonstrată în activitatea dumneavoastră. Sănătatea, armonia, pacea și succesul să ne ghideze în toate eforturile noastre și în anul 2026.



Conf. univ. dr. Biol. Constantin MUNTEANU,
Președinte al Asociației Române de Balneologie

Membrii ARB - persoane juridice

SC Biosafety SRL - București

Reprezentant: Munteanu Constantin



Membrii ARB - persoane fizice

În anul 2025, Asociația Română de Balneologie numără **165 membri**—persoane fizice, dintre care **57 Medici**.

Statutul de membru al Asociației Române de Balneologie se reînnoiește anual. Pentru **anul 2026** statutul de membru este acordat celor care vor completa formularul de înscriere online de pe pagina asociației <http://bioclima.ro> și vor achita taxa de membru în valoare de **100 lei**. Medicii rezidenți, fizio-kinetoterapeuții, asistenții medicali, cercetătorii științifici, funcționarii publici din autorități publice locale / centrale și membrii ai altor ONG-uri de promovare a turismului au o reducere de 50 % a taxei - pentru aceste categorii, valoarea taxei fiind de **50 lei**. Plata taxei de membru al Asociației Române de Balneologie include 25 lei pentru Abonamentul la revista asociației Balneo Research Journal, introdusă în Nomenclatorul Publicațiilor medicale ale Colegiului Medicilor din România.



Activități relevante ale Asociației Române de Balneologie în anul 2025

September 24-26, 2025
The 4th World
Congress of Biopharm
Industry Development
(BID-2025), Shanghai,
China

<https://www.gala-tech.cn/bioexpo2025en/default.asp>



Presedinte al Congresului
Aniversar Reunit de Medicină
Fizică, de Recuperare și
Balneologie, 2-5 Iunie 2025,
Palatul Parlamentului,
București

<https://bioclima.ro/Congres2025.php>



Proiectul European 101080875 - STRATIF-AI, finanțare aprobată, durata 48 luni



EUROPEAN HEALTH AND DIGITAL EXECUTIVE AGENCY
(HADEA)

HADEA A – Health and Food
A.3 – Health research

Gunnar CEDERSUND
LINKÖPINGS UNIVERSITET
CAMPUS VALLA
581 83 LINKÖPING
SWEDEN

Subject: Horizon Europe (HORIZON)
Call: HORIZON-HLTH-2022-TOOL-12-two-stage
Project: 101080875 — STRATIF-AI
GAP invitation letter

Dear Applicant,

I am writing in connection with your proposal for the above-mentioned call.

Having completed the evaluation, we are pleased to inform you that your proposal has passed this phase and that we would now like to start grant preparation.

Please find enclosed the evaluation summary report (ESR) for your proposal (for both stages of the evaluation).

Please be aware that there may be differences between the ESRs, since stage 1 evaluations are done on the outline of your proposal, while stage 2 evaluations cover the full proposal.

Invitation to grant preparation

Grant preparation will be based on the following:

1. Project

Project number and name: 101080875 — STRATIF-AI

Topic: HORIZON-HLTH-2022-TOOL-12-01-two-stage — Computational models for new patient stratification strategies

Type of action: HORIZON Research and Innovation Actions

Requested grant amount (proposal): 5 969 100.00 EUR

Maximum grant amount (after evaluation): 5 969 100.00 EUR

Project duration: 48 months

Within STRATIF-AI, we will apply this methodology to stroke care. Stroke is a high prevalence disease with a huge societal burden where continuous treatment would greatly enhance disease management, making it an ideal use case for the application of modern computational techniques. During the dynamic trajectory of the disease, from acute stroke to rehabilitation and long-term disease management phases, stratification would enable personalised care as patients evolve. Despite considerable progress in understanding stroke risk factors and treatments, it is still extremely difficult to implement traditional knowledge-based decisions on what prevention measures and/or therapeutics to use for which patients. The availability of more effective preventive and therapeutic interventions tailored to the individual or groups of individuals with common phenotypes is still lacking. The most important identified causes are i) the **lack of interdisciplinary research that takes advantage of data integration solutions and technologies** (e.g. advanced statistical and/or AI/machine learning methods and/or digital twin technologies) ii) the **absence of data integrative computational models from multiples stroke-relevant sources (structured and unstructured data)** to be stored, exchanged and re-used taking advantage of a series of already available interoperability standards, and iii) the **lack of optimised, robust, transparent, trustworthy and accurate computational models to guide stratification strategies** aimed at stroke prevention and for improving patients' clinical outcomes as measured by standardized assessments

The screenshot shows the 'Funding & tender opportunities' portal. The project 'STRATIF-AI' is listed with a status of 'Project ID: 101080875'. It is categorized under 'Operation: UNIFORM UNIVERSITET' and 'Operation: TECHNICAL UNIVERSITET'. The portal also displays a list of other projects and their details, including 'Operation: CHARTER UNIVERSITET SWEDEN' and 'Operation: SOFTWARE INNOVATION & INNOVATION'.

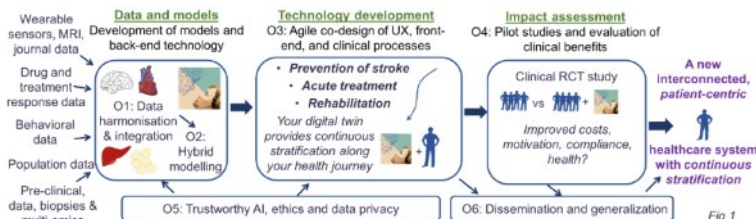


Fig 1

Constantin Munteanu



NEOGENESIS

IUBIRE ȘI JUDECATĂ



București, 2025
Editura Balneară



7th Global Conclave on

NEUROLOGY AND NEUROLOGICAL DISORDERS

June 22-23, 2026 | Singapore

LETTER OF INVITATION

Date: December-03, 2025

Name: Constantin Munteanu

Address: University of Medicine and Pharmacy, Romania

Dear Dr. Constantin Munteanu,

The purpose of this letter is to welcome you to be a distinguished speaker at 7th Global Conclave on Neurology and Neurological Disorders" (NEURO Conclave 2026), on June 22-23, 2026.

We are pleased to inform you that your abstract entitled "**Redox Homeostasis, Gut Microbiota, and Epigenetics in Neurodegenerative Diseases: A Systematic Review**" has been accepted for distinguished speaker presentation.

We're looking forward to an excellent meeting with great scientists from different countries around the world and sharing new and exciting results in Neurology and Neurological Disorders.

This event is hosted by the Peers Alley Media, with the theme "**Advancing Neurological Care: Innovations in Early Detection and Treatment for Nervous System Disorders**".

For more details PS: <https://www.neuroconclave.com/>



Warm Regards,

Alice Mary

Alice Mary

Program Director | NEURO Conclave 2026

Global Neuro Community and Network

1126 59 Ave East, V5X 1Y9

Vancouver BC, Canada

Email: neurology@inventorsarena.org

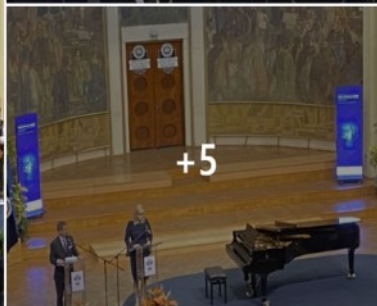
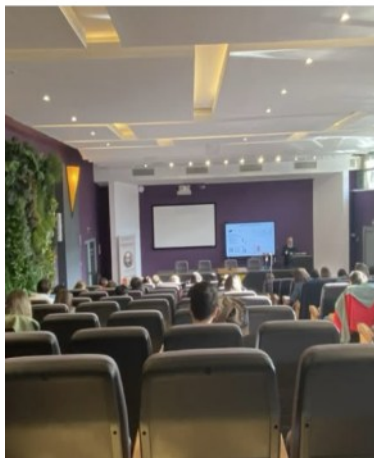


Munteanu Constantin este la Facultatea De Psihologie, Ubb, Cluj.

5 noiembrie · Cluj-Napoca, Cluj ·

...

SMART Diaspora 2025, Cluj - O experienta care modeleaza mintea si aduce speranta ca poate si Cercetarea poate depasi criza de relevanta socio-profesionala.



Munteanu Constantin este în Cluj-Napoca, Cluj.

7 noiembrie ·

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Cermonia de inchidere a Conferintei SMART Diaspora a avut mesajul extraordinar ca cercetarea poate fi mult mai mult! Urmatoarea editie din 2027 va fi, cel mai probabil la Iasi sub deviza Romania Sanatoasa! Sa fim sanatosi si sa mergem inainte cu speranta!



BALNEO and PRM Research Journal

Vol 16, No. 3, September 2024



ROMANIAN ASSOCIATION
DE MEDICINA
FIZICA
DE RECUPERARE
SI BALNEOClimatologie



Website <http://bioclima.ro/journal.htm>

E-mail: office@bioclima.ro

Balneo and PRM Research Journal is part of the international data bases (BDI) as follow:
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[Emerging Sources Citation Index - ESCI](#) [Thomson Reuters](#)

Publisher: Romanian Association of Balneology (Bucharest)

Asociația Română de Balneologie / Romanian Association of Balneology

Editura Balneara

Balneo and PRM Research Journal / Index name: BALNEO

Indexare science.thomsonreuters.com

Editor: Romanian Association of Balneology / Asociația Română de Balneologie

Dupa 15 volume cu peste 750 articole publicate și eforturi susținute, prin prisma lecțiilor învățate, **Balneo and PRM Research Journal** își menține locul între revistele românești indexate ISI, cu IF – 1,1 calculat pentru 2024.

În 2025 au fost publicate peste 120 de articole, evaluate de un grup de 20 de peer-review-eri, fiind emis un certificat în acest sens:



Indexare în EMERGING SOURCES CITATION INDEX (ESCI) - ISI

Vă mulțumim pentru efortul comun de până acum și vă invităm să continuăm acest demers pentru ca împreună să fim promotorii dezvoltării balneologiei și să oferim instrumente adecvate de promovare academică a fiecăruia dintre noi.



Certificate of publication

(721) How Are FIM Gains Improved after Intensive Rehabilitation for Cerebrovascular Diseases?

- Katsuo Usuda, Takahiko Uesaka, Takeshi Okubo, Takashi Shimada, Chieko Shimada, Haruhide Ito, Norihito Douko, Takuya Aoki, Mayumi Takada, Keiji Yokoyama, Masahiro Shimizu, Kengo Kitagawa, Naoaki Itamoto and Osami Shimada

Balneo and PRM Research Journal. 2024;15(3):721

DOI 10.12680/balneo.2024.721

- **Website <http://bioclima.ro/Journal.htm>**
- **Editorial Board: <http://bioclima.ro/Edit.php>**

Authorized signature:
Constantin Munteanu

Editor-in-chief of Balneo and PRM Research Journal
Romanian Association of Balneology

Balneo and PRM Research Journal

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FOUNDATION MEETING OF HYDROGEN SULFIDE IN BALNEOLOGY INITIATIVE

<https://bioclima.ro/H2S-Global.php>

So called sulfurous waters, sulfur muds and gas and Sulfur Spas/Thermal resorts are well known around the world. H₂S (hydrogen sulfide) is a gas that is famous for its distinctive rotten egg odor and can be found in nature dissolved in mineral waters and peloids (medical muds) and in its original gaseous form. With its unique chemical features H₂S is one of the most studied balneological agents or factors.

Considering these balneological aspects we planned to establish a “H₂S in Balneology Initiative” consisting of balneologists who are having scientific activities related to H₂S or working in a H₂S thermal resort. In future we will enlarge this is including people whose professional work is related to balneological H₂S sources.

Foundation meeting of “H₂S in Balneology Global Initiative” will take place in Banja Koviljaca Serbia 11-14 September 2024.

Founders of initiative:

Müfit Zeki Karagülle, Turkey
Aleksandar Jokić, Serbia
José M. Carbajo, Spain
Constantin Munteanu, Romania
Fausto Bonsignori, Italy

AGENDA of meeting - PDF

H₂S IN BALNEOLOGY



GLOBAL INITIATIVE

September 11-14 2024
Banja Koviljača, Serbia



Munteanu Constantin

4 septembrie · 🌐

In luna septembrie celebrăm un an de existență: <https://balneoh2s.org/home>



International Society of Hydrogen Sulfide in Balneology

ISH2SB

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Founding Members

- Prof. Müfit Zeki Karagülle (President) – Turkey
- Dr. Aleksandar Jokic (Vice-President) – Serbia
- Prof. Constantin Munteanu (Secretary General) – Romania
- Dr. Todorica Sokrateva (Deputy Secretary General) – Bulgaria
- Prof. Mine Karagülle – Turkey
- Prof. José M. Carballo – Spain
- Dr. Fausto Bonsignori – Italy
- Dr. Jasmina Milovanović-Arsić – Serbia
- Prof. Csaba Kovács – Hungary
- Prof. Davide Rossi – Italy

Advisory Board Members

Members

Türkiye: Müfit Zeki Karagülle, Mine Karagülle
Romania: Constantin Munteanu, Gelu Onese, Elena-Valentina Ionescu
Serbia: Aleksandar Jokic, Jasmina Milovanovic-Arsic, Djordje Radak, Atila Klimo
Bulgaria: Todorica Sokrateva, Yoana Kiselova, Diana Ivanova
Spain: Jose Manuel Carballo, Rosa Maria Meljide Faible, Francisco Maraver
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Russia: Alexander Razumov, Nazim Badalov, Leonid S Khodasevich
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Marocco: Mourad Errasfa
Poland: Irene Ponikowska
Lithuania: Lolita Rapailene
Latvia: Verje Rila Tuulik



Munteanu Constantin

10 iulie · 🌐

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International Society of
Hydrogen Sulfide in
Balneology



ISH2SB



Munteanu Constantin

4 august · 🌐

La invitația Primăriei Orașului Borsec am participat cu mare bucurie la manifestările prilejuite de marcarea a 300 de ani de tradiție balneară la Borsec - un laborator natural în care interacțiunea dintre geologie, hidrologie, climă subalpină și cultură locală a generat, în mod constant, valori de sănătate și bunăstare. Borsecul aniversează prin acest eveniment nu doar trecutul său glorios, ci și potențialul său de viitor. Voi răspunde întotdeauna prezent la efortul de dezvoltare. **Vezi mai mult**

...



Munteanu Constantin

23 iulie · 🌐

...





Munteanu Constantin

18 iunie · 🌐

...

DEZBATERILE
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ROMANIA



CONF. UNIV. DR. BIOLOG
CONSTANTIN MUNTEANU

președinte ASOCIAȚIA ROMÂNĂ DE
BALNEOLOGIE

STAȚIUNILE BALNEOCLIMATERICE
DIN ROMÂNIA,
SURSĂ IMPORTANTĂ PENTRU
SĂNĂTATE, TURISM ȘI EDUCAȚIE

Live pe www.euronews.ro

18 iunie, ora 16:00-18:00



Munteanu Constantin

4 iunie · 🌐

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Auspicii Academice



Balneological Twins; sulfurous waters and peloids

Prof. Dr. Müfit Zeki Karagülle

Reunited Anniversary Congress of
Physical Medicine, Rehabilitation and Balneoclimatology
2-5 June 2025 Bucharest, Romania



H2S IN BALNEOLOGY



GLOBAL INITIATIVE

H2S IN BALNEOLOGY
GLOBAL INITIATIVE



Müfit Zeki Karagülle este la Palatul Parlamentului București.

3 iunie · București · 🌐

Hydrogen Sulfide H2S in Balneology Global Initiative
Educational Session



Munteanu Constantin

3 iunie · 🌐



...



Munteanu Constantin

29 mai · 🌐

...





Review

The Janus Face of Oxidative Stress and Hydrogen Sulfide: Insights into Neurodegenerative Disease Pathogenesis

Constantin Munteanu^{1,2,*}, Anca Irina Galaction¹, Gelu Onose^{2,3}, Marius Turnea^{1,4} and Mariana Rotariu¹

- Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", 700454 Iasi, Romania; anca.galaction@umfiasi.ro (A.I.G.); mariana.rotariu@umfiasi.ro (M.R.)
- Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania; gelu.onose@umfcd.ro
- Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", 020022 Bucharest, Romania
- *Correspondence: constantin.munteanu.biolog@umfiasi.ro (C.M.); marius.turnea@umfiasi.ro (M.T.)

Abstract: Oxidative stress plays an essential role in neurodegenerative pathophysiology, acting as both a critical signaling mediator and a driver of neuronal damage. Hydrogen sulfide (H_2S), a versatile gasotransmitter, exhibits a similarly "Janus-faced" nature, acting as a potent antioxidant and cytoprotective molecule at physiological concentrations, but becoming detrimental when dysregulated. This review explores the dual roles of oxidative stress and H_2S in normal cellular physiology and pathophysiology, focusing on neurodegenerative disease progression. We highlight potential therapeutic opportunities for targeting redox and sulfur-based signaling systems in neurodegenerative diseases by elucidating the intricate balance between these opposing forces.

Keywords: oxidative stress; hydrogen sulfide (H_2S); neurodegenerative diseases; redox signaling; Janus face; neuroinflammation



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1. Introduction

Neurodegenerative disorders, such as Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis (ALS), are a growing medical challenge worldwide [1–3]. These conditions are typically characterized by progressive neuronal loss, accumulation of misfolded or aggregated proteins, peroxisomal dysfunction [4,5], and persistent neuroinflammation [6–10]. While each disorder has distinct clinical features—ranging from cognitive decline to motor dysfunction, there is an overarching theme that oxidative stress contributes significantly to the pathological cascades involved [11–13]. Excessive ROS in the central nervous system (CNS) can damage neuronal membranes through lipid peroxidation, alter synaptic function, and potentially accelerate protein misfolding [14–17].

Concurrently, the inflammatory microenvironment within the brain can exacerbate oxidative stress, creating a feed-forward loop of cellular injury [18,19]. Emerging data show that alterations in the gut microbiota can affect the integrity of the blood–brain barrier (BBB), modify the immune landscape, and alter levels of neuroactive metabolites, all of which can converge to amplify oxidative stress in the brain [20–23].

Under healthy conditions, controlled levels of ROS are generated as part of natural metabolic processes, playing indispensable roles in cell signaling, host defense, and maintaining homeostasis [24–26].



OPEN ACCESS

EDITED BY
Júlio Belo Fernandes,
Egas Moniz Center for Interdisciplinary
Research (ICiEM), Portugal

REVIEWED BY
Ajith Somnanda,
Qatar University, Qatar
Ricardo Antunes,
Egas Moniz Center for Interdisciplinary
Research (ICiEM), Portugal

*CORRESPONDENCE
Marius Turnea
✉ veronica.morcov@umfcd.ro
Aurora Spina
✉ aurora.spin@umfcd.ro

†These authors have contributed equally to this work

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Standardized clinical assessments and advanced AI-driven instruments used to evaluate neurofunctional deficits, including within biomarker based framework, in Parkinson's disease - human intelligence made vs. AI models - systematic review

Aurelian Angheltescu^{1,2†}, Constantin Munteanu^{2,3†}, Aurora Spina^{4*}, Vlad Ciobanu¹, Cristina Popescu⁴, Ioana Elena Cioca⁴, Ioana Andone⁴, Simona-Isabelle Stoica^{1,2}, Mihaela Mandu⁴, Ana Rebedea², Sebastian Giuvara², Alin-Daniel Malalea², Andreea-Iulia Vladulescu-Trandafir⁴, Maria-Veronica Morcov^{6,7*} and Gelu Onose⁴

¹Department of Specific Discipline, Faculty of Midwifery and Nursing, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania, ²Teaching Emergency Hospital "Bagdasar-Arseni", Bucharest, Romania, ³Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", Iasi, Romania, ⁴Department of Clinical Education, Physical and Rehabilitation Medicine, Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania, ⁵Department of Computer Science, Politehnica University of Bucharest, Bucharest, Romania, ⁶Department of Basic Medical Sciences, Faculty of Midwifery and Nursing, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania, ⁷National Teaching Center for Neuro-psycho-motor Rehabilitation in Children "Dr. N. Robanescu", Bucharest, Romania

Introduction: Considering the extensive development of artificial intelligence (AI) facilitates, like Generative Pre-Training Transformer (ChatGPT) 4.0 and ChatGPT Scholar, we explored their abilities to conduct a systematic literature review. Using a specific domain, an attempt to frame/methodize clinical assessment instruments used to evaluate neuro-functional deficits in Parkinson's disease (PD) – including framed through the ICF/DH paradigm – for the above-mentioned comparison between human intelligence (HI) and AI, this paper is as well, a follow-up regarding the most actual subject matter of the AI's capabilities evolution in this respect. As well-known clinical-/paraclinical-/functional evaluations, using assessment quantitative (as much as possible) instruments, are basic endeavors for rehabilitation, as they enable setting of appropriate and realistic therapeutic-rehabilitative specific goals.

Methods: Within the actual work, we have first achieved a narrative synthesis of the main molecular mechanisms involved in PD pathophysiology, underpinning its clinical appearance and evolution. To fundament our knowledge on an up-to-date information regarding the clinical-functional evaluation tools practiced in PD, we systematically reviewed the literature in this domain, published in the

Review

Hydrogen Sulfide (H₂S- or H₂S_n-Polysulfides) in Synaptic Plasticity: Modulation of NMDA Receptors and Neurotransmitter Release in Learning and Memory

Constantin Munteanu ^{1,2,*}, Anca Irina Galaction ¹, Gelu Onose ^{2,3}, Marius Turnea ^{1,4} and Mariana Rotariu ¹

- Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", 700454 Iasi, Romania; anca.galaction@umfiasi.ro (A.I.G.); mariana.rotariu@umfiasi.ro (M.R.)
- Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania; gelu.onose@umfcd.ro
- Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", 020022 Bucharest, Romania
- Correspondence: constantin.munteanu.biolog@umfiasi.ro (C.M.); marius.turnea@umfiasi.ro (M.T.)

Abstract: Hydrogen sulfide (H₂S) has emerged as a pivotal gaseous transmitter in the central nervous system, influencing synaptic plasticity, learning, and memory by modulating various molecular pathways. This review examines recent evidence regarding how H₂S regulates NMDA receptor function and neurotransmitter release in neuronal circuits. By synthesizing findings from animal and cellular models, we investigate the impacts of enzymatic H₂S production and exogenous H₂S on excitatory synaptic currents, long-term potentiation, and intracellular calcium signaling. Data suggest that H₂S interacts directly with NMDA receptor subunits, altering receptor function and modulating neuronal excitability. Simultaneously, H₂S promotes the release of neurotransmitters such as glutamate and GABA, shaping synaptic dynamics and plasticity. Furthermore, reports indicate that disruptions in H₂S metabolism contribute to cognitive impairments and neurodegenerative disorders, underscoring the potential therapeutic value of targeting H₂S-mediated pathways. Although the precise mechanisms of H₂S-induced changes in synaptic strength remain elusive, a growing body of evidence positions H₂S as a significant regulator of memory formation processes. This review calls for more rigorous exploration into the molecular underpinnings of H₂S in synaptic plasticity, paving the way for novel pharmacological interventions in cognitive dysfunction.

Keywords: hydrogen sulfide; NMDA receptor; synaptic plasticity; neurotransmitter release; cognitive function

1. Introduction

Hydrogen sulfide (H₂S) has long been recognized for its malodorous quality and toxicity at high concentrations, often linked to industrial hazards and volcanic emissions [1]. Despite these negative associations, the discovery of H₂S as an endogenous signaling molecule has redefined its status in biological systems [2–4]. H₂S stands out for its wide-ranging influence on multiple physiological and pathophysiological processes within the broader framework of gasotransmitters, including nitric oxide and carbon monoxide [5,6]. These include vasodilation, inflammation, cellular metabolism, or neural function [7–13].

Recent studies have established that H₂S is far more than a mere byproduct of sulfur metabolism; it can diffuse throughout neural tissues and exert its effects partly through

Article

Predictive Factors for COVID-19 Severity in Patients with Axial Spondyloarthritis: Real-World Data from the Romanian Registry of Rheumatic Diseases

Andreea-Iulia Vlădulescu-Trandafir ^{1,2,*}, Violeta-Claudia Bojină ^{1,3,†}, Cristina Popescu ^{1,2,*}, Constantin Munteanu ^{2,4,*}, Andra-Rodica Bălănescu ^{1,3}, Aurelian Angheliescu ^{2,5}, Justin Aurelian ^{5,6}, Roxana Bistriceanu ^{1,2}, Sebastian Givura ², Elena Grădinaru ³, Emanuela-Elena Mihai ¹, Daniel Nițu ³, Mihaela-Ruxandra Vintilă ^{1,7} and Gelu Onose ^{1,2}

- Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", 020022 Bucharest, Romania; andreea-iulia.trandafir@drd.umfcd.ro (A.-I.V.-T.); violeta.bojinac@umfcd.ro (V.-C.B.); andra.balanescu@umfcd.ro (A.-R.B.); roxana.bistriceanu@drd.umfcd.ro (R.B.); emmanuel-elena.mihai@drd.umfcd.ro (E.-E.M.); mihaela-ruxandra.udrea@drd.umfcd.ro (M.-R.V.); gelu.onose@umfcd.ro (G.O.)
- Neuromuscular Rehabilitation Clinic Division, Teaching Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania; aurelian.angheliescu@umfcd.ro (A.A.); sebastian.givura@gmail.com (S.G.)
- Internal Medicine and Rheumatology Departments, "Sfânta Maria" Hospital, 011172 Bucharest, Romania; elena.gradinaru@umfcd.ro (E.G.); nițu.daniel@5@yahoo.com (D.N.)
- Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa" Iasi, 700454 Iasi, Romania
- Faculty of Midwifery and Nursing, University of Medicine and Pharmacy "Carol Davila", 020022 Bucharest, Romania; justin.aurelian@umfcd.ro
- Department of Urology, "Prof. Dr. Th. Burghel" Clinical Hospital, 050653 Bucharest, Romania
- Department of Allergy and Clinical Immunology, "Carol Davila" Nephrology Clinical Hospital, 010731 Bucharest, Romania
- Correspondence: cristina.popescu@umfcd.ro (C.P.); constantin.munteanu.biolog@umfiasi.ro (C.M.)
- These authors contributed equally to this work.

Abstract: Background and Objectives: Coronavirus disease-2019 (COVID-19) posed unique challenges worldwide, underscoring important gaps in healthcare preparedness for patients receiving immunosuppressive therapies, such as the individuals with axial spondyloarthritis (axSpA), a subgroup of spondyloarthritis (SpA) characterized by chronic inflammation and immune dysregulation. While global registry data exist for SpA, specific data on axSpA alone remain scarce, especially in Central and Eastern European populations. This study aims to identify predictive factors for severe COVID-19 outcomes and provide a descriptive analysis of axSpA patients infected with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), using real-world data from the Romanian Registry of Rheumatic Diseases (RRRB). Materials and Methods: This is a three-year retrospective observational cohort study that included 5,786 axSpA patients from the RRRB, of whom 183 (3.16%) were diagnosed with SARS-CoV-2 infection. Data were analyzed using R V4.4.1 and performing univariate and multivariate binary logistic regression to estimate associations using odds ratios (ORs), 95% confidence intervals (CIs), and p-values. A backward selection algorithm was applied to create the final predictive model, accounting for multicollinearity through variance inflation factors (VIFs). Results: The mean age of patients was 48.19 ± 12.26 years, with male predominance (64.5%). Serious COVID-19 (encompassing moderate to critical cases) occurred in 46 cases, with age ≥ 52.5 years (OR 2.64, 95% CI: 1.28–5.48, p = 0.009) and arterial hypertension (OR 2.57, 95% CI: 1.29–5.16, p = 0.007) identified as significant predictors. Individuals with advanced education levels had nearly three times lower odds of experiencing serious COVID-19 (OR 0.38, 95% CI: 0.18–0.76, p = 0.008). Furthermore, our findings confirm the lack of association between HLA-B27 and COVID-19 severity



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Actual Data on Essential Trace Elements in Parkinson’s Disease

Cristina Popescu ^{1,2}, Constantin Munteanu ^{2,3,*}, Aura Spînu ^{1,2}, Ioana Andone ^{1,2}, Roxana Bistriceanu ^{1,2}, Roxandra Postoiu ^{1,2}, Andreea Suciu ^{1,2}, Sebastian Giuvara ^{1,2}, Andreea-Iulia Vlădulescu-Trandafir ^{1,2}, Sorina Maria Aurelian ^{1,4}, Nadina Liana Pop ⁵, Vlad Cioabanu ⁶ and Gelu Onose ^{1,2}

- Department of Medicine, University of Medicine and Pharmacy “Carol Davila”, 020021 Bucharest, Romania; cristina_popescu_recuperare@yahoo.com (C.P.); aura_kolly@yahoo.com (A.S.); ioanaandone1@yahoo.com (I.A.); roxana.bistriceanu@rez.umfcd.ro (R.B.); postoiu.roxandra@yahoo.ro (R.P.); andreea_vスピリ@yahoo.com (A.S.); sebastian.giuvara@gmail.com (S.G.); andreea-iulia.trandafir@drd.umfcd.ro (A.-I.V.-T.); sorina.aurelian@umfcd.ro (S.M.A.); gelu.onose@umfcd.ro (G.O.)
- Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital “Bagdasar-Arseni”, 041915 Bucharest, Romania
- Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy “Grigore T. Popa” Iasi, 700454 Iasi, Romania
- Clinic of Geriatrics, Hospital of Chronic Diseases “Sf. Luca”, 041915 Bucharest, Romania
- Department of Physiology, Iulia Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Clinicilor Street No. 1-3, 400006 Cluj-Napoca, Romania; popnadina@yahoo.com
- Computer Science Department, Politehnica University of Bucharest, 606042 Bucharest, Romania; vlad.cioabanu@upb.ro
- * Correspondence: constantin.munteanu.biolog@umfiasi.ro

Abstract: “*Sola dosis facit venenum*” (Paracelsus). Essential trace elements, crucial for maintaining neuronal function, have their dysregulation increasingly correlated with neurodegenerative disorders, particularly Parkinson’s disease (PD). This systematic review aims to synthesize recent high-quality evidence regarding the involvement of essential trace elements, such as iron, zinc, copper, manganese, and selenium, in the pathogenesis and, consequently, as potential therapeutic targets of PD. A comprehensive literature search was conducted for articles published between 1 January 2023 and 31 December 2024. Out of an initial pool of 1231 identified studies, 63 met the methodological eligibility criteria according to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. All potentially eligible interventional and observational studies were initially assessed using the Physiotherapy Evidence Database (PEDro) scale, which is commonly employed for evaluating the internal validity and statistical interpretability of clinical trials and rehabilitation-focused studies. Following the qualitative assessment using the PEDro scale, 18 studies were ultimately selected based on their scientific relevance and methodological rigor. To supplement the PEDro scoring, which is designed primarily for individual trials, we applied the AMSTAR-2 (A MeaSurement Tool to Assess Systematic Reviews) checklist for the evaluation of the included systematic reviews or meta-analyses. The included studies employed a variety of clinical, postmortem, and experimental models to investigate trace-element concentrations and their mechanistic roles in PD. The findings revealed consistent patterns of iron accumulation in the substantia nigra, zinc’s bidirectional effects on oxidative stress and autophagy, copper-induced α -synuclein aggregation, and the neuroprotective role of selenium via antioxidant pathways. Manganese was associated with mitochondrial dysfunction and neuroinflammation. Essential trace-element disturbances contribute to PD pathology through interconnected mechanisms involving redox imbalance, protein misfolding, and impaired cellular homeostasis. These elements may serve as both biomarkers and potential therapeutic tools, warranting further investigation into personalized metal-based interventions for PD.

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Harnessing Gasotransmitters to Combat Age-Related Oxidative Stress in Smooth Muscle and Endothelial Cells

Constantin Munteanu ^{1,2,*}, Anca Irina Galaction ¹, Gelu Onose ^{2,3}, Marius Turnea ^{1,*} and Mariana Rotariu ¹

- Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy “Grigore T. Popa”, 700454 Iasi, Romania; anca.galaction@umfiasi.ro (A.I.G.); mariana.rotariu@umfiasi.ro (M.R.)
- Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital “Bagdasar-Arseni”, 041915 Bucharest, Romania; gelu.onose@umfcd.ro
- Faculty of Medicine, University of Medicine and Pharmacy “Carol Davila”, 020022 Bucharest, Romania
- * Correspondence: constantin.munteanu.biolog@umfiasi.ro (C.M.); marius.turnea@umfiasi.ro (M.T.)

Abstract: Age-related oxidative stress is a critical factor in vascular dysfunction, contributing to hypertension and atherosclerosis. Smooth muscle cells and endothelial cells are particularly susceptible to oxidative damage, which exacerbates vascular aging through cellular senescence, chronic inflammation, and arterial stiffening. Gasotransmitters—hydrogen sulfide (H₂S), nitric oxide (NO), and carbon monoxide (CO)—are emerging as promising therapeutic agents for counteracting these processes. This review synthesizes findings from recent studies focusing on the mechanisms by which H₂S, NO, and CO influence vascular smooth muscle and endothelial cell function. Therapeutic strategies involving exogenous gasotransmitter delivery systems and combination therapies were analyzed. H₂S enhances mitochondrial bioenergetics, scavenges ROS, and activates antioxidant pathways. NO improves endothelial function, promotes vasodilation, and inhibits platelet aggregation. CO exhibits cytoprotective and anti-inflammatory effects by modulating heme oxygenase activity and ROS production. In preclinical studies, gasotransmitter-releasing molecules (e.g., NaHS, SNAP, CORMs) and targeted delivery systems show significant promise. Synergistic effects with lifestyle modifications and antioxidant therapies further enhance their therapeutic potential. In conclusion, gasotransmitters hold significant promise as therapeutic agents to combat age-related oxidative stress in vascular cells. Their multifaceted mechanisms and innovative delivery approaches make them potential candidates for treating vascular dysfunction and promoting healthy vascular aging. Further research is needed to translate these findings into clinical applications.

Keywords: gasotransmitters; oxidative stress; vascular aging; endothelial cells; smooth muscle cells; hydrogen sulfide; nitric oxide; carbon monoxide

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1. Introduction

Vascular aging is a critical factor contributing to the global burden of cardiovascular diseases (CVDs), which remain the leading cause of mortality worldwide [1,2]. Aging-induced vascular structure and function alterations, including arterial stiffening, endothelial dysfunction, and impaired vascular smooth muscle cell activity, are closely associated with oxidative stress [3]. This stress is characterized by an imbalance between reactive oxygen species (ROS) production and antioxidant defenses [4], which accelerates cellular damage, inflammation, and senescence, ultimately leading to chronic vascular dysfunction [5,6]. Oxidative stress is a primary driver of vascular aging [7]. The excessive accumulation of ROS disrupts cellular homeostasis and promotes molecular damage, inflammation, and



Hyperspectral imaging reveals that sapropelic mud therapy may improve local tissue oxygenation in elderly

Mihaela Antonina Calin¹ · Dragos Manea¹ · Sorin Viorel Parasca² · Cristina Popescu³ · Elena-Valentina Ionescu⁴ · Constantin Munteanu⁵

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Abstract

Sapropelic muds have been used for centuries to treat various illnesses, but their effects and mechanisms are still under research. In this study the effects of Techirghiol sapropelic mud on tissue oxygenation in elderly patients diagnosed with neuromuscular disorders were investigated using spatial and spectral information provided by hyperspectral imaging technique. A group of 38 elderly patients with neuromuscular disorders for which they received mud therapy was studied. Sapropelic mud was applied to the lumbar region of each patient for 30 min, directly on the skin in a thick layer, while a symmetrical area of 15 × 10 cm in the same region was covered with a medical patch to serve as the control area. The mud is typically heated to a temperature of 40–45 °C before application. Hyperspectral images were taken before, after the first day of therapy, and at day seven. Oxyhemoglobin and deoxyhemoglobin concentrations and oxygen saturation values were calculated from the hyperspectral images and compared to control areas. The results revealed that, in the treated area, the mean oxyhemoglobin concentration increased with $+0.2127 \pm 0.1096$ mol cm/L, while deoxyhemoglobin concentration decreased by -0.0509 ± 0.0558 mol cm/L. Local tissue oxygen saturation raised to over 98% in all patients. Lesser improvements were recorded for the control areas: oxyhemoglobin increased with $+0.1673 \pm 0.1059$ mol cm/L, and deoxyhemoglobin decreased with -0.0525 ± 0.0578 mol cm/L. A good level of agreement was found between values of oxygen saturation measured with hyperspectral imaging method and the classical pulse oximetry method. Thus, improvement in local circulation was demonstrated after mud therapy. In conclusion, therapy with Techirghiol sapropelic mud improved local tissue oxygenation, hyperspectral imaging being a reliable and non-invasive tool for monitoring these changes.

Keywords Oxyhemoglobin · Deoxyhemoglobin · Oxygen saturation · Neuromuscular disorders · Hyperspectral imaging

✉ Sorin Viorel Parasca
sorin.parasca@umfcd.ro; sorinparasca@yahoo.com

Mihaela Antonina Calin
antoninacalin@umfcd.ro; micalin@inoe.ro

Dragos Manea
manea.dragos88@gmail.com; manea.dragos@inoe.ro

Cristina Popescu
cristina_popescu_recuperare@yahoo.com

Elena-Valentina Ionescu
elena_valentina_ionescu@yahoo.com

Constantin Munteanu
constantin.munteanu.biolog@umfiasi.ro

¹ National Institute of Research and Development for Optoelectronics INOE 2000, 409 Atomistilor Street, P.O. BOX MG5, Magurele, Ilfov 077125, Romania

² Carol Davila University of Medicine and Pharmacy, 37 Dionisie Lupu Street, Bucharest, Romania

³ Neuromuscular Rehabilitation Division, Clinical Emergency Hospital “Bagdasar-Arseni”, Bucharest 041915, Romania

⁴ Balneal and Rehabilitation Sanatorium of Techirghiol, Techirghiol 906100, Romania

⁵ Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy “Grigore T. Popa”, Iasi, Romania



Review

Hydrogen Sulfide in Balneology: Physiology, Evidence, and Clinical Translation

Jose Manuel Carbajo¹ · Francisco Maraver^{1,2,*} · Lorena Vela^{1,2} and Constantin Munteanu³

¹ Medical Hydrology Group, Department of Radiology and Rehabilitation, Complutense University of Madrid, Plaza Ramón y Cajal s/n, 28040 Madrid, Spain; jcarbaj@ucm.es (J.M.C.); marialorenavela@ucm.es (L.V.)

² Professional School of Medical Hydrology, Complutense University of Madrid, Plaza Ramón y Cajal s/n, 28040 Madrid, Spain

³ Faculty of Medical Bioengineering, University of Medicine and Pharmacy “Grigore T. Popa” Iasi, 700115 Iasi, Romania; constantin.munteanu.biolog@umfiasi.ro

* Correspondence: fmaraver@ucm.es

Abstract

This review integrates the biology and clinical translation of hydrogen sulfide (H₂S) in balneology. It frames H₂S as a gasotransmitters with dual chemical and biological actions and summarizes the H₂S/HS⁻ equilibrium as a function of pH, temperature, and oxygenation, which governs bioaccessibility in sulfurous waters. Endogenous and exogenous sources, transport, and mitochondrial catabolism are outlined, together with core cellular mechanisms: protein persulfidation; activation of Nrf2/ARE; modulation of NF-κB; regulation of ion channels; and engagement of PI3K/Akt, MAPK/ERK, and Wnt pathways, plus epigenetic interactions with HDACs and sirtuins. Preclinical and clinical evidence in dermatology, musculoskeletal disease, and respiratory care is synthesized, alongside metabolic, cardiovascular, gastrointestinal, and renal effects. Technical aspects that preserve the bioactive fraction of H₂S while meeting environmental safety limits are highlighted. Routes of administration (bathing, peloids, inhalation, and drinking cures) and key operational parameters are described. Overall, the review links physicochemical and molecular foundations with clinical indications for sulfurous waters and derivatives and identifies opportunities for research and development in H₂S donors and thermal cosmetics without extrapolating beyond the available data.

Keywords: hydrogen sulfide; sulfurous waters; balneotherapy; dermatology; rheumatology; inhalation therapy; spa therapy; sulfur springs; peloids; epigenetics



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1. Introduction

Hydrogen sulfide (H₂S), previously considered merely a toxic byproduct of anaerobic metabolism, is now recognized as an endogenous gasotransmitter with important physiological functions, comparable to nitric oxide (NO) and carbon monoxide (CO) [1,2].

Over the past two decades, H₂S has been identified as a critical modulator of cellular signaling, redox homeostasis, inflammation, and epigenetic modulation with an increasing interest in its therapeutic applications, particularly in the context of balneotherapy with sulfurous medicinal waters [1,3,4]. Recent years have witnessed a surge in discoveries related to the signaling roles of polysulfides and their superior redox potential compared to H₂S, prompting reconsideration of therapeutic sulfur species in balneology. In parallel, novel H₂S delivery technologies and deeper insights into mitochondrial targets such

Article

The Integrated Approach in Patients with Spinal Muscular Atrophy in the Era of Early Diagnosis, Etiopathogenic Therapies and Multidisciplinary Standards of Care and Rehabilitation Interventions Leads to New Phenotypes

Madalina Cristina Leanca ^{1,2,†}, Andra Mirea ^{1,2,†}, Georgiana Nicolae ^{1,2,†}, Andrei Capitanescu ³, Constantin Munteanu ^{4,5,*} and Gelu Onose ^{1,5}

- Faculty of General Medicine, University of Medicine and Pharmacy "Carol Davila", 37 Dionisie Lupu Street, 020021 Bucharest, Romania; mada_mada332@yahoo.com (M.C.L.); andrada.mirea@gmail.com (A.M.); dr.georgiananicolae@gmail.com (G.N.); gelu.onose@umfcd.ro (G.O.)
 - National University Center for Children Neurorehabilitation "Dr. Nicolae Robanescu", 44 Dumitru Minca Street, 041408 Bucharest, Romania
 - Children's Emergency Clinical Hospital "Maria Sklodowska Curie", 20 Constantin Brancoveanu, 075534 Bucharest, Romania; andreicapitanescu@gmail.com
 - Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", 700115 Iasi, Romania
 - Teaching Emergency Hospital "Bagdasar-Arseni", 12 Bercei Avenue, 041915 Bucharest, Romania
- * Correspondence: constantin.munteanu.biolog@umfcd.ro
[†] These authors contributed equally to this work.

Abstract

Novel targeted therapies have transformed spinal muscular atrophy from a condition with a predictable, severe course into a more heterogeneous disorder with a range of new clinical phenotypes and outcomes. The emergence of new phenotypes in spinal muscular atrophy is a recent development in the field. The introduction of new etiopathogenic pharmacological treatments have significantly altered the natural history of the disease, leading to previously unseen clinical presentations and outcomes. Materials and Methods: We observed a cohort of 104 patients (children and adolescents), considering the number of SMN2 gene copies, the use of respiratory ventilation support devices and gastrointestinal support, and finally, their evolution on clinical-functional scales with physical therapy and rehabilitation interventions. With the increasing availability of effective therapies for spinal muscular atrophy, outcome measurement in clinical practice and research requires highly sensitive and reliable tools. In this study, motor function was systematically evaluated using two validated scales—the Children's Hospital of Philadelphia Infant Test of Neuromuscular Disorders (CHOP INTEND) and the Hammersmith Functional Motor Scale Expanded (HFMS)—which are specifically designed to capture incremental changes in motor skills across the spectrum of SMA severity and age groups. Results: The median scores on the validated tools steadily increased over the 24 months of follow-up. Starting from 29 at baseline, the scores rose to 36 at 6 months, then to 39 at 12 months, 43 at 18 months, and 44.5 at 24 months. The Friedman test showed that these changes were statistically significant ($p < 0.01$). Moreover, each follow-up score was significantly higher than both the baseline and the previous time point (all $p < 0.01$), showing continuous improvement over time. Conclusions: These findings reveal that the development of new SMA phenotypes is closely linked to the stage of disease at which treatment is initiated. Earlier intervention consistently enables patients to acquire previously unattainable motor skills. Consequently, enhancing diagnostic precision and expediting therapy initiation is crucial for maximizing clinical benefits and facilitating optimal functional outcomes.



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Research article

Gait Analysis Technologies for Evaluating Biomechanical Deviations: Insights from a Pilot Study on Healthy Athletes and Foot Deformities

Elena Taina Avramescu ¹, Anca Maria Amzolini ^{2*}, Ana Maria Bumbac ³, Simona Patru ¹, Magdalena Rodica Traistaru ¹, Carmen Daniela Neagoe ⁴, Gheorghe Ionescu ¹, Constantin Munteanu ¹ and Daniela Matei ³

- Department of Sports Medicine and Kinesiology, University of Craiova, Romania;
- Department of Medical Semiology, University of Medicine and Pharmacy of Craiova, Romania;
- Department of Medical Rehabilitation, University of Medicine and Pharmacy of Craiova, Romania;
- Department of Internal Medicine, University of Medicine and Pharmacy of Craiova, Romania;
- Department of Biomedical Sciences, Faculty of Medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", 700145 Iasi, Romania; Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania

* Correspondence: Anca Maria Amzolini, anca.amzolini@umfcd.ro

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Abstract: Gait analysis is an essential tool for assessing musculoskeletal function and identifying biomechanical abnormalities. This study aimed to establish normative reference values for gait parameters in young, physically active individuals and to identify deviations associated with foot deformities. Methods: A cross-sectional observational study was conducted on 102 healthy young adults engaged in performance sports. Gait parameters were recorded using the RScan plantar pressure distribution platform. Outlier identification methods were applied to exclude 12 participants with significant deviations, resulting in a final sample of 90 subjects. Descriptive statistics and comparative analyses were used to evaluate maximum force, impulse, load rate, and contact area across ten anatomical foot regions. Results: The final normative dataset established baseline values for plantar pressure distribution and biomechanical force dynamics. Among excluded participants, 33% exhibited pes planus (flatfoot), and one case presented pes cavus (high arch), both associated with altered pressure distributions and deviations in temporal gait parameters. Statistical comparisons confirmed significant variations in foot loading patterns and pressure maps ($p < 0.05$). Conclusions: This study provides a comprehensive reference for gait parameters in young, healthy adults and highlights the clinical relevance of individualized gait assessments. The findings underscore the utility of plantar pressure analysis for early detection of biomechanical abnormalities that could contribute to musculoskeletal dysfunction. These insights can aid in the optimization of rehabilitation strategies, sports performance assessments, and orthopedic interventions. Clinical Implications: The results emphasize the need for targeted interventions in individuals with foot deformities to prevent long-term functional impairments. Future research should explore longitudinal implications of biomechanical deviations in active populations.

Keywords: Gait analysis, Biomechanical Deviations, Foot Deformities

1. Introduction

Despite the apparent simplicity of walking—placing one foot in front of the other—it is a complex biomechanical process. Walking is not only fundamental to human movement but also reflects an individual's personality and physical state. While normal gait exhibits common patterns across individuals, subtle individual-specific variations are always present, making each person's walking pattern unique [1,2].

Research article

Multimodal Non-Pharmacological Interventions for Fibromyalgia: Targeting Emotional and Cognitive Symptoms

Anca Maria Amzolini ¹, Daniela Matei ^{2*}, Magdalena Rodica Traistaru ³, Ana Maria Bumbae ^{2*}, Miruna Andreiana Matei ³, Maria Teodora Amzolini ⁴, Anda Patru ⁵, Mihai Cealicu ⁴, Constantin Munteanu ⁵ and Simona Patru ²

- 1 Department of Medical Semiology, University of Medicine and Pharmacy Craiova, 200349 Craiova, Romania
- 2 Department of Medical Rehabilitation, University of Medicine and Pharmacy Craiova, 200349 Craiova, Romania;
- 3 University of Valencia, Faculty of Medicine, 46010 Valencia, Spain; andreian.alumini.uv.es (M.A.M.)
- 4 University of Medicine and Pharmacy Craiova, Faculty of Medicine, 200349 Craiova, Romania;
- 5 Department of Biomedical Sciences, Faculty of medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", 700454 Iasi, Romania; Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania

* Correspondence: daniela.matei@umfvc.ro (D.M.); anamaria.bumbae@umfvc.ro (A.M.B.);

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Abstract: Fibromyalgia (FM) is a chronic condition characterized by widespread pain, emotional distress, and cognitive impairments, significantly impacting quality of life. This study evaluated the effectiveness of three non-pharmacological interventions—stretching-based kinetic therapy, cognitive-behavioral therapy (CBT), and occupational therapy (OT)—on emotional and cognitive symptoms in FM patients. A prospective controlled study included 126 FM patients divided into four groups: CBT, stretching, OT, and a control group (CG) receiving only general education. Emotional outcomes were assessed using the Hospital Anxiety and Depression Scale (HADS) and Positive and Negative Affect Schedule (PANAS), while cognitive function was measured through Symbols and Digits tests. A follow-up assessment was conducted six months post-intervention to evaluate sustainability. CBT significantly reduced anxiety and sustained positive affect ($p = 0.01$). Stretching therapy provided long-term symptom relief ($p = 0.02$), while OT improved information processing speed ($p < 0.001$). The CG showed minimal changes. Despite observed benefits, adherence variability and the lack of randomization were study limitations. Conclusions: Multimodal non-pharmacological interventions demonstrated distinct yet complementary effects, supporting their integration into FM management. Stretching exercises contributed to sustained symptom relief, CBT was effective for emotional regulation, and OT improved cognitive function. Clinicians should consider patient-specific needs when designing rehabilitation strategies. Future studies should explore long-term adherence and comparative effectiveness across diverse FM populations.

Keywords: fibromyalgia; stretching-based kinetic therapy; occupational therapy; cognitive-behavioral therapy;

1. Introduction

Fibromyalgia (FM) is a chronic disorder characterized by widespread pain, fatigue, sleep disturbances, and a range of cognitive and emotional impairments. These symptoms, often referred to as "fibrolog," include difficulties with memory, attention, executive function, and emotional regulation, significantly impacting patients' daily functioning and quality of life [1,2]. While pharmacological treatments provide symptom relief, they often fail to address the full spectrum of cognitive and emotional challenges experienced by FM patients, highlighting the need for effective non-pharmacological interventions [3,4].

Research article

Advancing Personalized Care in Rheumatoid Arthritis: A Novel Framework Using NNT, ARR, and Quality of Life Metrics

Daniela Matei ¹, Anca Maria Amzolini ^{2*}, Miruna Andreiana Matei ³, Anda Patru ⁴, Mihai Cealicu ⁴, Maria Teodora Amzolini ⁴, Magdalena Rodica Traistaru ⁵, Ana Maria Bumbae ¹, Constantin Munteanu ⁵ and Simona Patru ¹

- 1 Department of Medical Rehabilitation, University of Medicine and Pharmacy Craiova, 200349 Craiova, Romania;
- 2 Department of Medical Semiology, University of Medicine and Pharmacy Craiova, 200349 Craiova, Romania;
- 3 University of Valencia, Faculty of Medicine, 46010 Valencia, Spain;
- 4 University of Medicine and Pharmacy Craiova, Faculty of Medicine, 200349 Craiova, Romania;
- 5 Department of Biomedical Sciences, Faculty of medical Bioengineering, University of Medicine and Pharmacy "Grigore T. Popa", 700454 Iasi, Romania; Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania;

* Correspondence: Anca Maria Amzolini, anca.amzolini@umfvc.ro

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Abstract: This study evaluates the efficacy of monotherapy versus combination therapy in rheumatoid arthritis (RA) using advanced quantitative metrics such as Number Needed to Treat (NNT), Absolute Risk Reduction (ARR), Relative Risk Reduction (RRR), and Control and Experimental Event Rates (CER and EER). The goal is to provide a structured, clinically relevant framework for optimizing RA management and bridging the gap between clinical research and real-world application. A prospective cohort study included 160 RA patients, stratified by age, gender, and disease activity. Patients received either monotherapy (MTX or LEF) or combination therapy (MTX/SSZ/HQ). Outcomes were assessed over 24 months using statistical significance measures such as confidence intervals, t-tests, ANOVA, and non-parametric alternatives. The findings provide a direct clinical application, guiding treatment selection based on quantifiable response metrics. NNT, ARR, RRR, CER, and EER were calculated to evaluate treatment effectiveness. Combination therapy (MTX/SSZ/HQ) demonstrated superior efficacy with an NNT of 3, compared to 25 for monotherapy. ARR and RRR were 71% and 90%, respectively, for combination therapy versus MTX/HQ. Quality of life scores significantly improved in the combination therapy group, correlating with sustained remission over 24 months. This study presents a practical tool for clinicians by integrating longitudinal metrics and patient-specific NNT to personalize RA treatment decisions. By integrating longitudinal metrics and patient-specific NNT, it provides a novel, evidence-based approach to improving treatment outcomes in RA.

Keywords: rheumatoid arthritis, treatment strategies, csDMARD, NNT

1. Introduction

Rheumatoid arthritis (RA) is a chronic systemic disease with an autoimmune origin, primarily affecting small joints and causing local inflammation as well as systemic manifestations [1]. Despite being a well-known condition, RA, like many other complex diseases [2-7], remains partly enigmatic in its etiology and pathogenesis [8,9]. It is characterized by chronic inflammation that leads to joint deformities, destruction of synovial tissue, severe disability, and, in some cases, premature mortality [10]. Beyond its health impact, RA imposes a significant socioeconomic burden due to its associated morbidity, long-term care requirements, and healthcare costs [11].

Literature review

Systematic literature review as knowledge base for the research efforts towards the inception of a National Programme for Cardiovascular Rehabilitation and of a National Electronic Register for Cardiovascular Diseases

Mihaela Mandu ^{1,2}, Gelu Onose ^{1,2*}, Cătălina Andrei ^{1,2*}, Ioana Andone ^{1,2}, Aura Spinu ^{1,2}, Cristina Popescu ^{1,2}, Andreea Lăcraru ^{1,2*}, Dragoș-Alin Trache ^{2,3}, Constantin Munteanu ^{2,3}, Vlad Ciobanu ⁴, Liliana Andronache ¹ and Ștefan Sebastian Busnatu ^{1,2}

- 1 University of Medicine and Pharmacy Carol Davila, Bucharest, Romania;
- 2 Clinical and Emergency Bagdasar-Arseni Hospital, Bucharest, Romania;
- 3 Department of Biomedical Sciences, Faculty of Medical Engineering, University of Medicine and Pharmacy "Grigore T. Popa" Iași, 700454 Iași, Romania;
- 4 National University of Science and Technology Politehnica, Bucharest, Romania

* Correspondence: andreealacraru@gmail.com (A.L.); dragoș-alin.trache@reem.umd.ro (D.T.)

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Abstract: Frequently, cardiovascular pathologies lead to disability states, affecting the patient's life quality, having a great socio-economic influence on public health systems. In order to identify the current situation of cardiovascular rehabilitation in Romania, we set out to create a systematic literature review on this subject matter. Aim. We aimed at a structured National protocol for cardiovascular rehabilitation, as for a national electronic register for cardiovascular diseases. Methods. We fulfilled, for the above mentioned purpose, a systematic literature review of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) type. The data query has been achieved in June 2023 and updated in March 2025 using several keyword combinations/ phrases, searched contextually. For this selection, we took into account: open access articles, written in English, published in ISI indexed journals between 01.01.2018 – 31.12.2022, extended until 31.12.2024. Results. Five eligible articles were identified and operated in order to achieve this systematic literature review. Discussion. Accordingly, we noticed that there is no National electronic register for cardiovascular pathology in Romania, nor a National protocol for cardiovascular rehabilitation – the need for this type of a programme being imperative. Conclusions. Consequently, based on our efforts and given the fact that we approached an insufficiently researched niche, we consider our paper to contribute to such an endeavor.

Keywords: Romanian National electronic register, cardiovascular programme, systematic literature review, cardiovascular rehabilitation, PRISMA

1. Introduction

Cardiovascular diseases are the leading cause of death worldwide, being a real challenge for public healthcare systems. [1], [2] Patients with such disorders often develop physical, mental, emotional or/and social problems that may affect their life quality, thus leading to disabilities that may affect the good development of daily activities. [3]

In such a global context, there is great emphasis on prevention, but also on the concept of cardiovascular rehabilitation. Thus, in the first half of the 18th century, the main indication for patients who survived an acute myocardial infarction was to

Research article

Exercise-Induced Hydrogen Sulfide Biosignaling Functional Relevance for Rehabilitation and Balneotherapy – Study protocol

Cristina Popescu ^{1,2}, Gelu Onose ^{1,2}, Sonia Gabriela Neagu ^{4,*}, and Constantin Munteanu ^{2,3}

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1. University of Medicine and Pharmacy "Carol Davila", 020022 Bucharest, Romania;
2. Neuromuscular Rehabilitation Clinic Division, Clinical Emergency Hospital "Bagdasar-Arseni", 041915 Bucharest, Romania;
3. "Grigore T. Popa" University of Medicine and Pharmacy Iași, 700454 Iași, Romania;
4. "Lucian Blaga" University, Faculty of Science, Department of Environment Science, Physics, Physical Education and Sport, Sibiu, Romania

* Correspondence: soniagabriela.neagu@ulbsibiu.ro

Abstract: Hydrogen sulfide (H₂S) is an endogenous gasotransmitter increasingly recognized as a biologically active biosignaling involved in vascular regulation, redox homeostasis, mitochondrial function, and inflammatory control. Physical exercise is a central intervention in physical and rehabilitation medicine, capable of activating molecular signaling pathways that overlap with hydrogen sulfide-dependent mechanisms. In parallel, sulfurous balneotherapy provides exogenous low-dose hydrogen sulfide exposure and is widely used in rehabilitation practice. However, the role of hydrogen sulfide as a mediator of exercise-induced functional adaptation and its potential modulation through balneotherapy has not been systematically investigated in clinical rehabilitation settings. The primary objective of this study is to evaluate the role of exercise-induced hydrogen sulfide-related biosignaling in functional adaptation during rehabilitation. Secondary objectives include assessing whether the addition of sulfurous balneotherapy enhances functional outcomes and modulates biomarkers related to oxidative stress and inflammation, as surrogate indicators of hydrogen sulfide-dependent signaling pathways. This protocol describes a prospective, controlled, parallel-group clinical trial to be conducted in a balneological rehabilitation center. Approximately 60 adults with chronic musculoskeletal disorders will be recruited and allocated to either a therapeutic exercise-only group or a combined intervention group receiving therapeutic exercise plus sulfurous balneotherapy. The intervention period will last 14 days. Functional outcomes will include validated performance-based and patient-reported measures of physical function and pain. Biological outcomes will include systemic markers of oxidative stress and inflammation assessed at baseline and post-intervention. Statistical analyses will be planned to compare within- and between-group changes and to explore associations between functional and biological outcomes.

Keywords: Hydrogen sulfide; Biosignaling; physical exercise; rehabilitation; balneotherapy; functional adaptation

1. Introduction

Physical exercise is a core therapeutic modality in physical and rehabilitation medicine (PRM), with established efficacy in improving functional capacity, reducing pain, and enhancing quality of life across a broad spectrum of chronic musculoskeletal and degenerative conditions [1]. Beyond its mechanical and neuromuscular effects, exercise elicits complex biological responses involving vascular regulation, mitochondrial adaptation, redox signaling, and immune modulation [2]. These molecular and cellular adaptations are particularly relevant in rehabilitation populations, where chronic inflammation, endothelial dysfunction, and impaired bioenergetics often limit functional recovery [3].



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Președinte,
Conf. univ. dr. biol. Constantin Munteanu

Vă mulțumesc din toată inima pentru susținerea Asociației
Române de Balneologie. Sănătatea, Armonia, Pacea și Succesul să
ne ghideze în eforturile noastre și în anul

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La mulți ani! 2026

