

Role of Gut Microbiota in Alzheimer’s Disease: Insights into Physical Activity

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INTRODUCTION

To critically evaluate the existing literature on how PA-mediated modulation of gut microbiota influences AD progression, with a focus on:

- Gut dysbiosis on AD
- Functional pathways involved in gut–brain communication
- PA mediated modulations in GMB



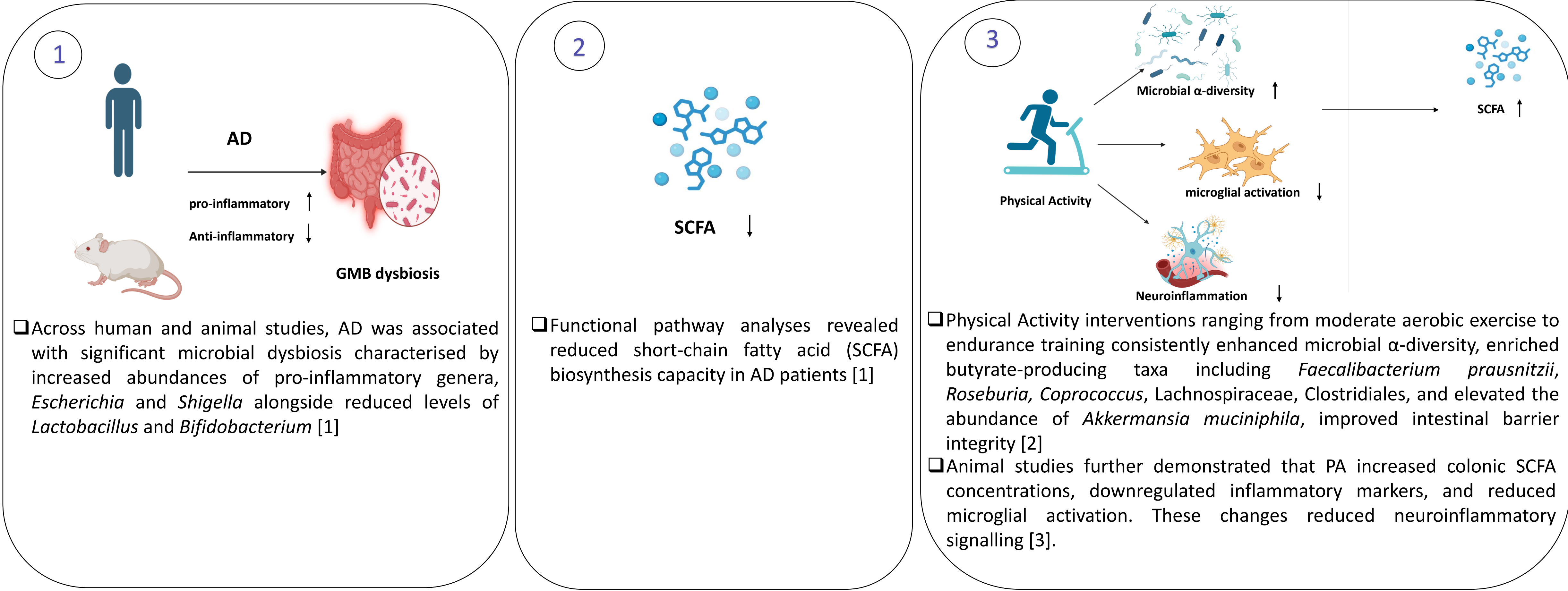
METHODS

- Narrative literature review of peer-reviewed studies (2010 to 2024)
- Databases searched: Google Scholar and PubMed
- Keywords included: “Alzheimer’s Disease”, “Gut Microbiome”, “Gut Microbiota”, “Physical Activity”, “Exercise”, “Functional Pathways”, “microbiome-gut-brain axis”
- Inclusion criteria: human or animal studies reporting GMB composition in AD, studies evaluating the effects of PA on microbiota.
- Exclusion criteria included reviews without primary data, and studies not reporting microbiota outcomes

CONCLUSIONS

- PA may help restore microbial homeostasis, increase neuroprotective metabolite production, and attenuate neuroinflammation in AD.
- It is representing a promising non-pharmacological approach to slow disease progression.
- Further longitudinal studies are needed to establish causal pathways and optimise microbiota-targeted strategies in AD management

RESULTS



Cohort	Tested Stage or Physical activity type	Microbial Genus/Species variation due to Physical activity	Effect on Function
Mice	Voluntary running	Faecalibacterium prausnitzii, Roseburia, Coprococcus, and members of Lachnospiraceae and Clostridiales	Increased butyrate-production [4]
Rats	voluntary aerobic exercise	Increased Lactobacillus and Bifidobacterium	potential to enhance human intestinal barrier integrity reducing intestinal inflammation [5]
Rats	Resistance Training	Akkermansia muciniphila Increased	protects against autoimmune diseases [5]
Human	MCI or early dementia due to AD	Blautia increased, Eubacterium genera increased (Eubacterium fissicatena)	increasing γ-aminobutyric acid (GABA) production [6]
Human	healthy participant (varying cardiorespiratory fitness levels)	Increased levels of Clostridiales, Roseburia, Lachnospiraceae, and Erysipelotrichaceae	fecal butyrate, a SCFA associated with improved gut health [2]

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