NEUROPROTECTIVE PROPERTIES OF COFFEE: AN UPDATE

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INTRODUCTION

World population drink around 2,000 million cups of coffee per day. It is an important nervous system stimulant with more than 1,000 compounds, which has demonstrated to be beneficial for health when moderately consumed, that is, 3 to 4 cups daily.

Regarding a specific type of health conditions, neurodegenerative diseases (ND), which comprise one of the most important medical issues nowadays, there is plenty of research concerning coffee effects. However, the great majority of the papers published on this topic are usually focused on the individual compounds of the brew, instead of coffee as a whole. In fact, the complete beverage and its metabolism differ from single compounds behaviour within the body.

AIM

This review brings out up-to-date animal and human in vivo studies on this matter, from the past 10 years, in order to analyse the real impact of the coffee brew consumption on the inception and development of ND.

METHODOLOGY

Electronic databases (papers, books), websites
Keywords 2010-2020: 222 articles

- Studies/meta-analyses
- Observational/experimental
- In vivo/human/animal
- Some type of association
- NO isolated compounds

Review

RESULTS

- Human studies in higher number than animal studies
- Nonally, most are observational studies, which convert the consumption of coffee (usually high, medium, low) in estimated caffeine doses

FINDINGS

- General neurological conditions (dementia, cognitive impairment, etc.) are the most explored, followed by Parkinson’s, Alzheimer’s, multiple and amyotrophic lateral sclerosis, and other rarer conditions.
- The majority of articles demonstrate positive associations between coffee consumption and neuroprotection:
  - decreased risk of developing diseases
  - reduction of mortality
  - improvement of cognitive performance
  - weakened symptoms
  - later onset.
- Some articles find no correlations. One article shows a negative association between coffee consumption and Huntington disease.
- The main compound mentioned in literature is caffeine, known for neurological stimulant effects and which demonstrate neuroprotective actions. Its similarity to the neurotransmitter adenosine may explain several mechanisms, such as:
  - raise of excitatory neurotransmitters, diminishing some ND outcomes
  - increased survival of motor neurons
  - minimization of cytokines responsible for inflammatory processes, reducing demyelination.
- Phenolic compounds (being chlorogenic acids the major group in coffee) present antioxidant characteristics and are effective against neurotoxicity. Several compounds formed during roasting (phenylindanes, β-carbolines, serotonin, etc.) also show to produce mechanisms of neuroprotection.
- Interactions have been emphasised, suggesting that effects of coffee components may be synergistic, the lack of only one compound can inhibit all neuroprotection, and variations in relative amounts may alter the interactions and, consequently, the outcomes.

CONCLUSION

It becomes clear that there are some impacts of coffee consumption on ND, being, the majority, beneficial impacts. Coffee may help to decrease or delay the risk, as well as attenuate symptoms. However, some studies could not conclude any association and, therefore, more investigation is required in order to fully recognize neuroprotective effects of coffee.

Some properties of specific coffee compounds are proven and their significance in neuroprotection is understandable, though the importance of interactions, as well as of the relative quantities between them, is brought into view. It is known that the processes of roasting, storage and preparation of the brew, as well as the bean species, all influence drink composition. Therefore, it would be important for all the studies to control these variables and, ideally, to always analyse subjects within the same conditions. Notwithstanding the necessity for more investigation, coffee may be accepted as a novel complementary factor for prevention of ND.

References

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