INPLASY

Post mortem interval estimation through OMICS

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ADMINISTRATIVE INFORMATION

Support - No support.

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

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 December 2024 and was last updated on 26 December 2024.

INTRODUCTION

Review question / Objective n this review we aimed to investigate the current state-of-the-art regarding the role of mass spectrometry-based “omics” approaches in the analysis of post-mortem degradation patterns of biomolecules, offering a general overview of the most promis-ing biological markers for post-mortem interval estimation.
Special attention has been paid to elucidating molecular mechanisms underlying the intricate biochemical time-related changes occurring after death.

Condition being studied The estimation of the postmortem interval (PMI), defined as the time elapsed since death, represents a complex and pivotal challenge for forensic pathologists in daily practice. The role of PMI becomes crucial in the context of criminal investigations where it assists in directing suspicions towards a certain perpetrator, defining the whereabouts and last movements of the victim and corroborating or rebutting witness testimony in court.

METHODS

Participant or population This systematic review is carried out following the criteria included in the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guide. Two authors performed a systematic literature search via “free-text” protocols in the PubMed, SCOPUS, and Web of Science databases, with time limits 01 January 2003– 01 February 2024. Search terms used for the three data-bases were as follows: (PMI OR "postmortem interval" OR "post-mortem interval" OR "post mortem interval" OR "time after death" OR "time since death" OR "time of death") AND (forensic* OR medicolegal OR "legal medicine" OR legal OR "medico-legal") AND (omic* OR genomic* OR metabolomic* OR proteomic* OR molecular OR tran-scriptomic* OR lipidomic* OR DNA OR RNA OR mRNA OR

miRNA* OR microRNA* OR protein* OR proteic OR "fatty acid*" OR microbiome OR microbiology).
The following inclusion criteria were applied.
A. Titles and abstracts available in the English language.
B. Experimental studies including, as investigated samples, animal or human corps-es in toto or in parts (i.e., organs, tissues and/or fluids) aiming at estimating PMI.
C. Experimental studies estimating PMI through mass-spectrometry based untar-geted omic approaches.
Only studies matching all of the aforementioned criteria were included.
2.1.2. Exclusion criteria
A. Letters to the Editor, Book chapters, reviews, conference proceedings.
B. Full-texts not available in the English language.
C. Studies estimating PMI through in vitro experiments.
D. Records estimating PMI through the analysis of the post-mortem colonizing fauna.
Not meeting all of the inclusion criteria (A, B, C) or, conversely, meeting at least one of the exclusion criteria (D, E, F, G) was reason for paper exclusion.

Intervention The intervention is represented by time-related changes to biomolecules and tissues.

Comparator Not applicable.

Study designs to be included Only experimental studies including, as investigated samples, animal or human corpses in toto or in parts (i.e., organs, tissues and/or fluids) aiming at estimating post-mortem interval through mass-spectrometry based untargeted omic approaches.

Eligibility criteria The following inclusion criteria were applied.
A. Titles and abstracts available in the English language.
B. Experimental studies including, as investigated samples, animal or human corps-es in toto or in parts (i.e., organs, tissues and/or fluids) aiming at estimating PMI.
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Information sources PubMed, SCOPUS, and Web of Science databases.

Main outcome(s) Find relevant time-related postmortem changes at the proteomic, metabolomic and lipidomic levels.

Quality assessment / Risk of bias analysis Quality assessment of the included manuscript was performed using the ARRIVE guidelines (Animal Research: Reporting of In Vivo Experiments) for animal studies and the STROBE checklist human studies.

Strategy of data synthesis Data were extracted and reported in a synoptic Table (no Meta-analysis performed).

Subgroup analysis Not performed.

Sensitivity analysis Not performed.

Language restriction Only English.

Country(ies) involved Italy.

Keywords postmortem interval; time-since-death; mass-spectrometry; forensic; omics; proteomics; metabo-lomics; lipidomics.

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