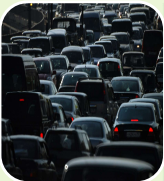


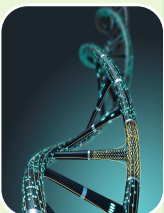
MOLECULAR BIOMARKERS OF RISK AND RESILIENCE IN HEALTH FROM EXPOSURE TO ENVIRONMENTAL STRESS: A SYSTEMATIC REVIEW

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INTRODUCTION



Exposure to environmental stressors, such as air pollution, can negatively impact on health.
But why are some more susceptible than others in the same environment?

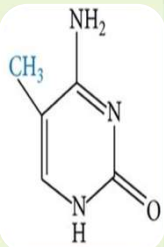


Individual responses to stressors may be influenced by differences in underlying biology, including the **genome**, **transcriptome**, and **epigenome**. These differences could be used as **biomarkers**.

Genome: all the genetic information of an organism – in humans this is stored in the sequence of DNA.

Transcriptome: A transcript is a DNA sequence copied into an RNA sequence. It is RNA transcripts that are translated into the proteins that build us.

Epigenome: epigenetic marks modify which DNA sequences are transcribed. E.g., adding a methyl group to a DNA molecule (left in blue) can prevent the rest of the sequence being copied into RNA.

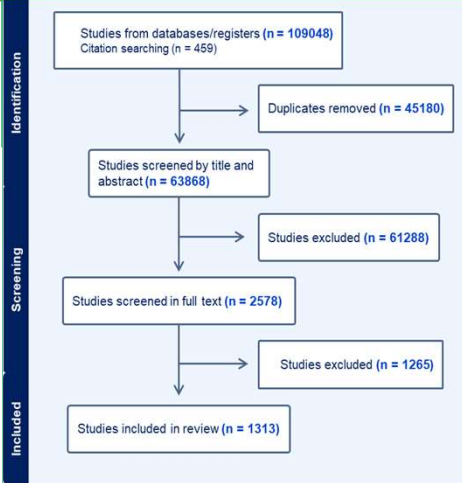


Aim of review: to identify molecular biomarkers associated with environmental stressors, and any health outcomes recorded.

METHODS

Scientific literature databases were searched for studies matching eligibility criteria from the PICO framework:

Population	Human
Intervention or exposure	exposure to environmental hazards and by-products
Comparator	laboratory molecular biology-based biomarker
Outcome	any health outcome

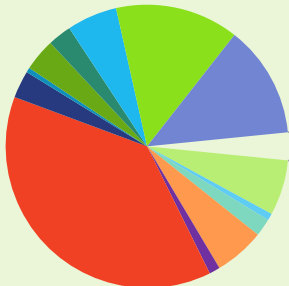


RESULTS: MOLECULAR BIOMARKERS FROM INCLUDED STUDIES

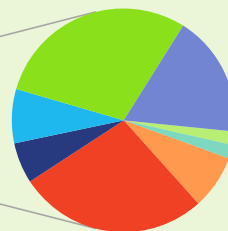
- 8-hydroxy-2-deoxyguanosine
- Chromosomal
- DNA adduct
- Gene expression
- Micronuclei
- RNA
- Telomeres
- Chromatin changes
- miRNA
- DNA methylation
- Histone modification
- Mitochondrial
- SNPs

RNA biomarkers were used more often, mitochondria and micronuclei less, in studies that included cognitive decline.

1313 included studies

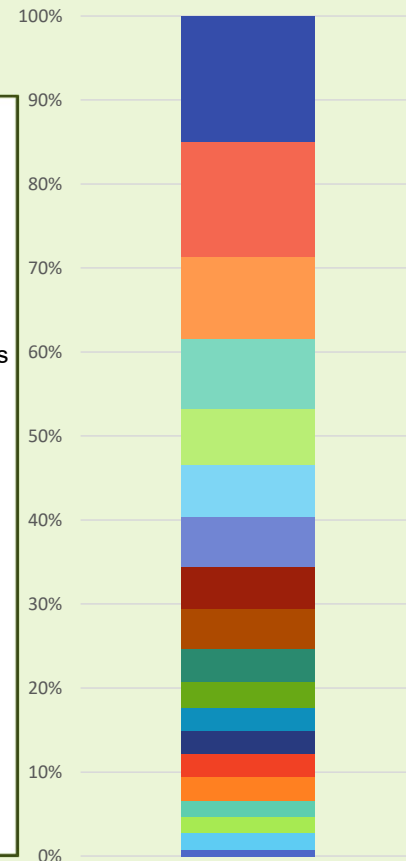


46 studies had cognitive decline as a health outcome



RESULTS: TYPES OF EXPOSURE FROM INCLUDED STUDIES

- Toxic element
- Occupational exposure
- Tobacco smoke
- Ambient air pollution
- Low socio-economic status
- Particulate matter 2.5
- Polycyclic aromatic hydrocarbons
- Aromatic compounds
- Pesticide exposure
- Endocrine disruptor
- Particulate matter 10
- Traffic pollution
- Environment urban
- Proximity to industry
- Radiation
- Home exposure
- Phthalates
- Chemical (of unspecified origin)
- Social discrimination



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