MICRO- AND NANOPLASTICS AND HEALTH

What we learned from POLYRISK

The EU-funded POLYRISK project worked to better understand to what extent people are exposed to micro- and nanoplastics (MNPs) through their environment and whether this exposure negatively affects their health.

Toxicity testing and methodologies

- We developed key analytical methods and protocols to detect microplastics in human blood, water, and air samples.
- We laid the groundwork for methods to study negative health effects and detect nanoplastics.
- Nanoplastic particles are challenging to produce for toxicity testing and analytical calibration purposes, and are more difficult to detect than microplastics.
- We conducted human exposure studies that investigated MNP exposure and health risks in three different real-life settings:
  - Spending time in traffic-heavy areas, such as while commuting
  - Playing soccer on fields with artificial turf
  - Working in textile industry factories

Plastic particles and health

- People are continuously exposed to particles in the air. The levels of MNPs we measured are only a small portion of that total exposure.
- Microplastics are modified as they age in the environment, changing in size, shape, and surface chemistry.
  - We found that MNPs with reactive surfaces and aged particles are more likely to cause inflammatory responses.
- People working in the synthetic textile industry are exposed to high levels of micro- and nanoplastics in the two factories studied. This highlights the importance of occupational studies in future research.
- Playing football on a field with rubber granulates as infill is not a major source of exposure to MNPs for the players.
- Breathing in micro- and nanoplastic particles released from car tyres in traffic can trigger an immune response.
  - Repeated exposure to these particles could lead to more serious health concerns particularly in people who are already more vulnerable.

Risk assessment and regulation of plastic particles

- We created a risk assessment framework for MNPs with a modular design to organise existing exposure and hazard data, which provides the flexibility to adapt it as the science advances.
- Future risk assessment should consider the fact that we are exposed to complex mixtures, rather than MNPs in isolation.
- Our recommendation is to apply caution regarding plastic. We should produce less plastics, use less plastics in our daily life, and ensure that fewer plastics end up in the environment where they become a source of MNPs.

https://polyrisk.science/

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