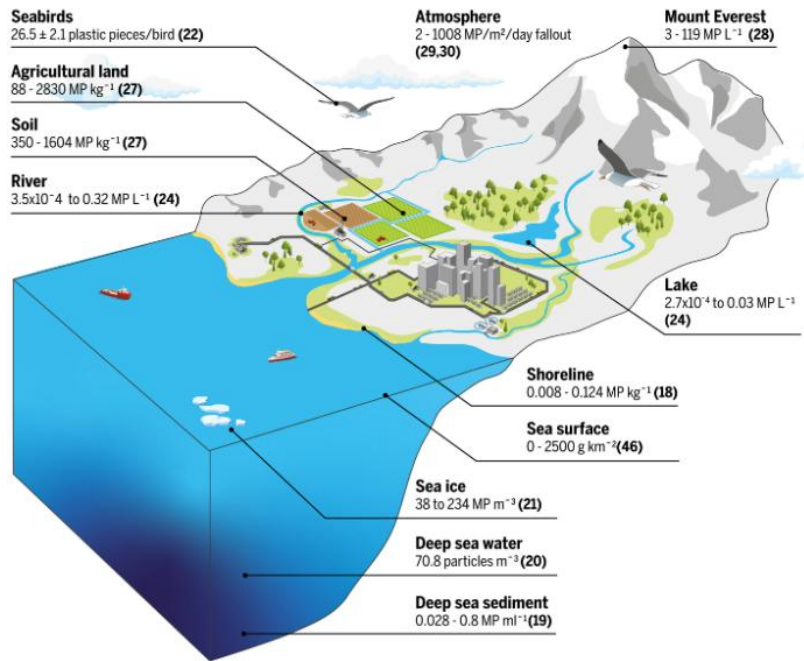


Addressing complexities in exposure assessment within MNP research

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From environments to humans: an extra layer of complexity

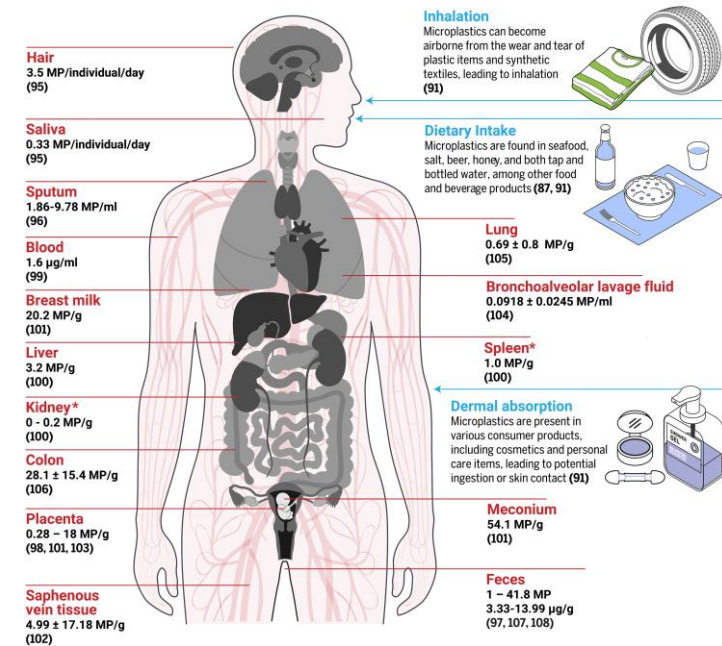


Thompson, et al. 2024



Modified from Soltani, et al. 2021;
redesigned by Monique Chilton

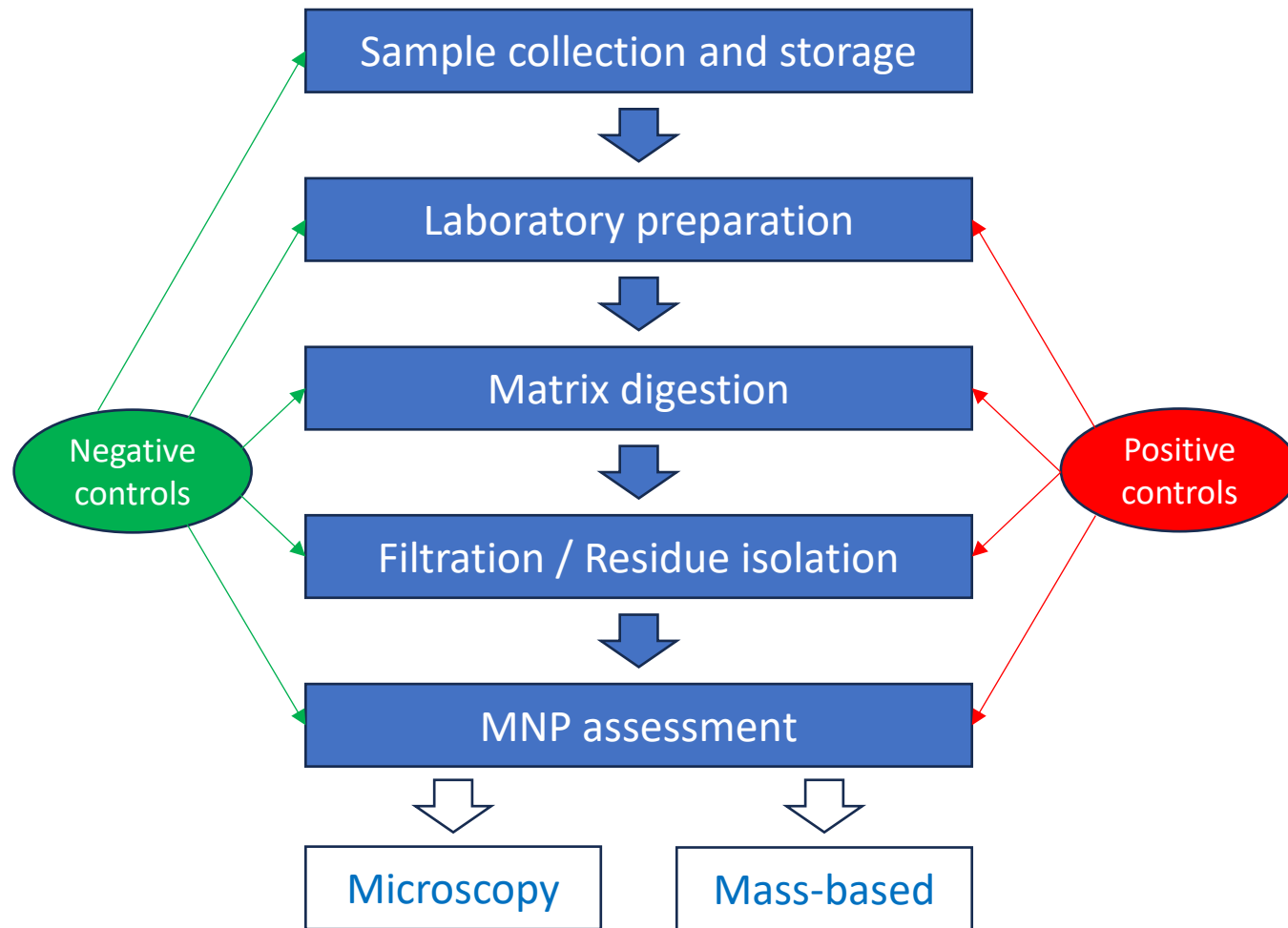
Microplastics in the human body



Thompson, et al. 2024



MNP assessment in human samples and potential biases



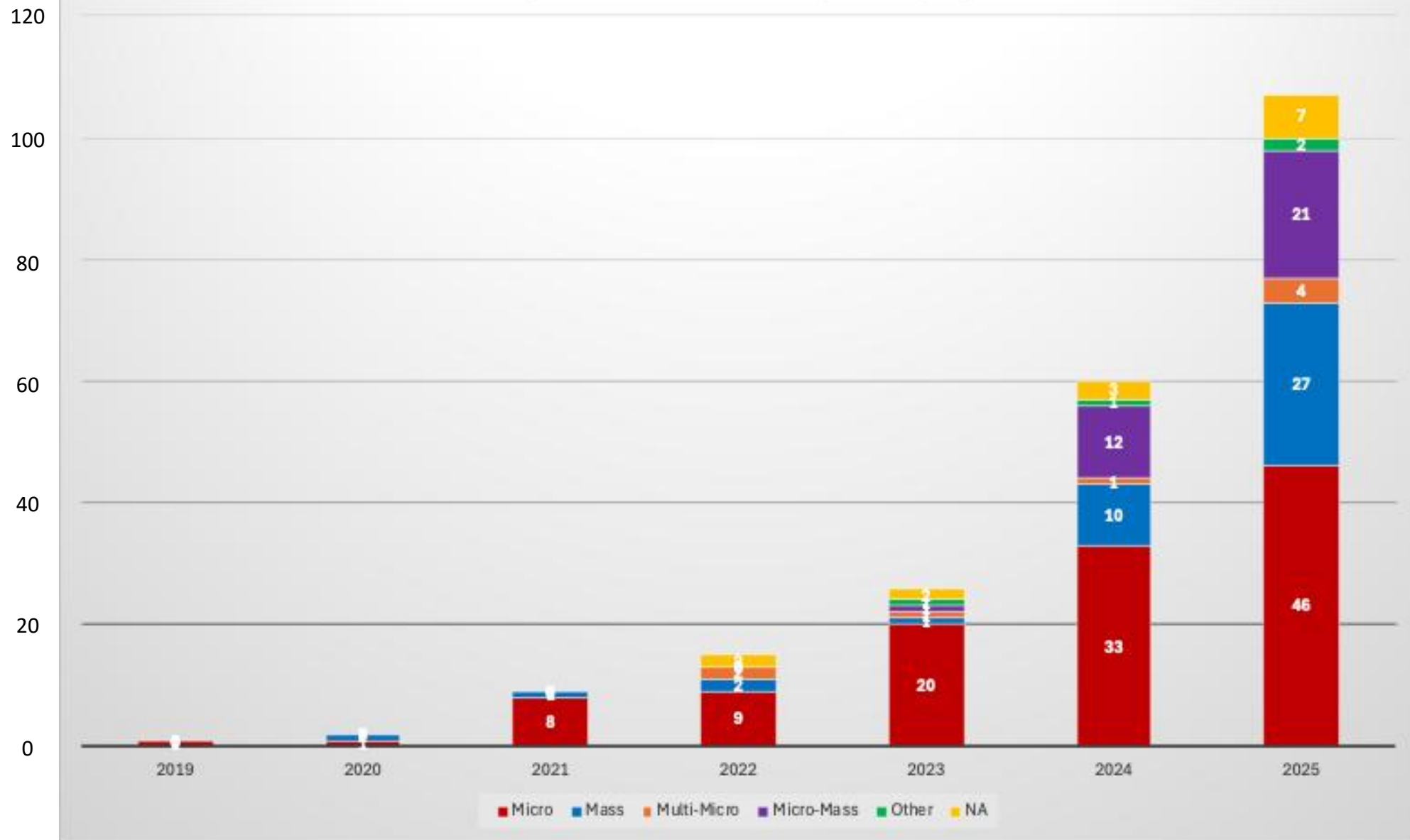
- Morphology (size, shape, etc.)
- Polymer type
- Concentration (count)

- Polymer type
- Concentration (mass)

Step	Contamination	Particle loss	Analytical interference	Measurement bias
Sample collection & Storage	x			
Laboratory preparation	x			
Matrix digestion	x	x	x	x
Filtration / residue isolation	x	x		x
MNP assessment	x	x	x	x



Techniques used to identify MNP polymers



Challenges and future directions

The screenshot shows the Science journal website interface. At the top, the Science logo is on the left, and navigation links for 'Current Issue', 'First release papers', 'Archive', and 'About' are in the center. A 'Submit man' button is on the right. Below the navigation, a breadcrumb trail reads 'HOME > SCIENCE > VOL. 386, NO. 6720 > TWENTY YEARS OF MICROPLASTIC POLLUTION RESEARCH—WHAT HAVE WE LEARNED?'. A 'REVIEW | MICROPLASTICS' tag is visible, along with social media icons for Facebook, X, Twitter, LinkedIn, YouTube, Instagram, and Email. The main article title is 'Twenty years of microplastic pollution research—what have we learned?'. Below the title, the authors are listed: 'RICHARD C. THOMPSON, WINNIE COURTENE-JONES, JULIEN BOUCHER, SABINE PAHL, KAREN RAUBENHEIMER, AND ALBERT A. KOELMANS'. Below the authors is a preview of a Guardian article with a colorful image of a person's head covered in microplastics and various plastic items. The Guardian article title is 'A bombshell': doubt cast on discovery of microplastics throughout human body. theguardian.com

- Contamination control
- Criticisms on Py-GC/MS
 - Matrix interference: PE, PVC
 - Lack of information on morphology
- Variability of results: lack of SOPs & inadequate QA/QC
- Biological plausibility: MPs vs. NPs
- A comprehensive QA/QC framework
 - Measures to minimize contaminations
 - Repeated measurements: reproducibility and precision
 - Negative & positive controls
 - Reagents used
 - Particle size range
 - Key parameters used and LOD/LOQ information
 - Combining microscopy-based and mass-based methods



Efforts on QA/QC by AURORA

- Standard laboratory procedures
- Duplicated samples
- De Novo collection – quadruple-matrix sampling
- Spatial distribution (placenta)
- Independent lab/cross-method validation
 - Py-GC/MS (Emory, UO)
 - Microscopy (UU)
 - TD-PTR-MS (UU)
- Matrix effect investigations
- Polymer selection/prioritization

