



# DETECTION AND CHARACTERIZATION OF MICROPLASTICS IN HUMAN FOLLICULAR FLUID

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## Background

- Plastics degrade into microplastics (MPs), <5mm, which humans are exposed to through ingestion, inhalation, and dermal contact
- Persistence of MPs after exposure has been documented in human tissue
  - e.g. blood, urine, breastmilk, placenta
- MPs promote oxidative stress, cell cycle disruption and apoptosis in a concentration dependent manner
- Animal studies using testicular and ovarian tissue suggest potential impacts on fertility
- MPs have been detected in human reproductive tissues, including ovarian follicular fluid, although sample populations are small, detection methods vary, and effects on fertility are still unknown.

## Objective

This study aims to evaluate the presence and type of microplastics in human ovarian follicular fluid.

## Conclusion

There is quantifiable presence of microplastics in ovarian follicular fluid, with inter-individual variability.

Polyethylene (PE), commonly used in various plastic products, was the most frequently detected plastic type.

Further research needed to explore the implications of microplastic presence in follicular fluid on fertility outcomes.

## Results

There was a negligible quantity of microplastics in the procedural blank/control. Processing was efficient with 89 +/- 17% mass recovery post filtration and sampling.

Normalized Mass (µg/mL)	PMMA	PP	PVC	PS	PE	PET	PC	Total
Sample 1	0.0075	0.0071	0.0000	0.0000	0.3535	0.0000	0.0000	0.3681
Sample 2	0.0000	0.0106	0.0000	0.0000	0.0000	0.0000	0.0000	0.0106
Sample 3	0.0047	0.0055	0.0208	0.0000	0.3005	0.0000	0.0129	0.3443
Sample 4	0.0079	0.0059	0.0000	0.0000	0.3193	0.0000	0.0000	0.3331
Sample 5	0.0000	0.0041	0.0207	0.0000	0.0000	0.0000	0.0000	0.0248
Sample 6	0.0064	0.0039	0.0000	0.0000	0.3725	0.0000	0.0119	0.3948
Sample 7	0.0190	0.0052	0.0407	0.0049	1.4323	0.0000	0.0000	1.5021
Sample 8	0.0077	0.0073	0.0186	0.0047	1.1463	0.0000	0.0000	1.1846
Sample 9	0.0297	0.0587	0.0673	0.0114	2.3024	0.0000	0.0000	2.4695
Sample 10	0.1892	0.1169	0.8890	0.0498	18.7763	0.0000	0.0000	20.0212

*Poly(methyl methacrylate) (PMMA), Polypropylene (PP), Polyvinyl chloride (PVC), Polystyrene (PS), Polyethylene (PE), Polyethylene terephthalate (PET), and Polycarbonate (PC)*

## Methods

- Pilot Study
- Institutional Review Board approved
- Consent for tissue collection and use obtained
- 10 samples of human follicular fluid collected during clinically indicated oocyte retrieval procedures
- Procedural blank: Cell suspension media collected using the same oocyte collection tools and storage containers was used as a control sample to determine the baseline presence of MPs.
- The morphology, color, and size of MPs was characterized using a stereomicroscope.
- Chemical composition was analyzed using pyrolysis-gas chromatography/mass spectroscopy (Py-GC/MS).
- The primary outcome measured was the quantity of MP per volume, while the secondary outcome involved identifying the type of plastic present.

## References

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