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Microplastics in the Brain – Credibility Check

There has been a series of media articles and television coverage about a study purporting to show that there is a “plastic spoon” (~6g) of microplastics in the human brain (Nihart et al.).

The media are not equipped to judge the credibility of that claim, so that task falls upon scientists. We at the PRC have reviewed over 500 studies on microplastics uncompensated, to become a leading source of independent expertise on the subject.

Microplastic exposure

While the public believe microplastics to be a new, unrecognized threat. Scientists know otherwise. It is not a new topic, as we have over 50 years of studies on it. It is not unrecognized as we have several hundred peer-reviewed studies covering all aspects of it. Lastly, it is not a threat, because exposure is very low and the particles are non-toxic.

Speaking of exposure:

We ingest 0.000003g of plastic particles per week (Nor et al.).

So total lifetime exposure to microplastic by ingestion is 0.01g.

The vast majority (~99.7%) of small particles ingested pass right through us (Powell et al.).

So, we can calculate the total amount not expelled over 70 years as 0.00003g.

And even that tiny fraction is attacked and destroyed by the body's defences.

Already from this we can see it is physically impossible to find 6g of plastic in a human brain because we are only exposed to 0.01g in our lifetime and most of that passes right through us. We cannot accumulate more of a substance than we have been exposed to, and yet this elementary fact was overlooked by the authors of the study.

The microplastics in the brain study was first disproven over a year ago (DeArmitt) and since then many researchers have come forward to show why it is not a valid study (including Jones et al.).

The brain study has arrows pointing to “putative” microplastic particles, which means they had no actual proof that the particles they show were actually made of plastic. What evidence do they have that there is any plastic at all in the brains studied?

The method they used is called pyrolysis gas chromatography-mass spectrometry (pyrolysis GC-MS). That involves heating the sample to such a high temperature that the molecules fall apart, then those fragments are detected, and scientists try to work out what the substance was before it was broken into smaller pieces.

Scientists have specifically stated that **pyrolysis GC-MS cannot be used to find polyethylene plastic in the body** because it confuses it with other substances in the body, including fat and lipids, thus giving false results (Rauert et al.). It was shown that the microplastic particles claimed to have been found in the body are too large to have crossed biological barriers, so they may well come instead from contamination of the sample e.g. by lab dust (Laforsch et al.).

Conclusion

Decades of studies and the FDA agree that microplastics are not a threat because exposure is extremely low and they are non-toxic. The microplastic in the brain study has been discredited by several scientists. It is just the latest in a series of anti-scientific attacks on plastics which are under 1% of the material we use and shown to have least impact in the vast majority of cases. The misguided anti-plastics campaign increases waste, greenhouse gas, fossil fuel use and cost.



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Supporting Information

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C. DeArmitt, Microplastics in the Brain

<https://phantomplastics.com/microplastics-in-the-brain/>

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