



PLASTICS RESEARCH
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FACTS FOR A BRIGHTER FUTURE

Microplastics in the Body

There has been a series of media articles and television coverage about microplastics. We at the PRC have reviewed over 500 studies on microplastics uncompensated, to become a leading source of independent expertise on the subject. Our objective is to provide peer-reviewed science and perspective because only by taking a holistic view can we make wise choices.

Particles in the human body

Any discovery of particles in the body is alarming to the general public and news stories abound. While the phenomenon is indeed disconcerting, scientists have in fact been studying the existence of different types of particle in tissue since the year 1844 when it was first reported in Germany (Herbst). Many later studies exist, and they report all manner of particles (Hussain et al., Bové et al., Liu et al., Buerki-Thurnherr et al.).

Some of the particles found in the human body include:

Titanium dioxide, zinc oxide, manganese oxide, carbon black, iron soot, chromium oxide, pthalocyanine, Mars red, goethite, silver, alumina, diesel exhaust, quantum dots, platinum, gold, fullerenes, zirconium oxide, carbon nanotubes.

What logical reason is there to report endlessly on the plastic particles without mention of any of the others? There is no valid reason.

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 0.0000014g of plastic particles per week (Nor et al.).
- So total lifetime exposure to microplastic by ingestion is 0.005g.
- 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 0.000015g.
- 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 0.005g 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 plastic in the body because it confuses plastic with other substances that are supposed to be in the body, including fat and lipids, thus giving false results (Rauert et al.).

Conclusion

Plastic particles are 0.001% of the total particles we breathe and ingest. They are non-toxic as shown by 50 years of studies and the FDA. When it comes to particles in the body, the story is the same. Plastic makes up a tiny fraction of the non-toxic particles with no evidence of any harm whatsoever. Meanwhile, in the blood, there are ~99 other particles for every one of plastic. The other particles we are exposed to are not only vastly more numerous but contain proven toxins and cancer-causing substances that we are ignoring in a misguided obsession over plastic to the exclusion of all else.

Decades of studies and the FDA agree that microplastics are not a threat because exposure is extremely low and they are non-toxic. This latest study reports information that is not new because it has been reported before (Montano, Hu and others), that is not newsworthy because there is no credible threat and that is biased in that it talks about the few plastic particles and not the majority of particles found that were not made of plastic.



Dr. Chris DeArmitt FRSC FIMMM CChem

Dr. DeArmitt is a globally recognized independent expert on plastics, microplastics and their effects on the environment. He is the author of two books based on an unfunded review of over 5000 peer-reviewed studies. He is founder of the Plastics Research Council composed of international professors and scientists who share the belief that we should forge a better future based on solid scientific evidence. Foundation members work without compensation in order to retain impartiality.



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Supporting Information

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