PLASTIC IN THE WOMB

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INTRODUCTION

Growing worries regarding the effects of microplastics on human health are brought on by their prevalence in the biosphere. Microplastics are particulates less than five millimeters in size that are created when plastic items in the environment deteriorate. The paucity of data on human exposure is a key problem for establishing the hazards of microplastics on people's wellbeing. To assess their potential impact on the burden of disease throughout the world, it is critical to comprehend the function of microplastics and their contribution to total ambient particle exposure. Microplastics may display distinctive particle qualities with a distinct and deeper toxicity profile compared with those of other ambient particles because of their complex structure, wide size range and persistence.

FIRST EVIDENCE IN HUMAN PLACENTA

The primary evidence of microplastics in human placenta was detected by a group of scientists from Italy. By using Raman Micro spectroscopy, six human placentas taken from willing mothers who were having healthy pregnancies were examined for the presence of microplastics. Four placentas included 12 microplastic particles with spherical or irregular shapes and sizes ranging

from 5 to 10 m. (3 in the chorioamniotic membranes, 4 on the maternal side, and 5 on the foetal side). They were all pigmented in which, three were later determined to be polypropylene stains, a thermoplastic polymer, while the remaining nine were used in finger paints, synthetic coatings, adhesives, paints, plasters, polymers, cosmetics as well as personal care products.

The immunological strategy of self-tolerance has to be reconsidered in light of the mere existence of microplastics in the placental layers. Regrettably, we are unsure of how MPs enter the circulation or if they originate in the digestive or respiratory systems. Moreover, it has been mentioned that MPs, once they are inside our body, might build up and cause localised toxicity by triggering and/or intensifying immunological responses, thereby weakening the body's defences against infections and changing how energy stores are used.

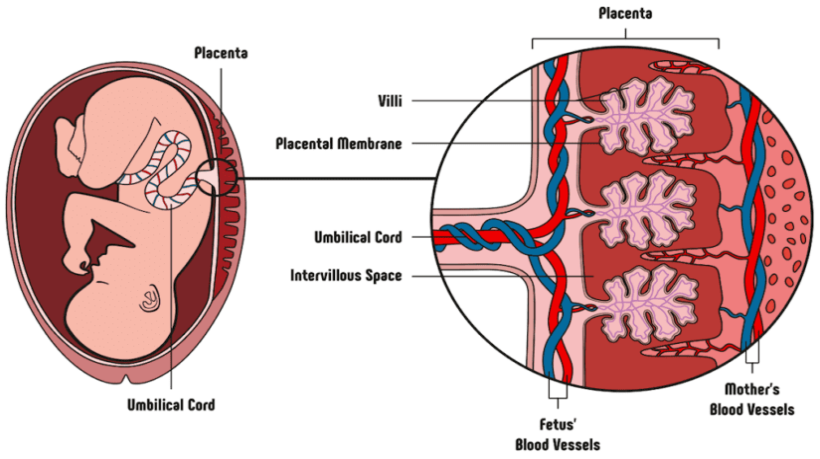

Figure 1. Cross section of placenta. Image: udaix / shutterstock.com

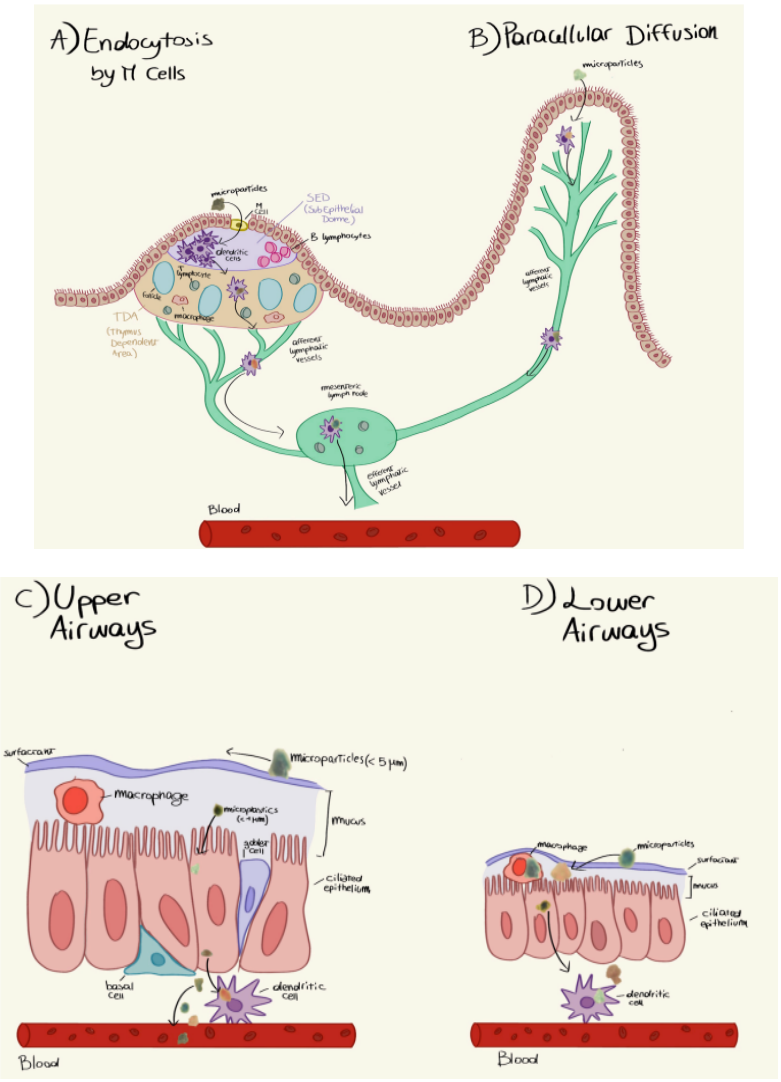

Figure 2. Potential routes by which MPs might be transported from the gastrointestinal and respiratory organs to the placenta (Ragusa et al., 2021)

(A) M cells endocytose at the Peyer's patch level. MPs that have been swallowed with foodstuff can be taken up by endocytosis from the M cells, carried through the epithelium to the subepithelial dome, where they come into contact with dendritic cells, who then transport those through the lymphatic system until they reaches the blood.

(B) In Paracellular Diffusion, from the loose connections, MPs could enter the intestinal lumen. This process might help to explain why some inflammatory conditions that cause loose connections to rise favor intestinal passage. Once the intestinal lumen has been traversed, dendritic cells gather the MPs and transport them through the lymphatic system, then into the systemic circulation.

(C) In the upper airways, because of the mechanical motion of the ciliated epithelium and the involvement of surfactant, fine particles are prevented from dispersing through the epithelium and entering the airflow at the point of the upper respiratory tract, where the mucus is much thicker and allows for efficient clearance of the foreign body particles.

(D) In the lower airways, the mucus layer is thinner in the lower respiratory tract, which helps the diffusion of particles into this area of the respiratory system because of their unique aerodynamic form. Once within, the MPs can move through cellular absorption or diffusion into the general circulation.

WAYS TO REDUCE MICROPLASTIC INTAKE

1. Don’t microwave food in plastic
2. Drink (filtered) tap water
3. Cut out takeaway cups
4. Avoid extra-harmful plastics (Grade 3, 6, 7)
5. Change your laundry routine

6. Make use of plastic- and microbead-free cosmetics.
7. Limit seafood consumption
8. Change from tea bags to loose leaf tea
9. Dust and vacuum regularly

10. support laws that aims to reduce the use of single-use plastics, etc.,

The destiny and effects of microplastics when they are ingested by humans are still debatable and poorly understood. If a distribution of particles in secondary tissues, such as the liver, muscles, and brain is possible, then only microplastics smaller than 20 m should be capable of penetrating organs, that those with a magnitude of about 10 m ought to be able to enter all organs, cross cell membranes then blood-brain barrier, and then into the placenta. The impact of microplastics on human health are not entirely understood, but they could be caused by their physical characteristics like shape, size and length, chemical characteristics like the kind of polymer or additives present, concentration, or microbial biofilm development. Additional research is required to determine whether MPs in the human placenta can impair pregnancy by causing immune responses or the release of hazardous pollutants.

Reference

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