



“Mutability of temper and inconsistency with ourselves is the greatest weakness of human nature.”
seph Addison

CONVEGNO NAZIONALE



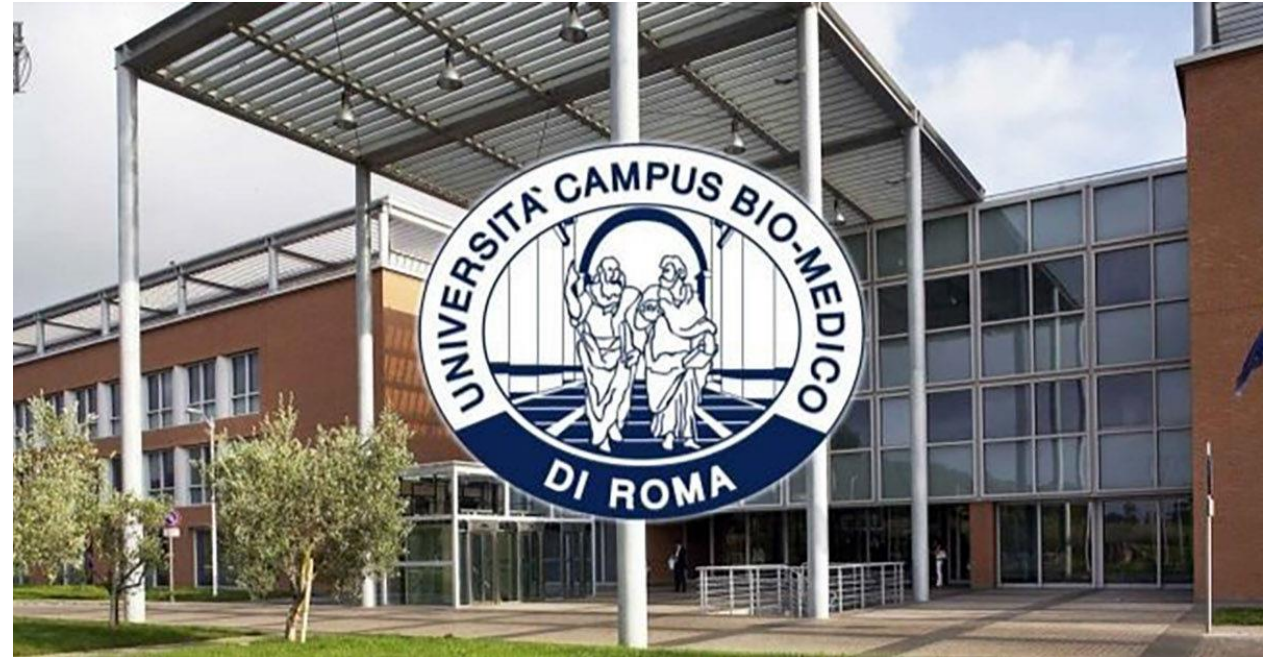
MARE
E
SALUTE

*Comprendere e controllare i nessi
tra oceano globale e salute umana
attraverso la cooperazione scientifica
e la partnership istituzionale*

ROMA, 15 GIUGNO 2023

Istituto Superiore di Sanità
Viale Regina Elena 299, Roma

AULA POCCHIARI



***Mare interno e Mare esterno: Relazione e
Reciprocità.***

Antonio Ragusa

comitato scientifico MAREVIVO, Roma

Mare interno e Mare esterno: Relazione e Reciprocità.

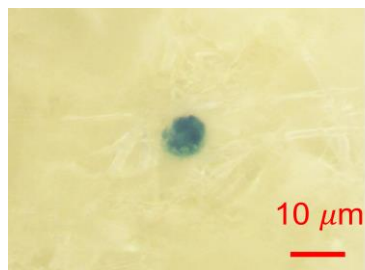
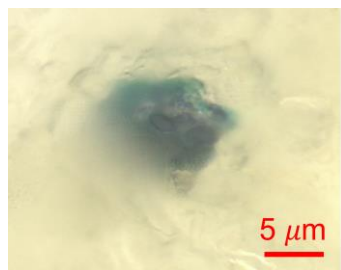




ELSEVIER

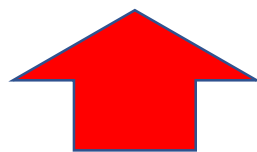
Plasticenta: First evidence of microplastics in human placenta

Antonio Ragusa^a, Alessandro Svelato^{a,*}, Criselda Santacroce^b, Piera Catalano^b,
Valentina Notarstefano^c, Oliana Carnevali^c, Fabrizio Papa^b, Mauro Ciro Antonio Rongioletti^b,
Federico Baiocco^a, Simonetta Draghi^a, Elisabetta D'Amore^a, Denise Rinaldo^d, Maria Matta^e,
Elisabetta Giorgini^c

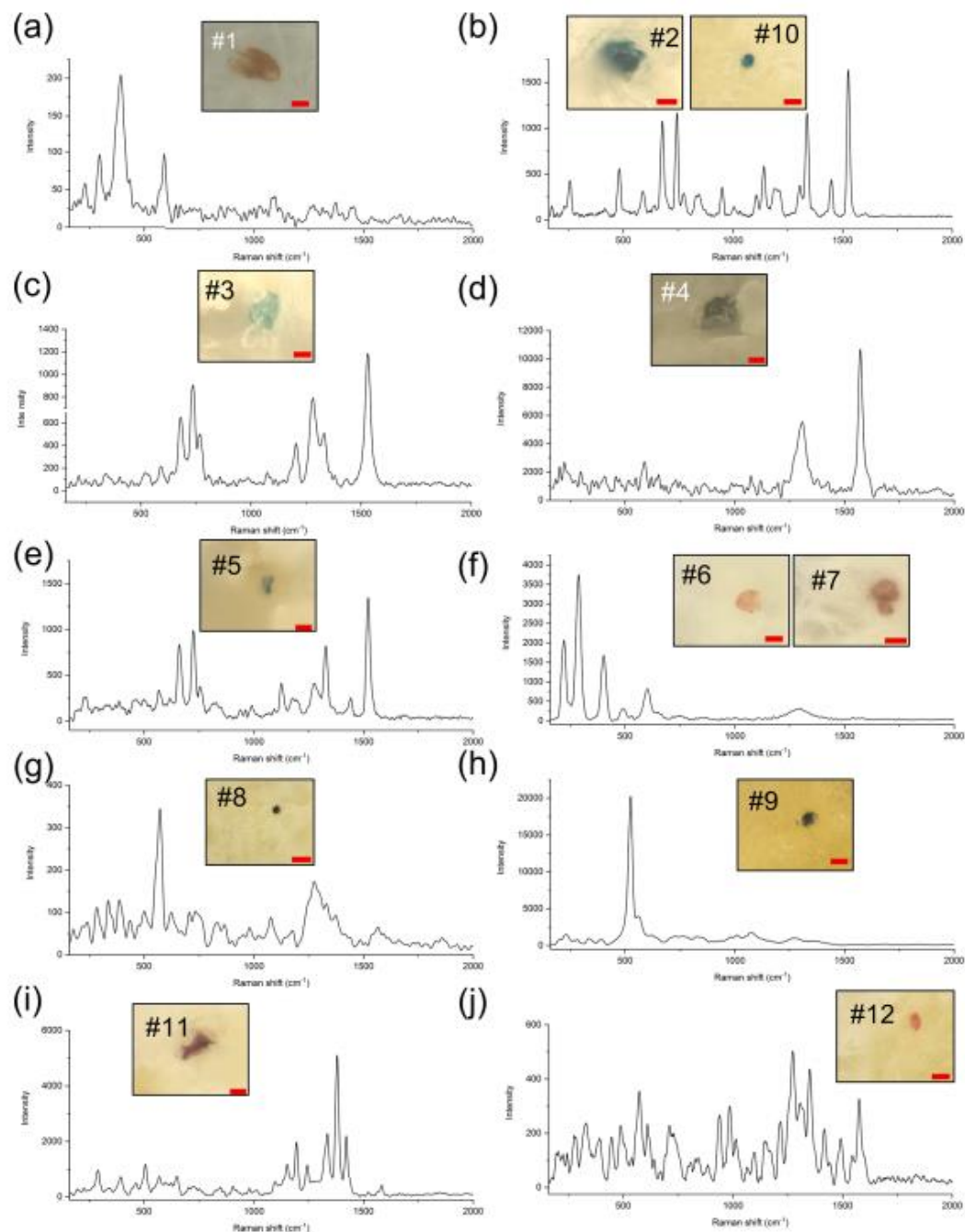


Blue Polypropylene

Copper phthalocyanine (Pigment Blue 15; C.I. Constitution 74160)



Moplen!



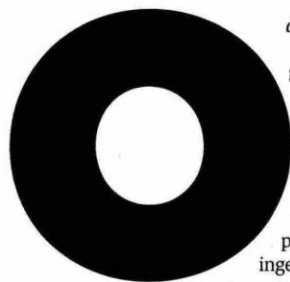
Antonio Ragusa et al. / Environment International 146 (2021) 106274
 Fig. 2. Microphotographs and Raman spectra of the microplastics found in human placenta: (a) Particle #1 (scale bar 5 μm); (b) Particles #2 and #10 (scale bar 5 μm for #2 and 10 μm for #10); (c) Particle #3 (scale bar 5 μm); (d) Particle #4 (scale bar 5 μm); (e) Particle #5 (scale bar 5 μm); (f) Particles #6 and #7 (scale bar 10 μm for #6 and 5 μm for #7); (g) Particle #8 (scale bar 10 μm); (h) Particle #9 (scale bar 10 μm); (i) Particle #11 (scale bar 5 μm), and (j) Particle #12 (scale bar 10 μm).

06-10-2021 56/59 1 / 4

NATI CON LE MICROPLASTICHE

Frammenti di queste sostanze sono state rilevate, in uno studio italiano, persino nella placenta materna. E, in media, ne ingeriamo 90 mila particelle l'anno. Originare dagli alimenti, dalle auto, dai vestiti...

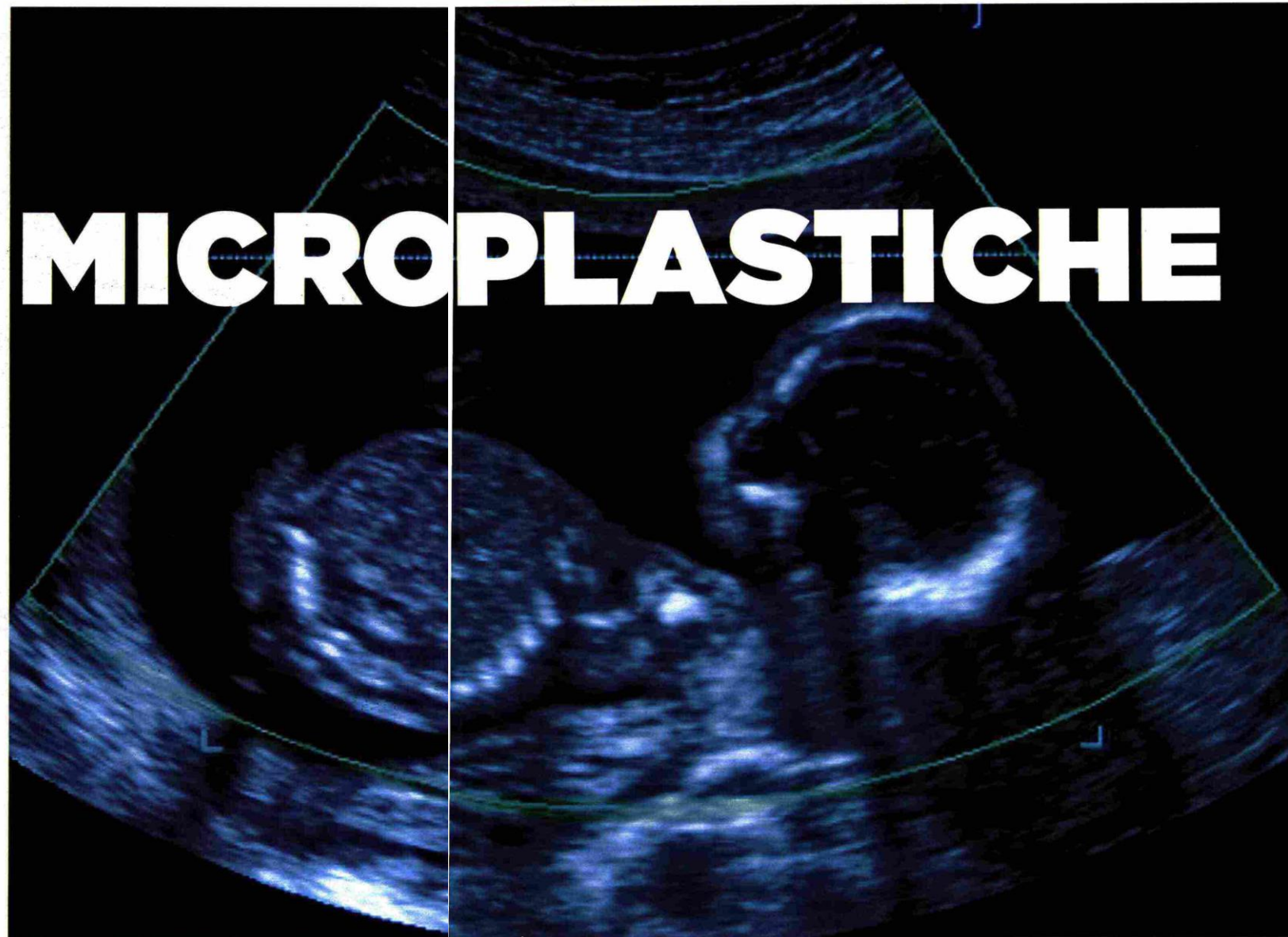
di Vincenzo Caccioppoli



Ogni settimana, ciascun essere umano ingerisce in media 1.769 particelle di microplastica, l'equivalente di 5 grammi, semplicemente bevendo acqua. Facendo un rapido calcolo, significa che ingeriamo, ogni anno, qualcosa come 90 mila microparticelle di plastica nascoste in un bicchiere.

Lo studio che lo sostiene è dell'Università di Sidney, ma non è l'unico. Secondo molte altre indagini, la plastica invisibile è presente nel sale, nel pesce, nei cosmetici, negli abiti, nei contenitori. Una «compagna» fedele della nostra vita quotidiana. Persino prima ancora di venire al mondo. A dirlo, questa volta, sono i ricercatori dell'ospedale Fatebenefratelli di Roma che, per primi al mondo, hanno individuato tracce di microplastica

Il feto assorbe le microparticelle di plastica attraverso la placenta, secondo un'indagine dell'ospedale Fatebenefratelli di Roma.



Antonio Ragusa

Microplastics revealed in the placentas of unborn babies

Health impact is unknown but scientists say particles may cause long-term damage to foetuses

“It is like having a cyborg baby: no longer composed only of human cells, but a mixture of biological and inorganic entities,”

[said](#) Antonio Ragusa, director of obstetrics and gynaecology at the San Giovanni Calibita Fatebenefratelli hospital in Rome



REVIEW ARTICLE

Cyborg Babies: A Bane to Human Beings

Iniyaval R¹, Poongodi V², Renuka K³

ABSTRACT

Microplastics are particles smaller than 5 mm that form as plastic objects in the environment degradation. Microplastics may be transferred from the atmosphere to living animals, such as mammals. Six human placentas were obtained from consenting women with physiological pregnancies and examined using Raman microspectroscopy to see whether microplastics were present. In total, 12 spherical or irregularly shaped microplastic fragments (ranging in size from 5 to 10 mm) were found in four placentas (five on the fetal side, four on the maternal side, and three in the chorioamniotic membranes). The morphology and chemical composition of all microplastic particles were studied. All of them were pigmented; three of them were identified as stained polypropylene, a thermoplastic polymer, while the other nine could only be identified by their pigments. Many of them were used in coatings, oils, adhesives, plasters, finger paints, polymers, cosmetics, and personal care products.

Keywords: Cyborg baby, Plastics, Pregnancy.

Pondicherry Journal of Nursing (2021): 10.5005/jp-journals-10084-13107



Article

Raman Microspectroscopy Detection and Characterisation of Microplastics in Human Breastmilk

Antonio Ragusa ¹, Valentina Notarstefano ^{2,*}, Alessandro Svelato ³, Alessia Belloni ², Giorgia Gioacchini ², Christine Blondeel ³, Emma Zucchelli ³, Caterina De Luca ³, Sara D'Avino ³, Alessandra Gulotta ⁴, Oliana Carnevali ² and Elisabetta Giorgini ²

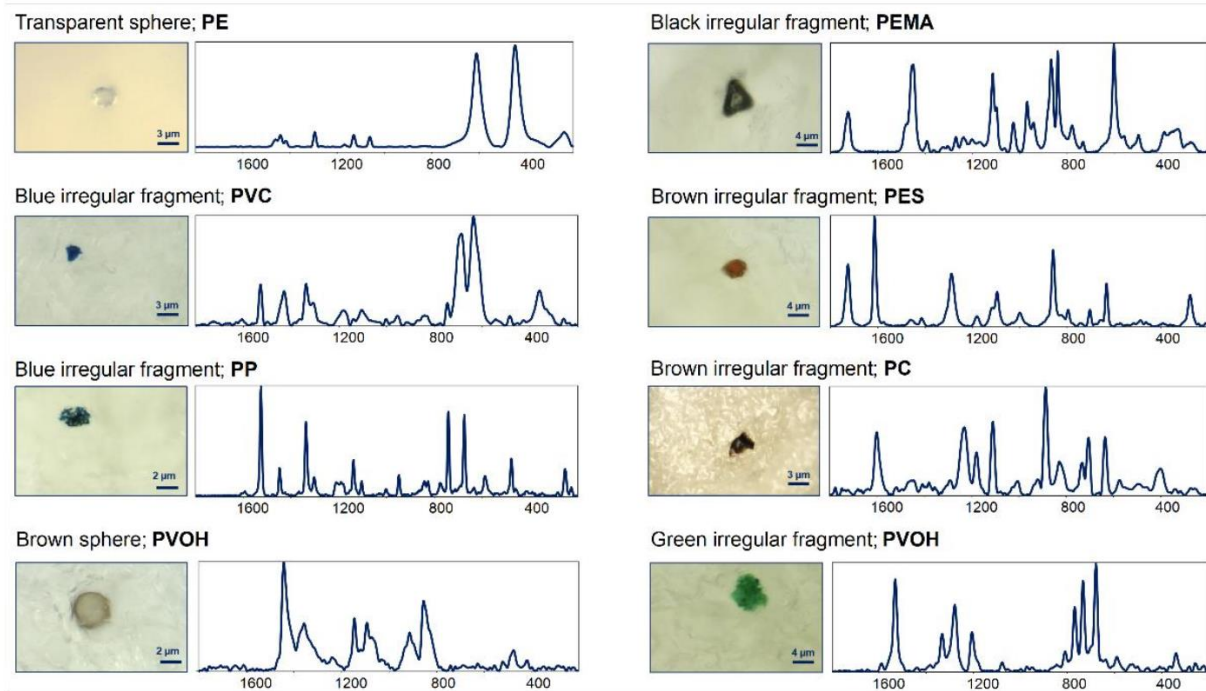


Figure 1. Microphotographs and Raman spectra (wavenumbers, cm^{-1}) of some selected MPs found in the analysed breastmilk samples. PE: polyethylene; PVC: polyvinyl chloride; PP: polypropylene; PVOH: polyvinyl alcohol; PEMA: poly(ethyl methacrylate); PES: polyester, and PC: polycarbonate.

N. 34 women were analysed by Raman Microspectroscopy, and, for the first time, MP contamination was found in 26 out of 34 samples.

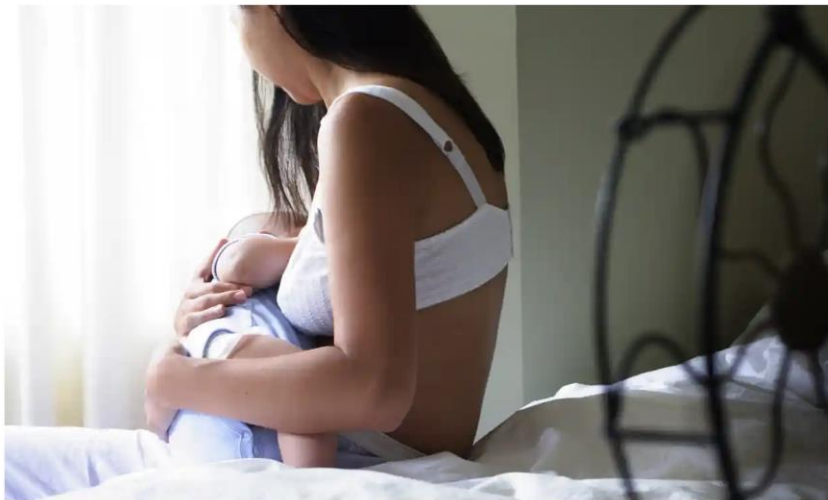
Microplastics found in human breast milk for the first time

Exclusive: Researchers concerned over potential health impacts of chemical contaminants on babies

Damian Carrington
Environment editor

@dpcarrington

Fri 7 Oct 2022 15.00 BST



The breast milk samples were taken from 34 healthy mothers, a week after giving birth. Photograph: michellegibson/Getty Images

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08/10/2022

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The breast milk samples were taken from healthy mothers a week after they gave birth; 75% of them contained microplastics. PHOTOGRAPH: DAVID OXBERRY/GETTY

Microplastics found in human breast milk for the first time

Damian Carrington
Environment editor

Microplastics have been detected in human breast milk for the first time, with researchers concerned over the potential health impacts on babies.

Infants are especially vulnerable to chemical contaminants and the scientists said further research was urgently needed. But they stressed that breastfeeding remains by far the best way to feed a baby.

The breast milk samples were taken from 34 healthy mothers in Rome a week after giving birth. Microplastics were detected in 75% of them. Previous research has shown the toxic effects of microplastics in human cell lines, lab animals and marine wildlife but the impact on living humans remains unknown. Plastics often contain harmful chemicals, such as

phthalates, which have been found in breast milk before.

The scientists recorded the mothers' consumption of food and drink in plastic packaging and of seafood, as well as the use of plastic-containing personal hygiene products. But they found no correlation with the presence of microplastics. This suggests the ubiquitous presence of microplastics in the environment "makes human exposure inevitable", the researchers said, although larger studies in future might identify particular risk factors.

The Italian team identified microplastics in human placentas in 2020. "So the proof of microplastics' presence in breast milk increases our great concern for the extremely vulnerable population of infants," said Dr Valentina Notarstefano, at the Università Politecnica delle Marche, in Ancona, Italy.

Human exposure to microplastics is now inevitable

Valentina Notarstefano
Researcher

"It will be crucial to assess ways to reduce exposure to these contaminants during pregnancy and lactation," she said. "But it must be stressed that the advantages of breastfeeding are much greater than the disadvantages caused by the presence of polluting microplastics. Studies like ours must not reduce breastfeeding of children, but instead raise public awareness to pressure politicians to promote laws that reduce pollution."

Recent research also found that

bottle-fed babies are likely to be swallowing millions of microplastic particles a day and that cow's milk can contain microplastics.

Huge amounts of plastic waste are dumped into the environment. Microplastics contaminate the entire planet, from the summit of Mount Everest to the deepest oceans. People consume the tiny particles via food and water, and by breathing them in. They have been found in the faeces of babies and adults.

The breast milk research, published in the journal *Polymers*, found microplastics composed of polyethylene, PVC and polypropylene, which are all found in packaging. The breast milk samples were collected, stored and analysed without the use of plastics and control samples were also processed to rule out contamination.

While specific microplastic risk factors were not identified in this small study, Notarstefano said: "We would like to advise pregnant women to pay greater attention to avoiding food and drink packaged in plastic, cosmetics and toothpastes containing microplastics, and clothes made of synthetic fabrics."

Microplastics were revealed to be present in human blood in March by a team led by Prof Dick Vethaak, at Vrije Universiteit Amsterdam in the Netherlands. He said: "The new study provides preliminary evidence that microplastics are present in human breast milk (but) more studies with a higher number of samples, and preferably using other methods, are urgently needed to confirm it. We are hard at work collecting this data."

"We see only the tip of the iceberg with microplastics. Smaller nano-sized plastics are likely to be more prevalent and toxic. However, it is currently impossible to analyse nano-plastics in complex matrices such as breastmilk."

"There is no knowledge about the possible impact of microplastics and related contaminants on the suckling infant. Therefore, there is an urgent need for more studies because early life stages, newborns, and young children seem more susceptible to chemical and particle exposure. This should be a health research priority."

No Prince of Wales: Welsh council votes to get rid of William's title

Steven Morris

A Welsh council has officially called



Gwynedd council in north Wales



One of the councillors, Elfed Wyn

The Prince and Princess of Wales shaking it up this week on a visit to Northern Ireland

The actor Michael Sheen is among those who has criticised the King for making his first visit to Wales on Owain Glyndŵr Day last month, a celebration of the last Welshman to be known as Prince of Wales. He said: "If it's chosen deliberately, then I'm sure many will feel that is quite an insult to those that celebrate Owain Glyndŵr, who tried to free this nation from the oppression of the English monarch."

Tories in Wales attacked the council's stance. Sam Rowlands, the shadow minister for local government in the Senedd, said: "It's disappointing that Gwynedd council

Microplastiche

GIOVANNI BALZARANI

Watercolours

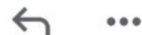


Congrats! In arrivo ☆



Rory Fielding 15 dic 2022

a me ▾



Dr. Ragusa,

It was amazing to hear your study brought up in US Senate hearing this morning. Congrats!

Rory



<https://youtu.be/l4l-akkLgew>



EPW Subcommittee Hearing on Plastic Waste Solutions

Article

Deeply in Placenta: Presence of Microplastics in the Intracellular Compartment of Human Placentas

Antonio Ragusa ¹, Maria Matta ², Loredana Cristiano ^{3,*}, Roberto Matassa ⁴, Ezio Battaglione ⁴, Alessandro Svelato ⁵, Caterina De Luca ⁵, Sara D'Avino ⁵, Alessandra Gulotta ⁵, Mauro Ciro Antonio Rongioletti ⁶, Piera Catalano ⁶, Criselda Santacroce ⁶, Valentina Notarstefano ⁷, Oliana Carnevali ⁷, Elisabetta Giorgini ⁷, Enrico Vizza ⁸, Giuseppe Familiari ⁴ and Stefania Annarita Nottola ⁴

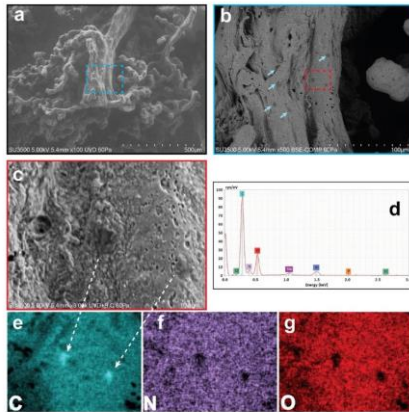


Figure 1. Surface morpho-chemical study of MPs on stem villus in hydrated human placenta (VP-SEM-JEDS). (a) Stem villus with intermediate and terminal villous ramifications. (b) MPs deposited on magnified stem villus (blue arrowheads). (c) Two MPs on magnified region (red dotted square) and (d) corresponding EDS spectral image with (e-g) multi-elemental mapping images below (C, carbon; N, nitrogen; O, oxygen).

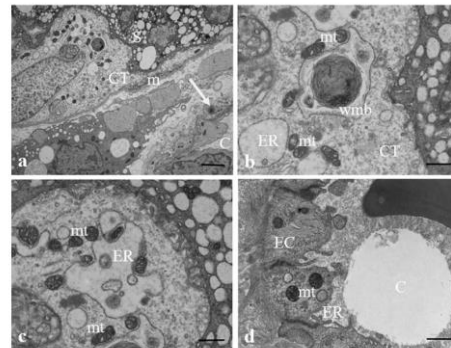


Figure 6. Ultrastructural changes of organelles in the cytotrophoblast cells. (a–c) Micrographs of the cytotrophoblast layer (CT) in which it is possible to observe in the cytoplasm of the cell dilated vesicles of ER, numerous electrodense swollen mitochondria (mt) and whorled membranous bodies (wmb) derived from involuting ER and other structures. (d) Changes in the structure of ER and mitochondria occur also in endothelial cells (ECs) surrounding the fetal capillaries (C). MP (arrow) in a pericyte is seen (a). Bar, 2 μ m (a) and 800 nm (b–d).

Figure 7 highlights the presence of a MP (b, c) inside the endothelial cell in combination with the narrowing of a fetal capillary. The nucleus of the endothelial cell appears enlarged, compressing the adjacent vessel.

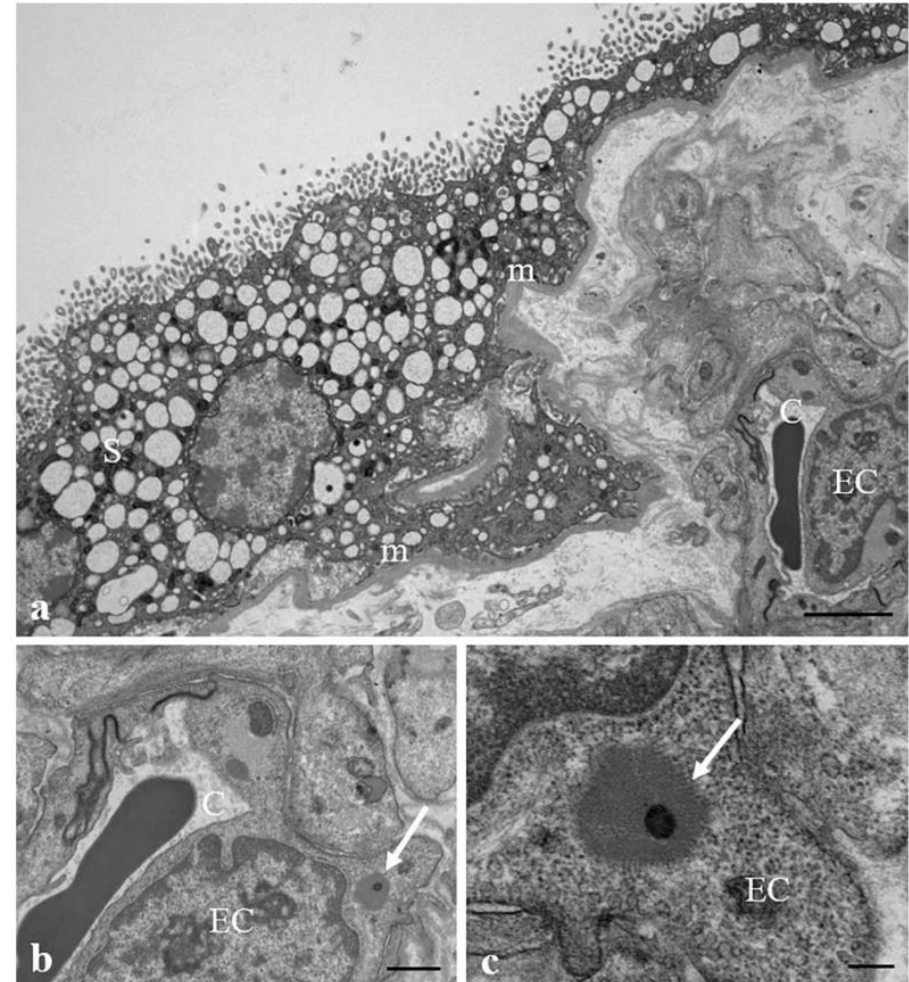


Figure 7. MPs and narrowing of the fetal capillaries. (a,b) Transmission electron micrographs of a narrowing of the fetal micro-vessel (C) in association with (b,c) the presence of a MP (arrow) inside the cytoplasm of an endothelial cell (EC). Bar, 2 μ m (a), 800 nm (b), 200 nm (c).

Article

Deeply in Placententa: Presence of Microplastics in the Intracellular Compartment of Human Placentas

Antonio Ragusa ¹, Maria Matta ², Loredana Cristiano ^{3,*}, Roberto Matassa ⁴, Ezio Battaglione ⁴, Alessandro Svelato ⁵, Caterina De Luca ⁵, Sara D'Avino ⁵, Alessandra Gulotta ⁵, Mauro Ciro Antonio Rongioletti ⁶, Piera Catalano ⁶, Criselda Santacroce ⁶, Valentina Notarstefano ⁷, Oliana Carnevali ⁷, Elisabetta Giorgini ⁷, Enrico Vizza ⁸, Giuseppe Familiari ⁴ and Stefania Annarita Nottola ⁴

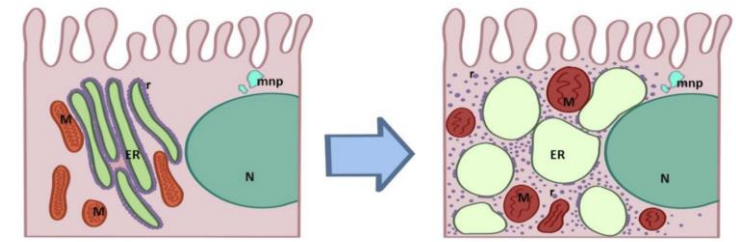


Figure 3: Schematic illustration of the syncytiotrophoblast in section, depicting normal physiological morphology of organelles on the left, and organelles degeneration on the right, due to severe stress. The stress of the endoplasmic reticulum and mitochondria are thought to cause swelling of both ER and mitochondria as well as ribosomal dispersion in the cytoplasm. Stress could be a consequence of non-degradable micro/nanoplastic contamination, causing perpetual activation of CDR response, degeneration of organelles, and eventually inhibition of their function in cellular metabolism. ER= endoplasmic reticulum, M= mitochondria, N= nucleus, mnp= micro-nano-plastic, r= ribosomes.

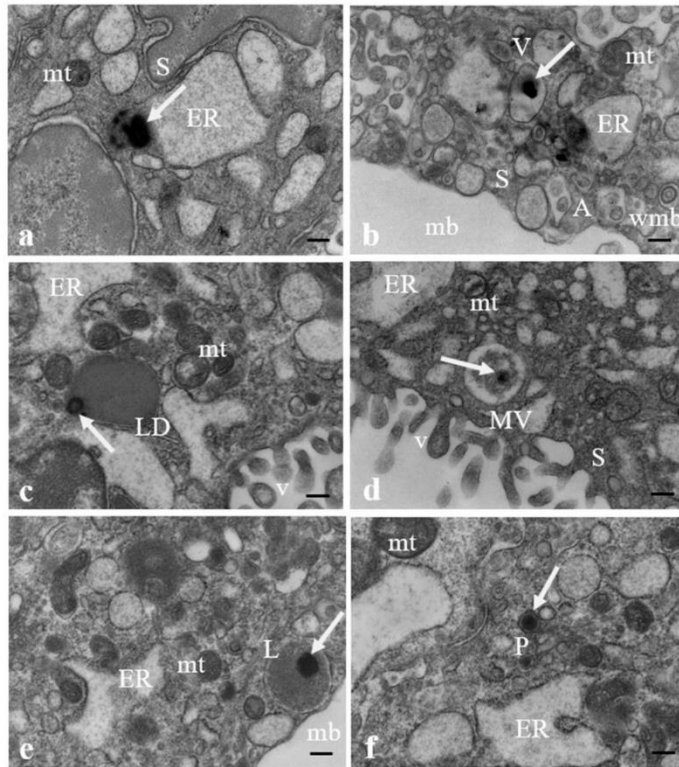


Figure 3. MPs in human placenta. (a) MPs (arrows) are found inside the syncytiotrophoblast (S), free in the cytoplasm and localized in a structure resembling (b) a vacuole (V), (c) a lipid droplet (LD), (d) a multivesicular body (MV), (e) a lysosome (L), (f) a peroxisome (P). In all images endoplasmic reticulum (ER) appears dilated. Swollen mitochondria (mt), whorled membranous bodies (wmb) and autolysosomes (A), particularly evident in (b), containing mitochondria, mitochondrial remnants and other structures also occur. maternal blood (mb); microvilli (v). Bar = 200 nm.

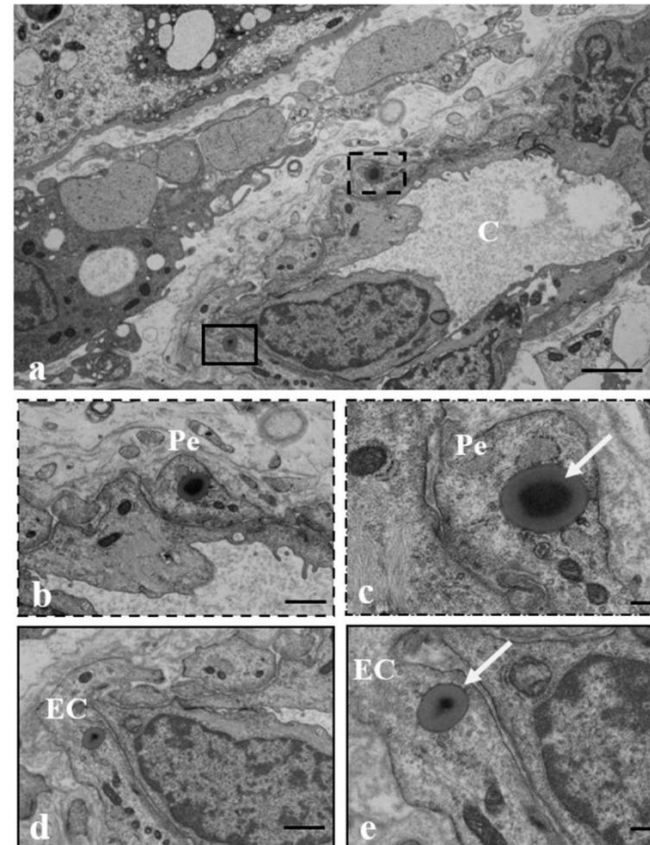


Figure 4. MPs in the fetal microvessels of human placenta. (a) Micrographs of a fetal microvessel (C) in which MPs (arrows) are (b,c) encapsulated in the cytoplasm of both the pericyte (Pe) lining the outer surface of endothelial cells (ECs) surrounding the sinusoid and (d,e) the ECs. Bar: um (a): Bar = 1um (b,d): Bar = 200 nm (c,e).

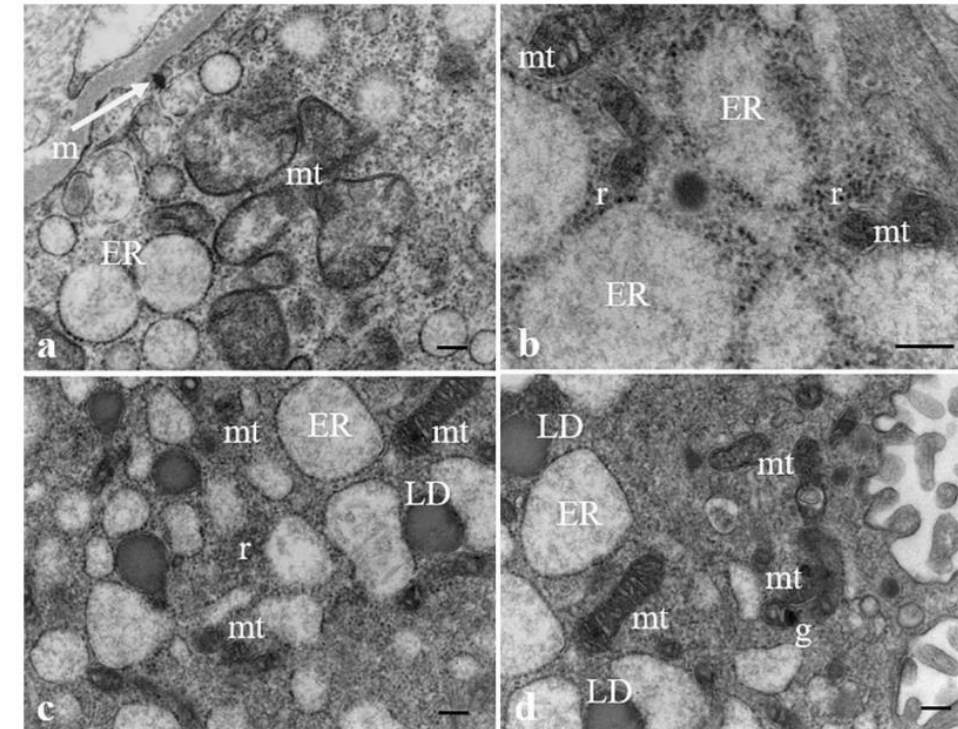


Figure 5. Ultrastructural changes of organelles in the syncytiotrophoblast layer. (a) A MP (arrow) is present close to basement membrane. The endoplasmic reticulum (ER) appears dilated, with sparse ribosomes on the outer surface. (b) Ribosomes (r) result free in the cytoplasm and (a,b) swollen mitochondria (mt) next to (c,d) smaller, pycnotic and electrodense mitochondria are evident in the cytoplasm. (d) Mitochondrial matrix contains prominent electron-dense granules (g). Lipid droplets (LD) close to ER dilatated vesicles are also present (c,d). Bar, 200 nm.



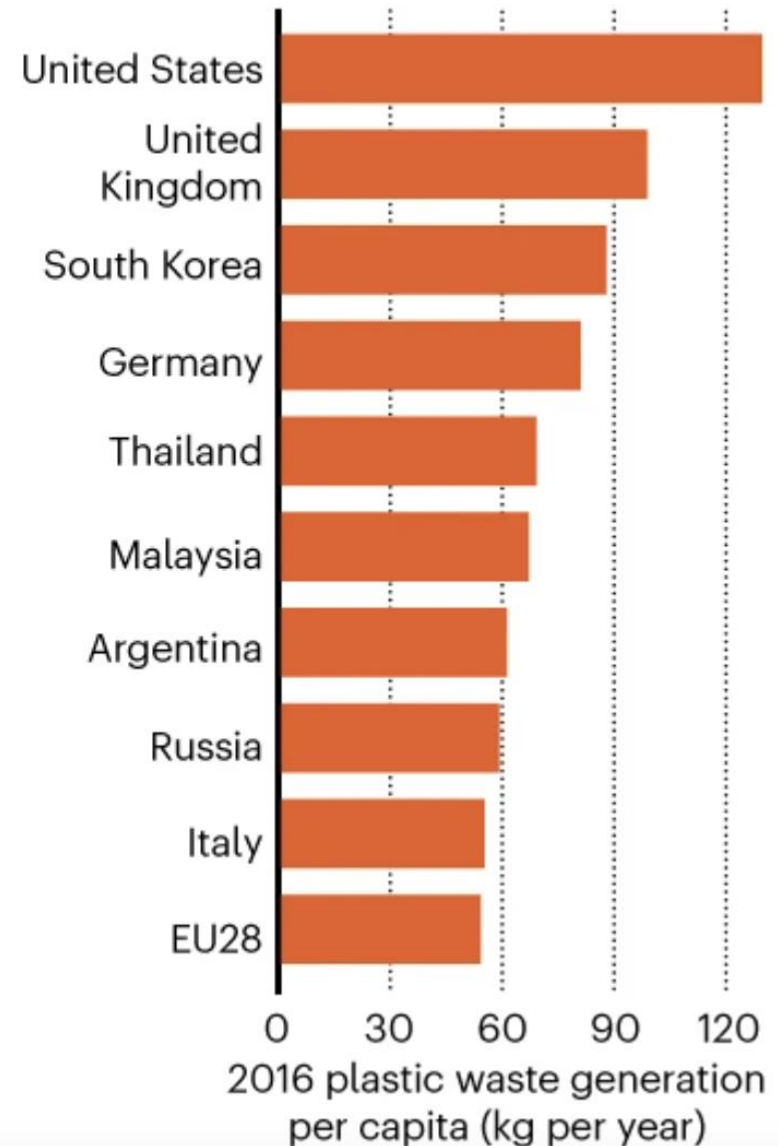
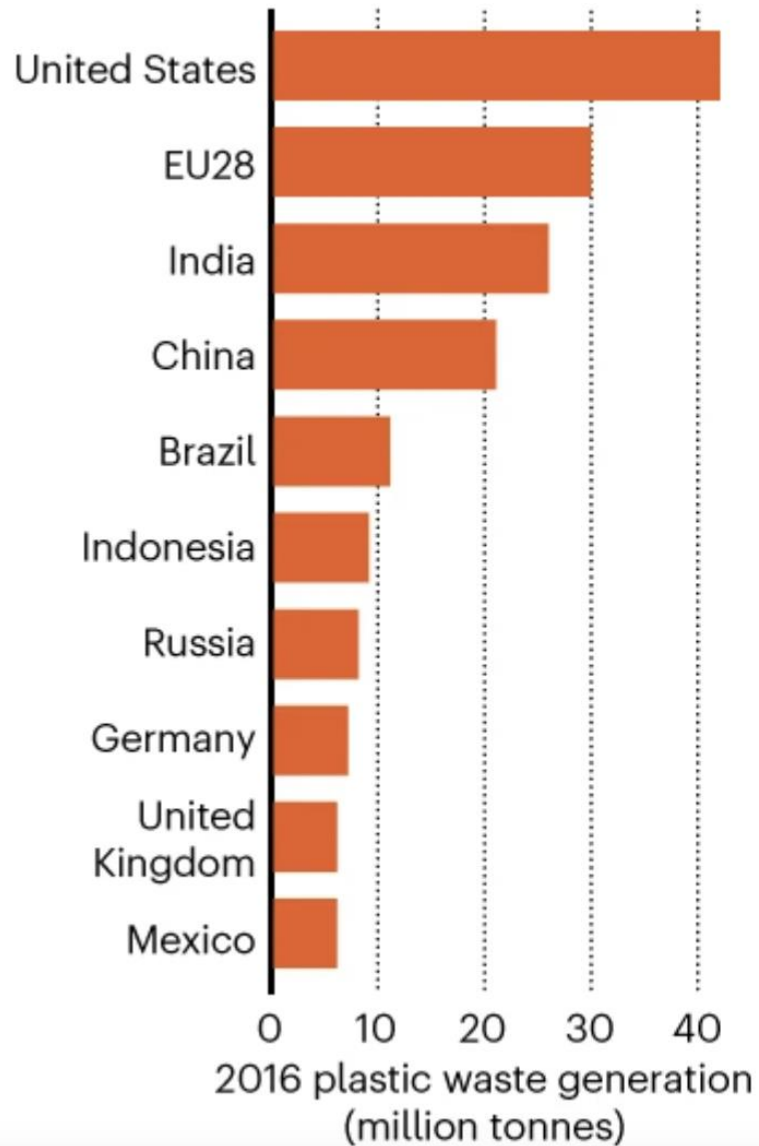
CAN NATIONS REIN IN PLASTICS POLLUTION?

As countries negotiate a plastics treaty, researchers warn that a lack of information will make any agreement hard to enforce. **By Meera Subramanian**

650 | Nature | Vol 611 | 24 November 2022

TOPS IN TRASH

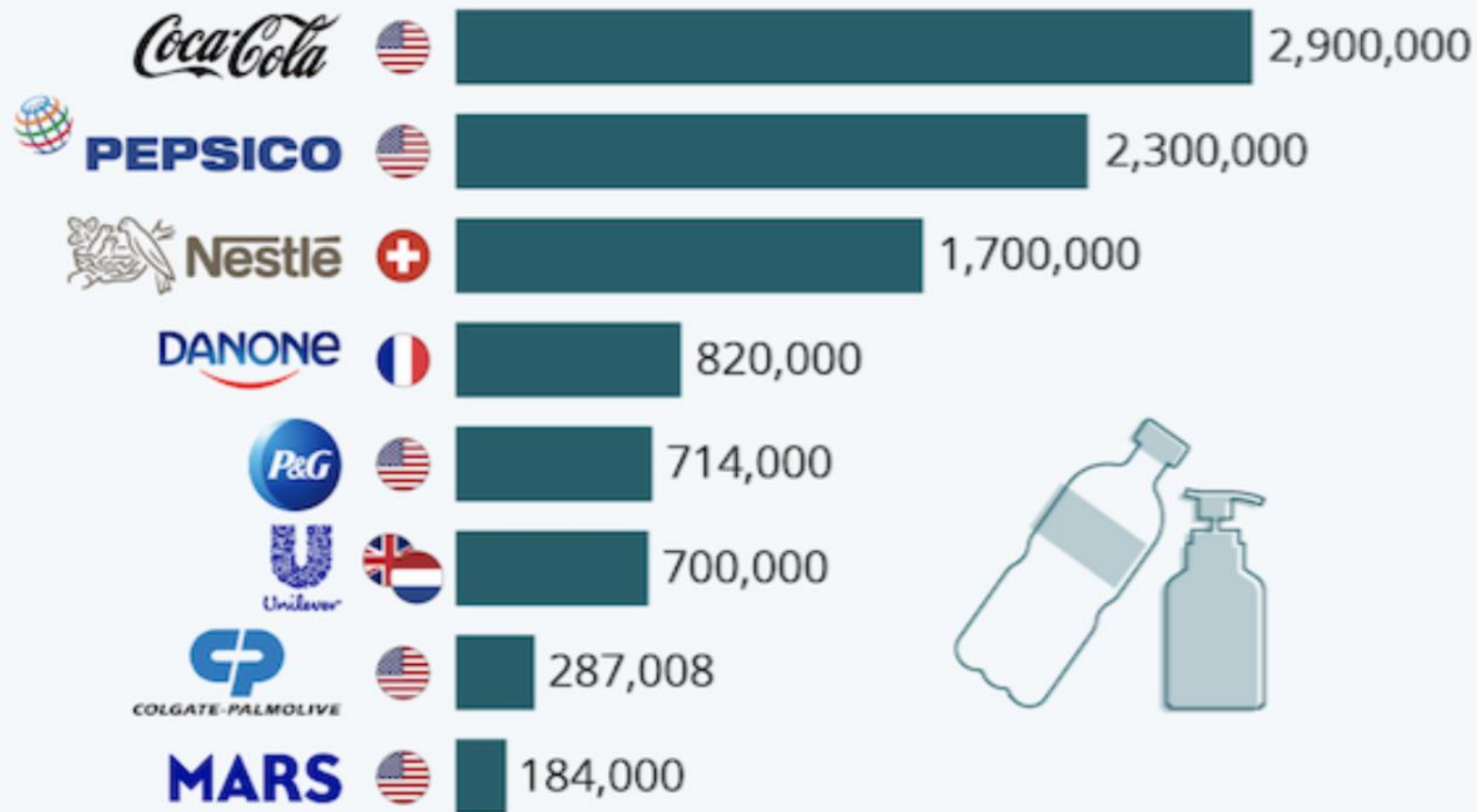
The United States generates more plastic waste overall and the highest per capita amount among all nations.



55% of the world's plastic waste comes from just 20 companies
By [Sabrina Fearon Melville](#) • 19/05/2021

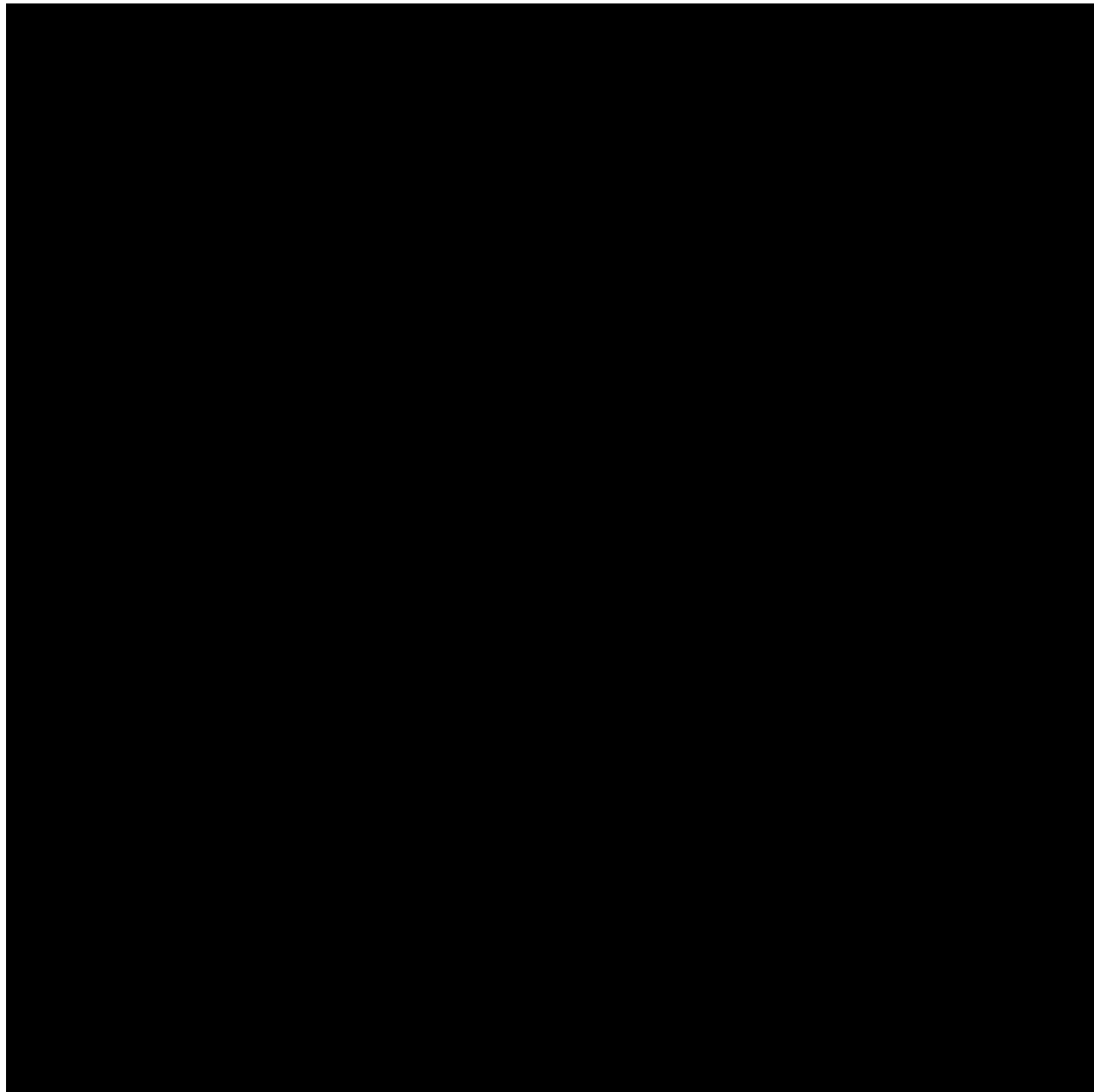
The World's Worst Offenders For Plastic Pollution

Metric tonnes of plastic packaging produced annually



* As of 2020. Based on companies that have disclosed their packaging figures.

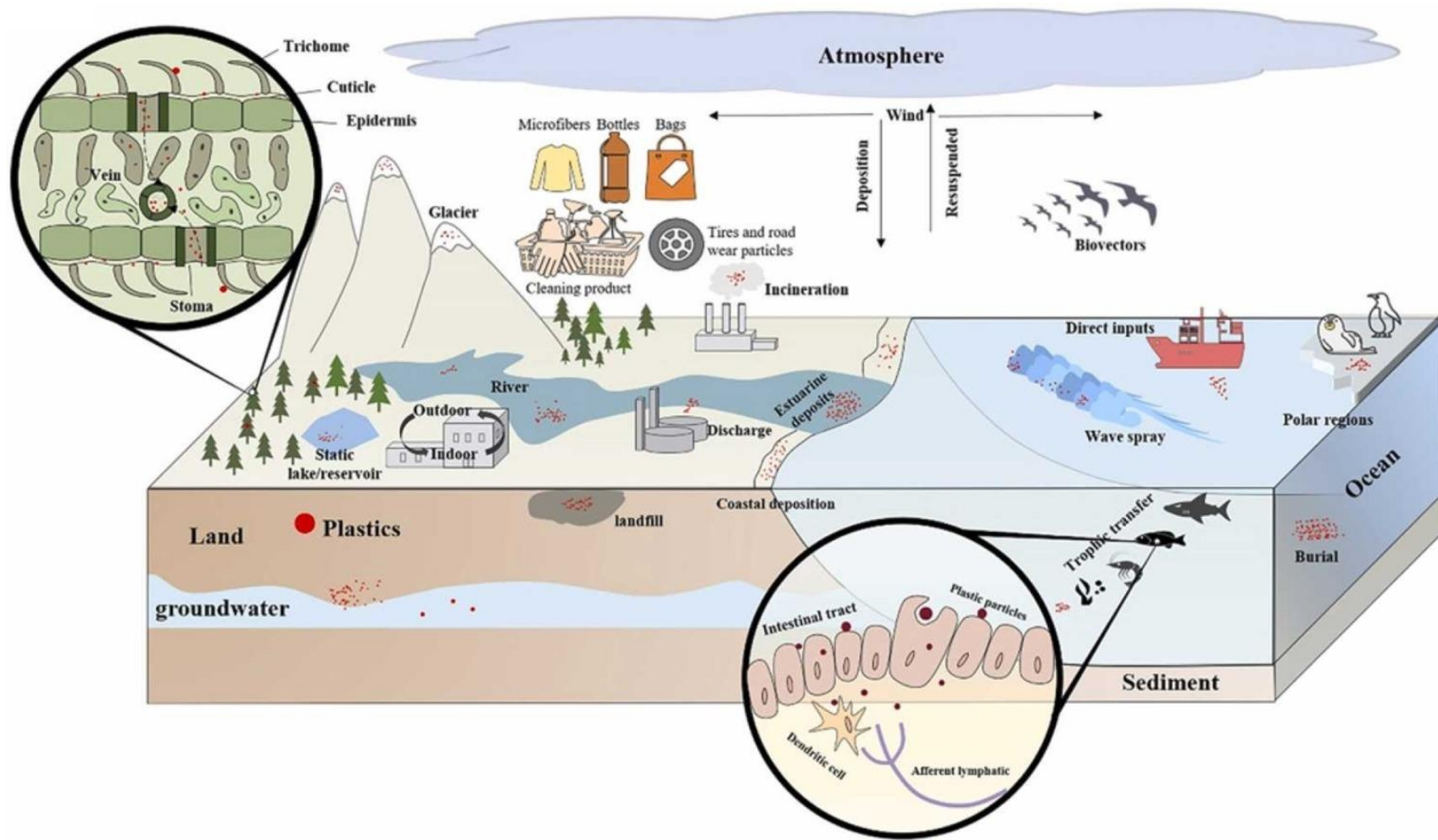
Source: Changing Markets Foundation Antonio Ragusa

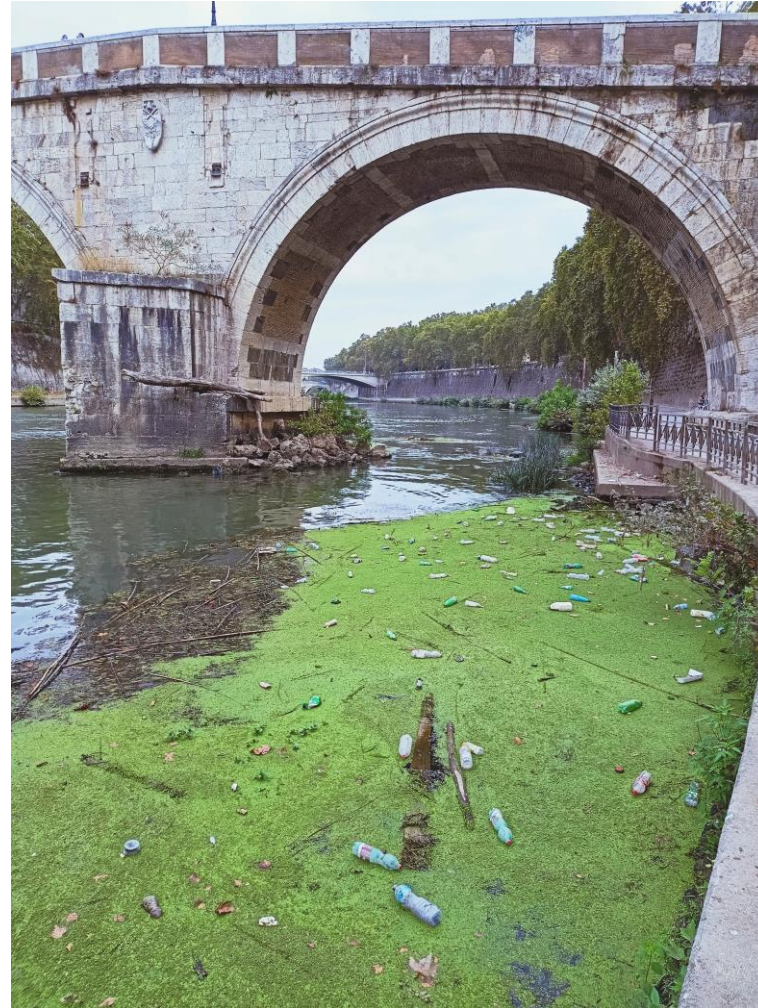


Review

Recent advances on the transport of microplastics/nanoplastics in abiotic and biotic compartments

Danlian Huang ^{a, b}, Haojie Chen ^{a, b}, Maocai Shen ^{a, b}, Jiayi Tao ^{a, b}, Sha Chen ^{a, b}, Lingshi Yin ^{a, b}, Wei Zhou ^{a, b}, Xinya Wang ^{a, b}, Ruihao Xiao ^{a, b}, Ruijin Li ^{a, b}

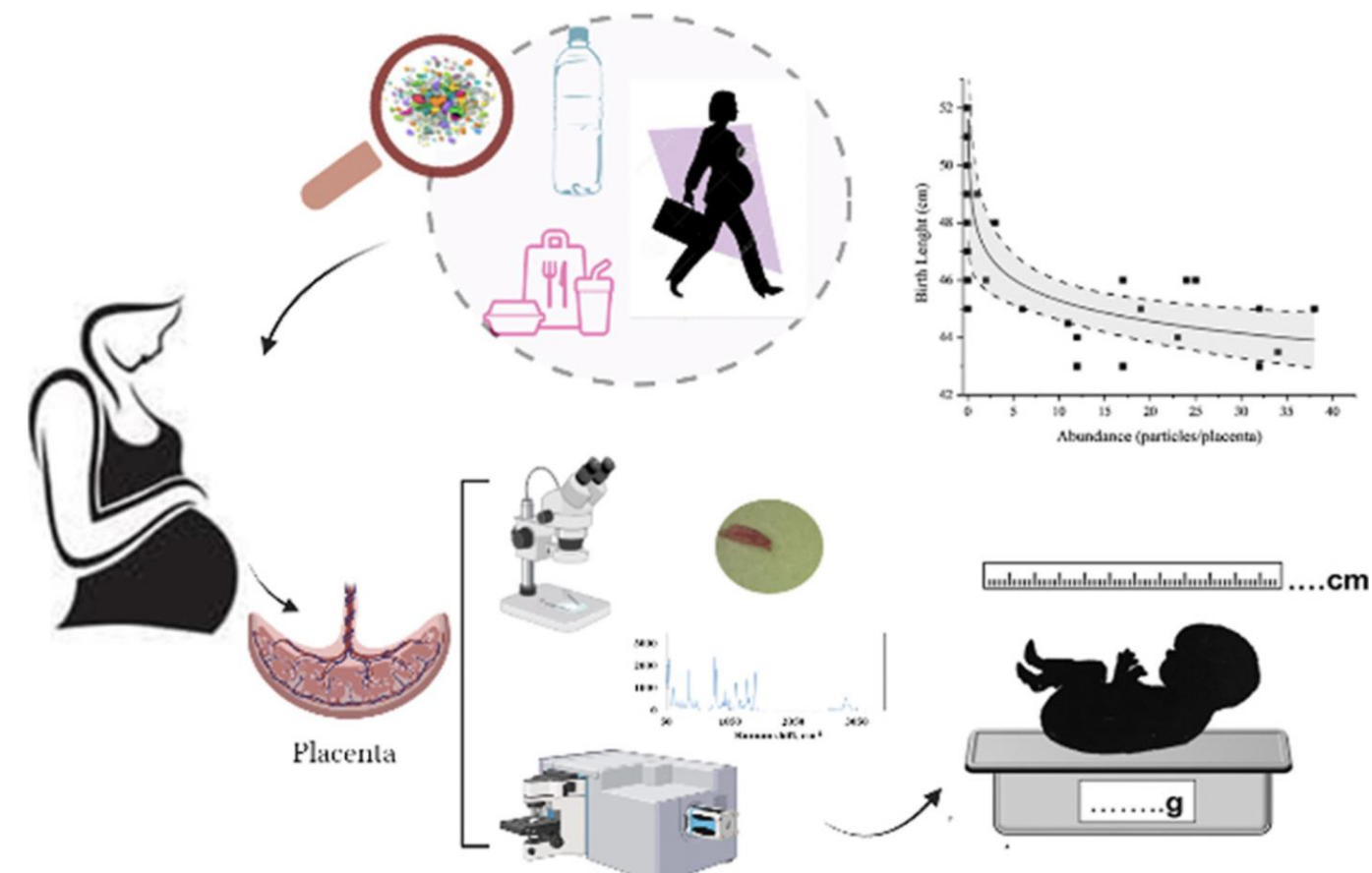




Placental plastics in young women from general population correlate with reduced foetal growth in IUGR pregnancies ☆

Fatemeh Amereh ^a, Nooshin Amjadi ^b, Anoushiravan Mohseni-Bandpei ^{a, c}, Siavash Isazadeh ^d, Yadollah Mehrabi ^e, Akbar Eslami ^{a, f}, Zahra Naeiji ^g, Mohammad Rafiee ^{a, c} ✉

in terms of birth weight, length, head circumference, and 1-min Apgar score





* Department of Obstetrics and Gynecology, Campus Bio-Medico University Hospital Foundation Rome, Italy.
°Department of Obstetrics and Gynaecology, University of Messina, Messina, Italy. ^Harvey Medical and Surgery Course, University of Pavia, Corso Strada Nuova 65, 27100 Pavia, Italy

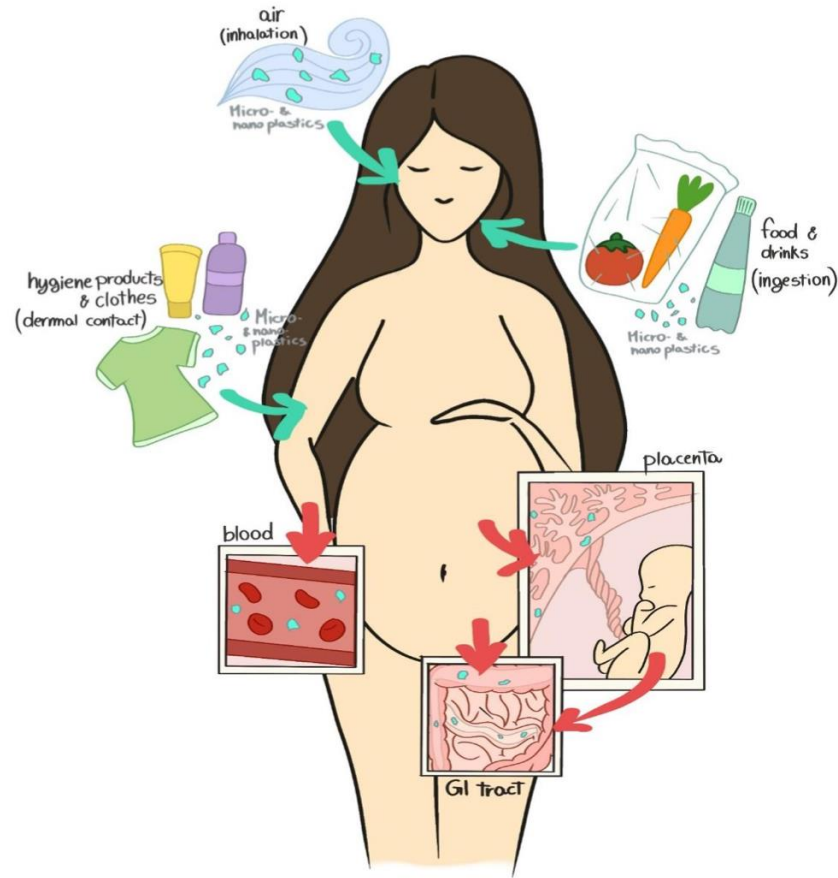
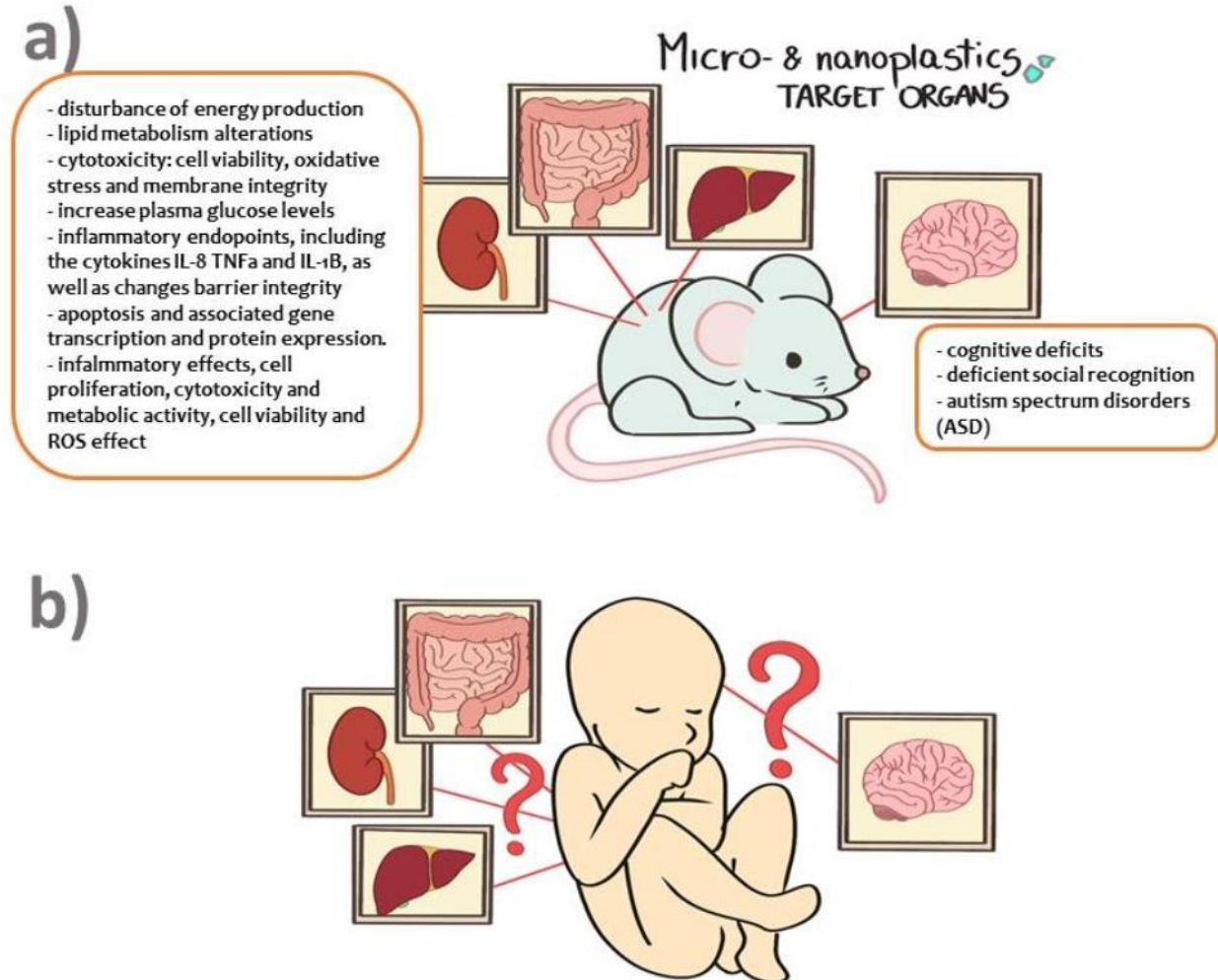


Figure 1: Schematic representation of micro- and nanoplastic contamination by inhalation from air pollution, ingestion from food and drinks, particularly those in plastic wrapping or containers, and dermal contact from daily hygiene products and clothes. Consequent findings of MP in blood, inside the placenta, and in the gastrointestinal tract of the pregnant mother and fetus are also illustrated.



Microplastic in environment



Diet



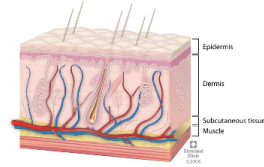
Gastrointestinal tract



Air



Lung



Skin

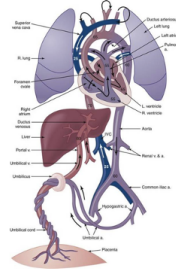


blood

M cells of the Peyer's patches

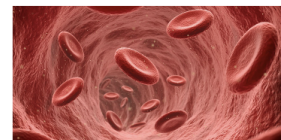


Lymph node

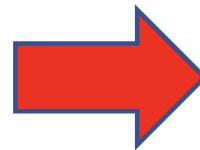


Systemic circulation

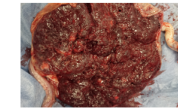
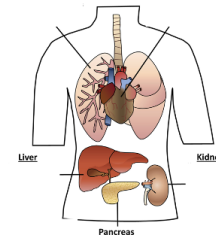
Macrophage and dendritic cell



Blood

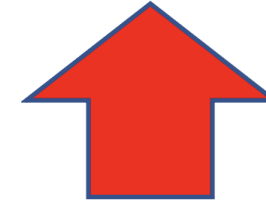


parenchymal organs

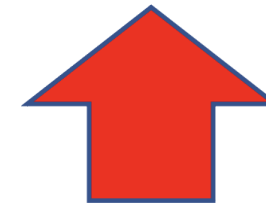


Placenta

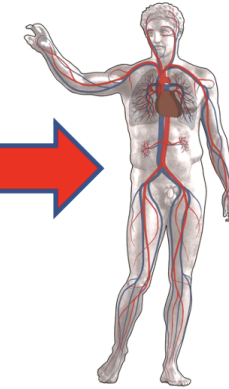
Epigenetic changes



Change in the transcription of neurological and vascular genes and energy metabolism pathways



Phenotypic changes



Hypothetical harmful cycle of microplastics: from the environment to man / woman through the blood and parenchymatous organs



Viewpoint

The Plasticene: Time and rocks

Nelson Rangel-Buitrago^{a,*}, William Neal^b, Allan Williams^c^a Programas de Física y Biología, Facultad de Ciencias Básicas, Universidad del Atlántico, Barranquilla, Atlántico, Colombia^b Department of Geology, Grand Valley State University, The Seymour K. & Esther R. Padnos Hall of Science 213A, Allendale, MI, USA^c Faculty of Architecture, Computing and Engineering, University of Wales Trinity Saint David (Swansea), SA1 6ED Mount Pleasant, Swansea, Wales, United Kingdom

V. Rangel-Buitrago et al.

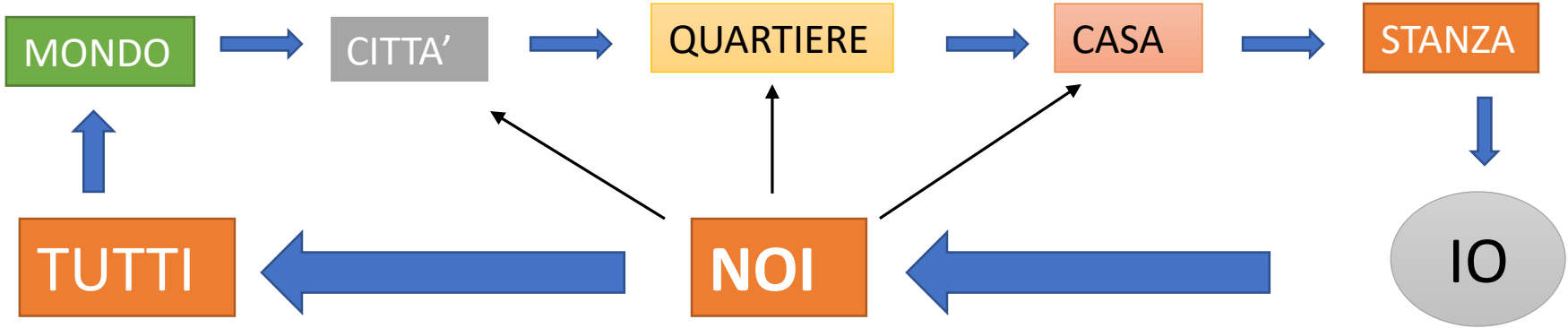
Marine Pollution Bulletin 185 (2022) 114358



Fig. 4. Examples of the new formations typical of the Plasticene. Left: example of an Anthrosols: a combination of litter items such as glass, plastics, rubber pencil (serves as scale). Centre: example of a Detriplastic rock combining plastics in all sizes and shapes with solid particles. In this case, the rock in the picture corresponds to a Plastiglomerate. Right: example of a Pyroplastics, an amorphous matrix composed of angular to weathered-rounded clasts generated from burning plastics.



IL MONDO COMINCIA DALLA MIA STANZA



vigilia di natale del 1968.

...Anders: “Era la cosa più bella che avessi mai visto. Totalmente inaspettata. Eravamo stati addestrati per andare sulla luna, non per andare sulla luna e guardare la terra. Non ci avevo mai nemmeno pensato! Mi resi conto che... l’aspetto più interessante di questo volo era la terra vista dalla luna”.



Conosciuta con il nome Earthrise, “il sorgere della Terra” fu la prima foto del nostro pianeta scattata da persone in carne ed ossa in orbita intorno alla Luna. L’immagine è stata catturata dall’astronauta dell’Apollo 8 Bill Anders il 24 dicembre 1968, a bordo del primo veicolo spaziale che volò intorno al nostro satellite.

La visione dell’astronauta



Editorial

Environment and Pregnancy

Antonio Ragusa^{1,*}

La miseria non coincide con la povertà; la miseria è la povertà senza fiducia, senza solidarietà, senza speranza.

(Papa Francesco)

When the poorest people of the population are pregnant women, the problems are amplified and are transmitted between one generation and the next...

THE NEW COAL

PLASTICS &
CLIMATE CHANGE

Beyond Plastics | October 2021

Questo rapporto documenta lo sbalorditivo contributo del settore della plastica alle emissioni di gas serra negli Stati Uniti, che ora è pronto a superare quello delle centrali elettriche a carbone. La plastica è il nuovo carbone.

PLASTICS IS THE FOSSIL FUEL INDUSTRY'S PLAN B. BUT THERE IS NO PLAN B FOR THE REST OF US.

FOREWORD BY JUDITH ENCK

Plastic production is the last gasp of the fossil fuel industry.

when climate change policies are debated at a state, federal or international level. If we hope to remain within the 1.5 degree C temperature rise scientists agree is necessary to avoid the worst ravages of climate change



Review

Pregnancy in the Era of the Environmental Crisis: Plastic and Pollution

Antonio Ragusa¹, Giulia Principi^{2,*}, Maria Matta³

Furthermore, unexpectedly and in the absence of any moral scruple, the large companies, which had recorded a reduction in the sales of fossil fuels, changed their production, producing more and more virgin plastic

Plastic, microplastic, and the inconsistency of human thought

TYPE Opinion
PUBLISHED 05 June 2023
DOI 10.3389/fpubh.2023.1145240

Antonio Ragusa¹, Caterina De Luca^{2*}, Emma Zucchelli³,
Denise Rinaldo⁴ and Alessandro Svelato²

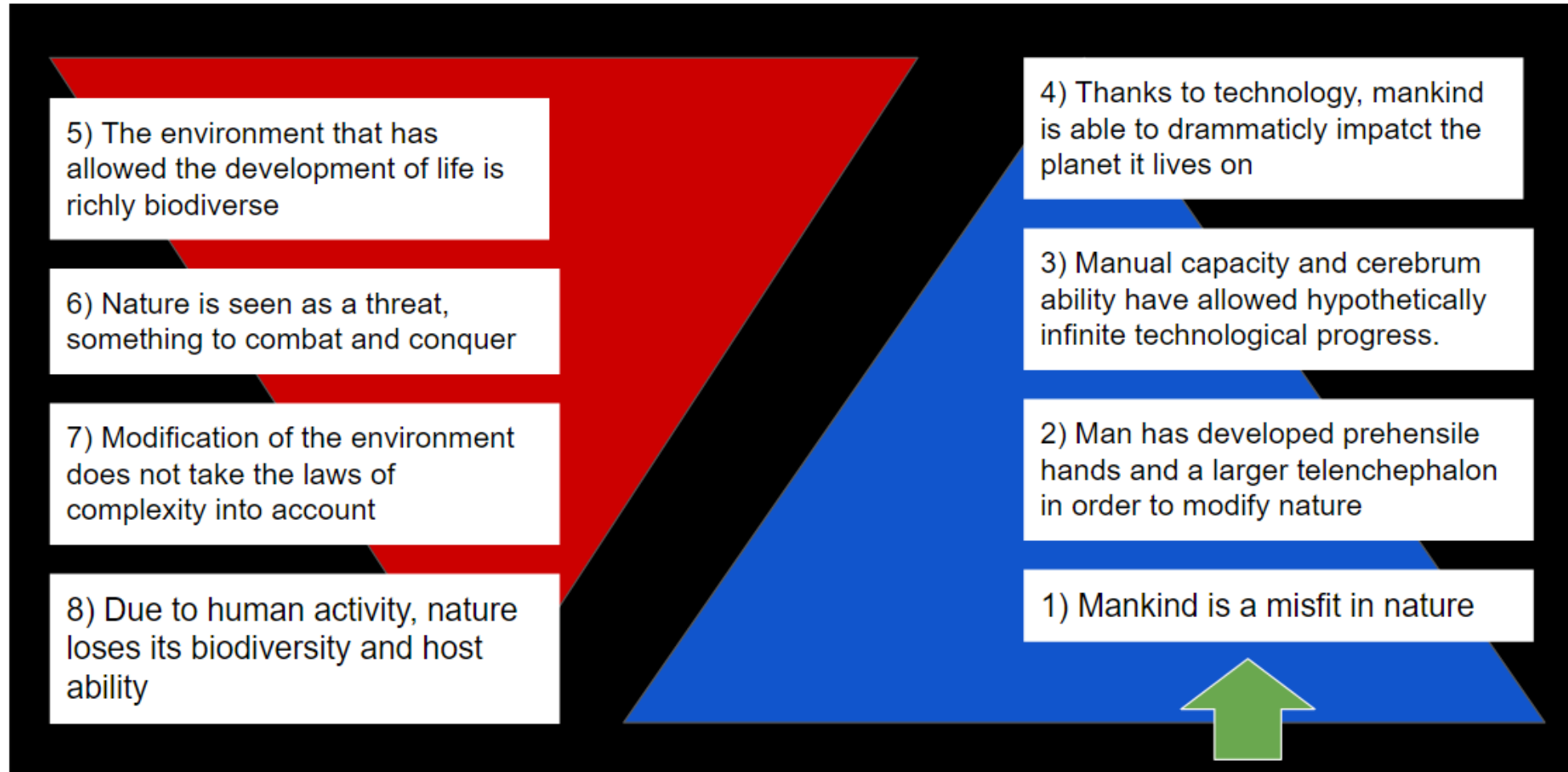


Fig. 1 How we have become the greatest competitors in nature and the only beings that do not adapt, but rather modify the environment.

Plastic, microplastic, and the inconsistency of human thought

Antonio Ragusa¹, Caterina De Luca^{2*}, Emma Zucchelli³,
Denise Rinaldo⁴ and Alessandro Svelato²

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The three cognitive problems briefly presented in the paper are:

1. For millennials, humans considered environment a hostile setting to conquer and invade. This may be due to the sense of impotence in front of the immense, destructive strength of nature. This attitude is still partially present in contemporary man.
2. the bias of the present, also called hyperbolic discounting, human decisions are often made to obtain immediate gratification, ignoring the possibility of gain deferred over time.
3. our world perception, which is extremely variable between individuals and not open to consider long-term consequences of our actions

CAN NATIONS REIN IN PLASTICS POLLUTION?

As countries negotiate a plastics treaty, researchers warn that a lack of information will make any agreement hard to enforce. **By Meera Subramanian**

650 | Nature | Vol 611 | 24 November 2022

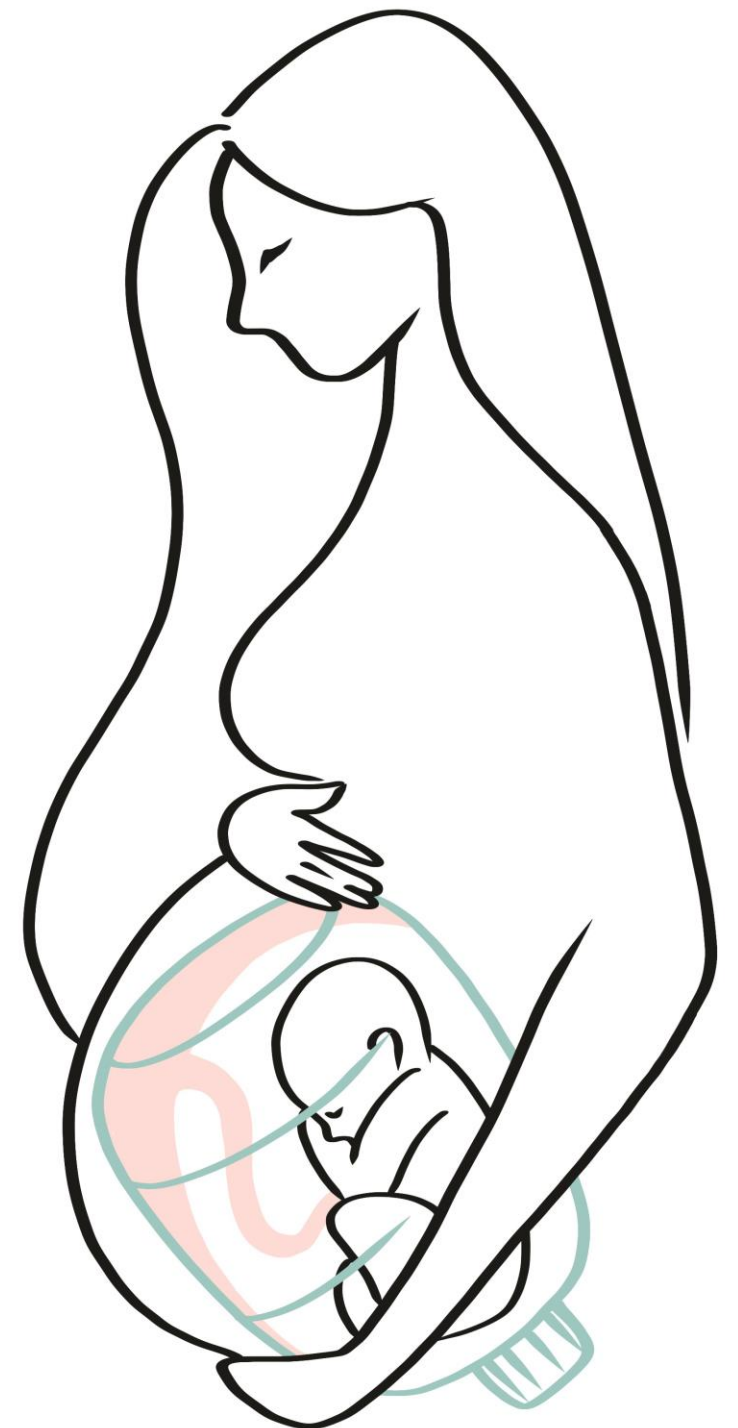
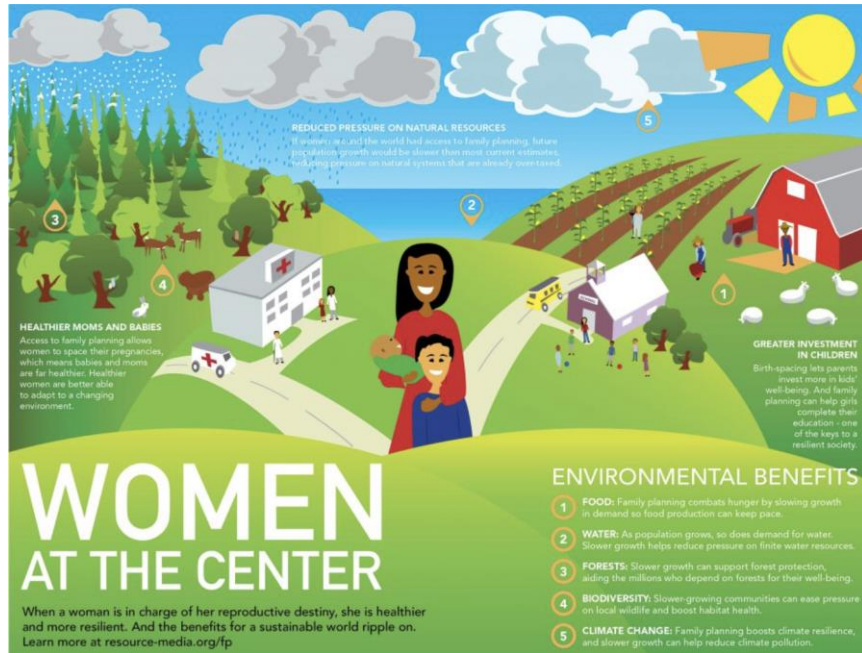


Membri dell'esercito dello Sri Lanka ripuliscono spessi strati di rifiuti di plastica che si sono riversati sulle spiagge dopo che una nave portacontainer è affondata al largo nel maggio 2021. Crediti: Ishara S. Kodikara/AFP via Getty

Review

Pregnancy in the Era of the Environmental Crisis: Plastic and Pollution

Antonio Ragusa¹, Giulia Principi^{2,*}, Maria Matta³



«un **mondo** lieto col volto di mamma, che comprende, accompagna, accarezza”. “Sognate anche voi questo **mondo**, credete in esso, innovate con libertà”.

Plastic, microplastic, and the inconsistency of human thought

Antonio Ragusa¹, Caterina De Luca^{2*}, Emma Zucchelli³,
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**Grazie di avermi
ascoltato**

The initial decalogue, to address the problem, could be the following:

1. Sign international agreements to reduce the production of “virgin” plastic.
2. Give responsibility for plastic disposal to plastic producers and not to end consumers.
3. Gradually replace plastic with recyclable material of natural origin.
4. Increase the recycling rate of plastic materials.
5. Ban the sale of mineral water and soft drinks in plastic containers and abolish the use and production of single-use plastics (straws, bags, plates, cutlery, and plastic cups).
6. Use organic material for packaging.
7. Make natural plastic with algae, potatoes, corn, etc.
8. Buy bulk and non-plastic packaged foods.
9. Buy clothing made from natural and non-synthetic materials.
10. Teach all this in schools.

In his essay “The Man in Revolt,” Camus argued that “to be, man must rebel.” Only in this way is it possible to give meaning to one’s existence, the reason for the revolt is “... In wanting to serve justice so as not to increase the injustice of the human condition, in striving for clear language so as not to thicken the universal lie and in focusing, despite human misery, on happiness.”