FERTILITA' MASCHILE: vecchie e nuove sfide in un ambiente a rischio

Ordine dei Medici Chirurghi e Odontoiatri della Provincia di Vicenza
Hotel Tiepolo
9 Novembre 2024

Microplastiche ed Infertilità

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Coordinatore progetto di ricerca EcoFoodFertility
PhD in Biologia dell'Evoluzione ed Ecologia

EcoFoodFertility

Rete Interdisciplinare per la Salute Ambientale e Riproduttiva (R.I.S.A.R.)

Un'Alleanza per la Salvaguardia della Fertilità nelle Aree a Rischio

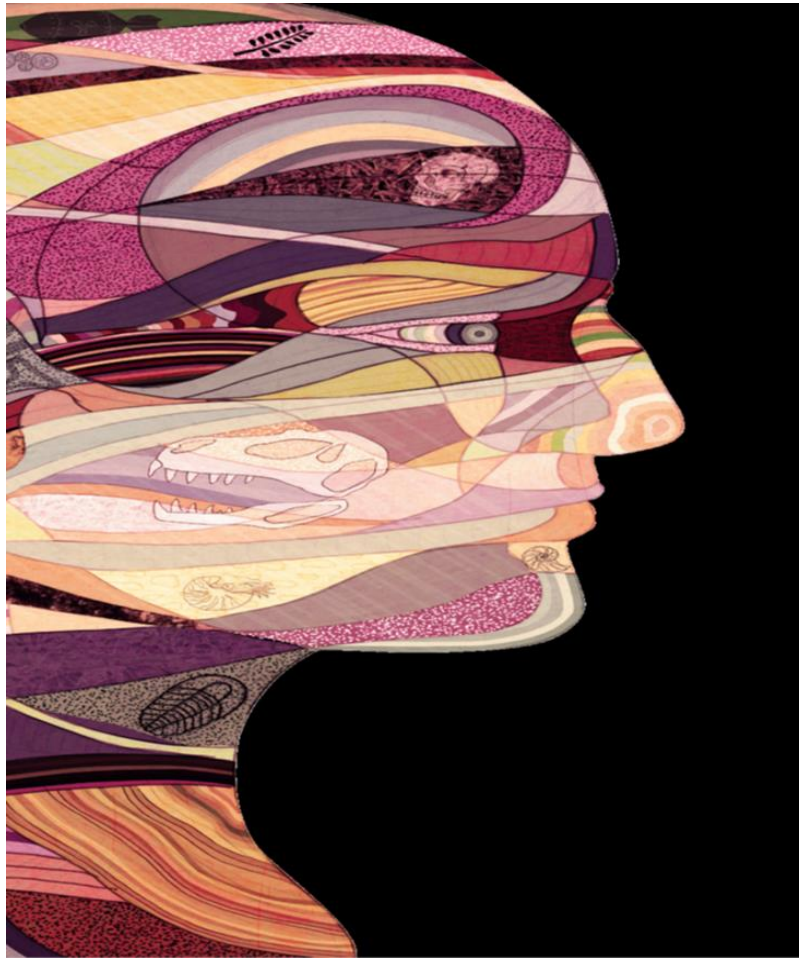
Prima rete indipendente fra ricercatori di diversi enti universitari, di ricerca e o ospedalieri per il Biomonitoraggio nei Siti di Interesse Nazionale (SIN) d'Italia

EcoFoodFertility

Human activities introduced a large number of contaminants in the environment on a global scale

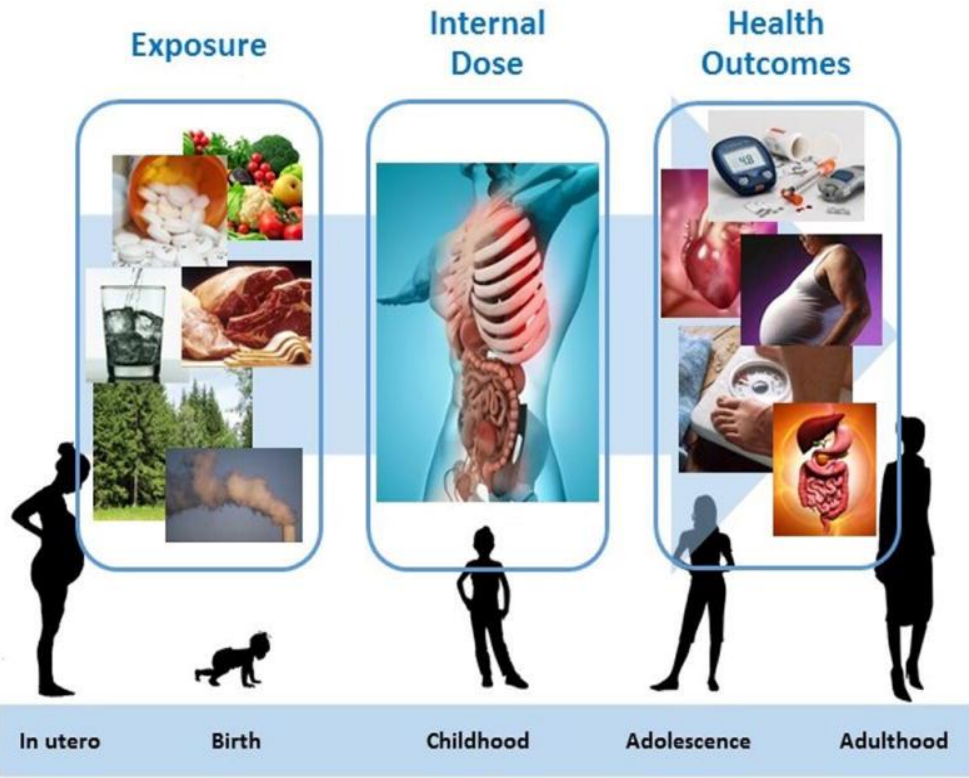
ANTHROPOCENE

Nature 519, March 2015



EXPOSOME

Env. H. Persp. 2016



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ANTROPOCENE - PLASTICENE - PLASTICEMIA

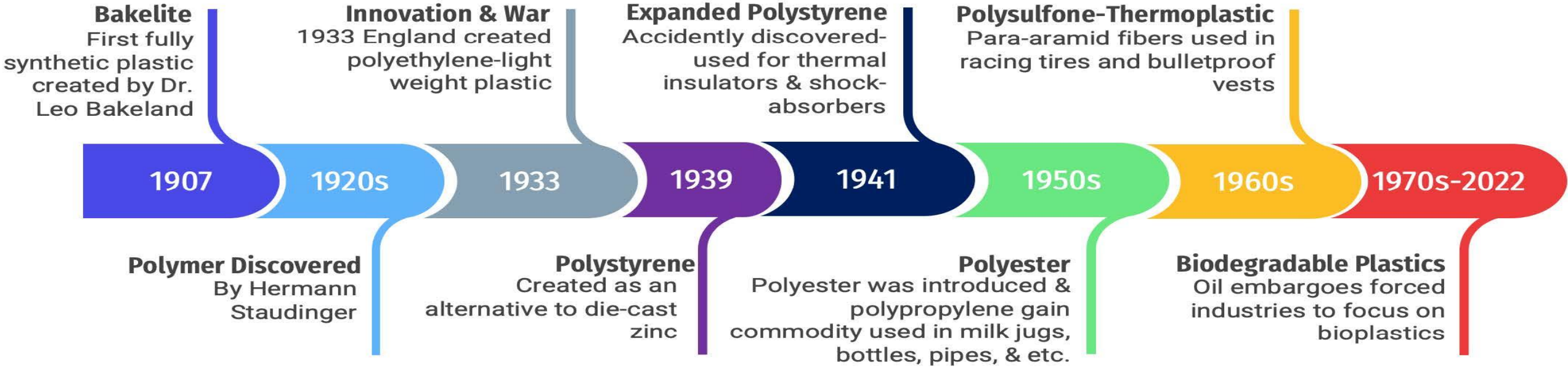
HOMO PLASTICUS

HOMO METALLICUS

EcoFoodFertility

Cronologia storica della plastica dal 1907 al 2022

(Plastic Industry Association, 2022)



Tra il 1950 e il 2017, sono stati prodotti circa 9,2 miliardi di tonnellate di plastica, la stragrande maggioranza dei quali rimane come rifiuti nel nostro ambiente naturale, minacciando gli ecosistemi globali. Entro il 2050 si potrebbe raggiungere la cifra di 1.1 miliardo di tonnellate all'anno.

La plastica è un materiale utilizzato per costituire la maggior parte degli oggetti della vita quotidiana; tuttavia, nel mondo di oggi, la cattiva gestione, la manipolazione impropria e l'abuso di plastica hanno portato all'inquinamento da MP in ogni margine dell'ambiente acquatico, dallo strato pelagico più elevato alle rocce sedimentarie del fondale marino.

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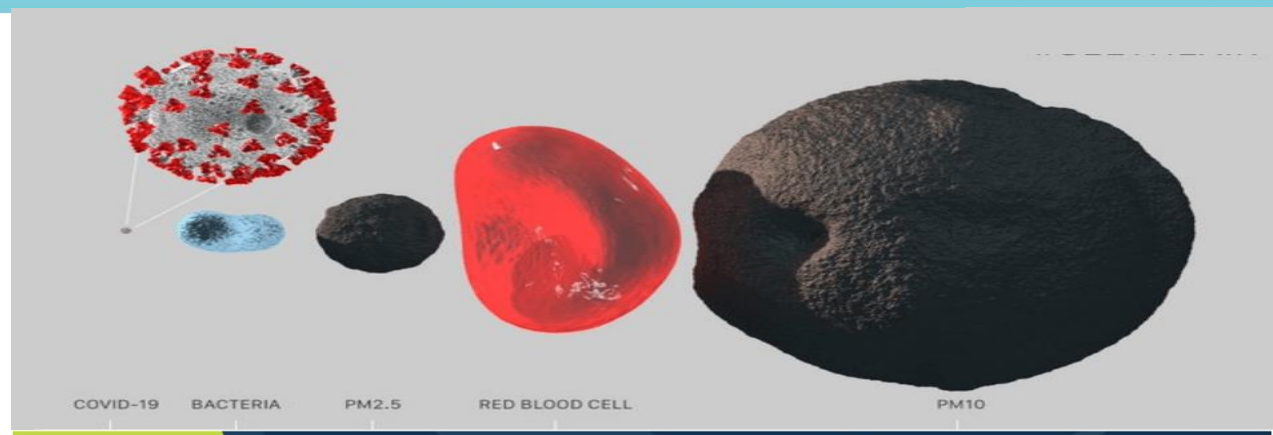
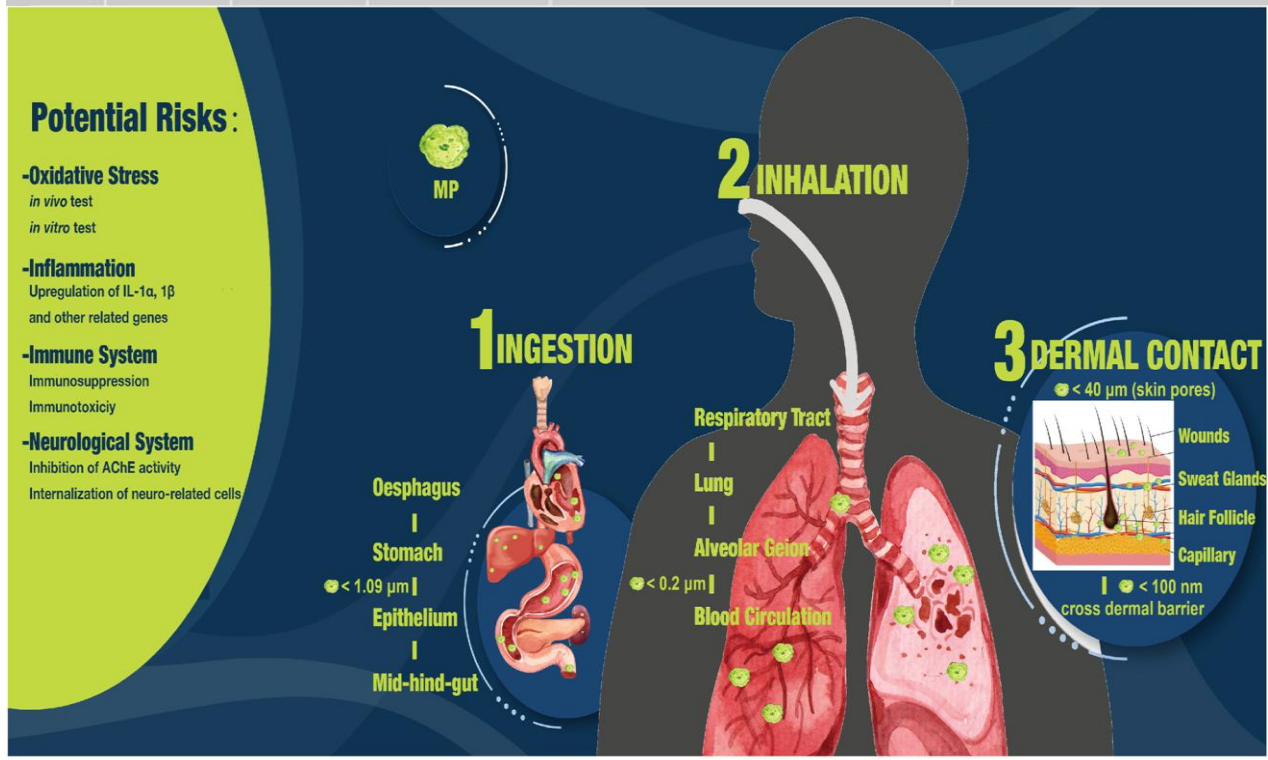
Le **Microplastiche** sono **frammenti di plastica di diametro inferiore a 5 mm (da 0,1 a 5000** micrometri, µm).
1 micrometro è un milionesimo (10^{-6}) di metro.

Le **Nanoplastiche** invece misurano da **0,001 a 0,1 µm** (ossia da 1 a 100 nanometri)
1 nanometro è un miliardesimo (10^{-9}) di metro

Derivano da una varietà di fonti che finiscono nelle acque reflue, dalle setole degli spazzolini da denti ai tappi delle bottiglie, oltre che dalla degradazione diretta dei prodotti di plastica che raggiungono mari e oceani e che peraltro si disperdono nell'aria





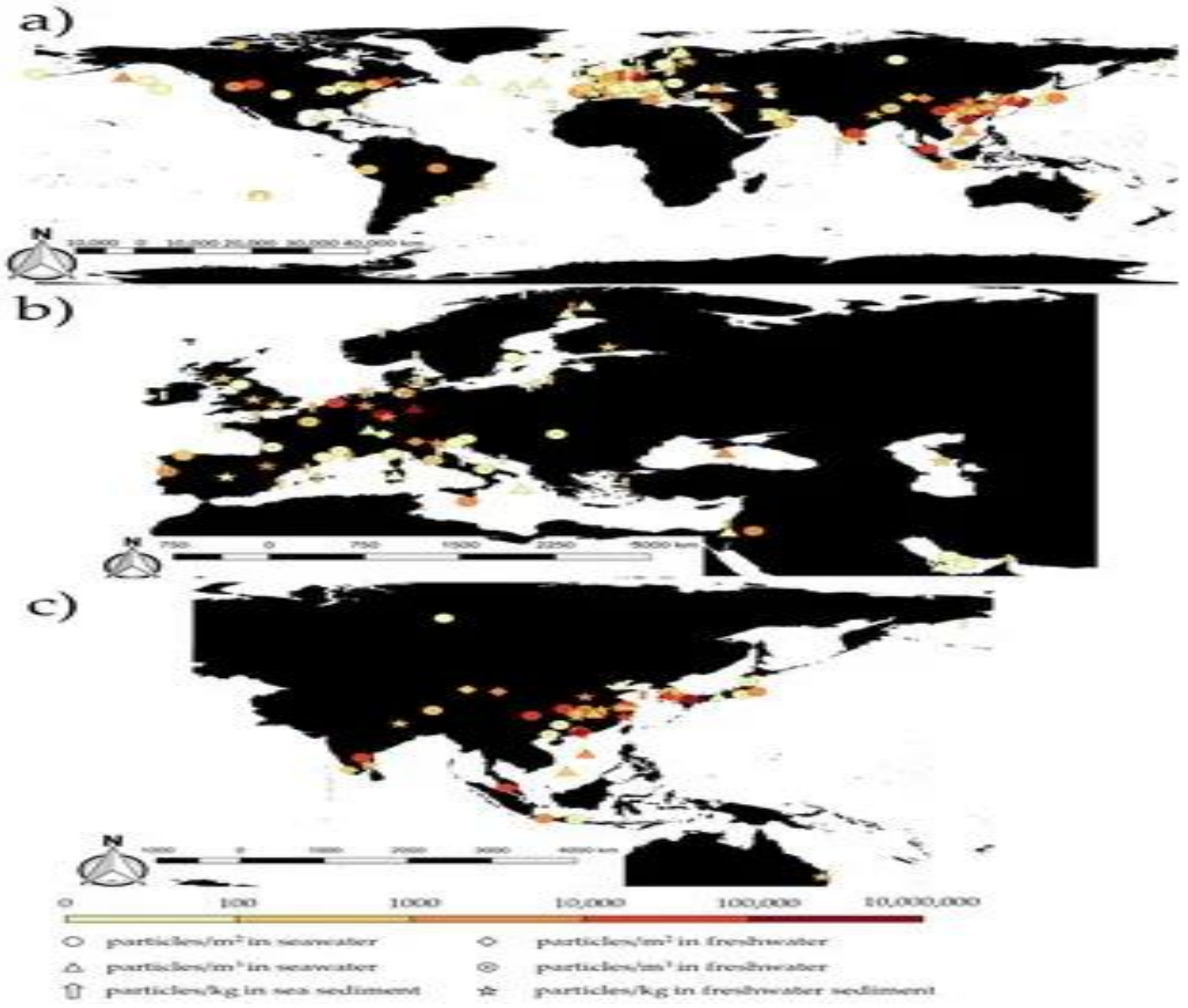
EcoFoodFertility

water

Microplastics Analysis in the Aquatic Environment: Occurrence, Persistence, Analisys, and Human Exposure

Maria Ricciardi , Concetta Pironti , Oriana Motta 1,*ORCID,Ylenia Miele, Antonio Proto and **Luigi Montano**

Water 2021, 13(7), 973; https://doi.org/10.3390/w13070973



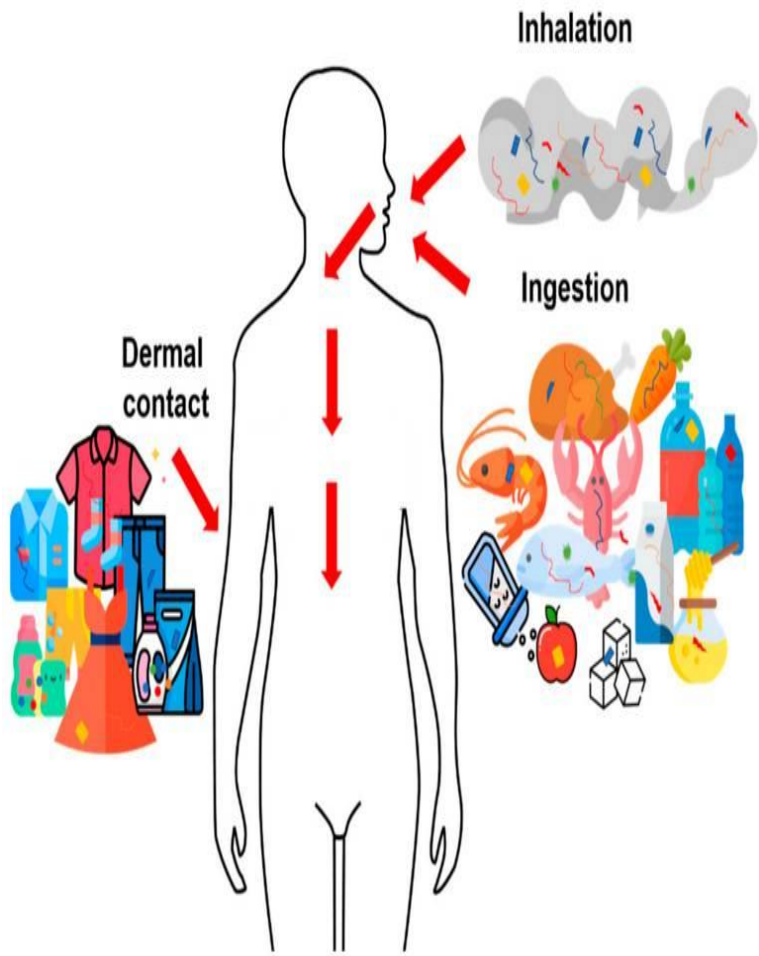
EcoFoodFertility

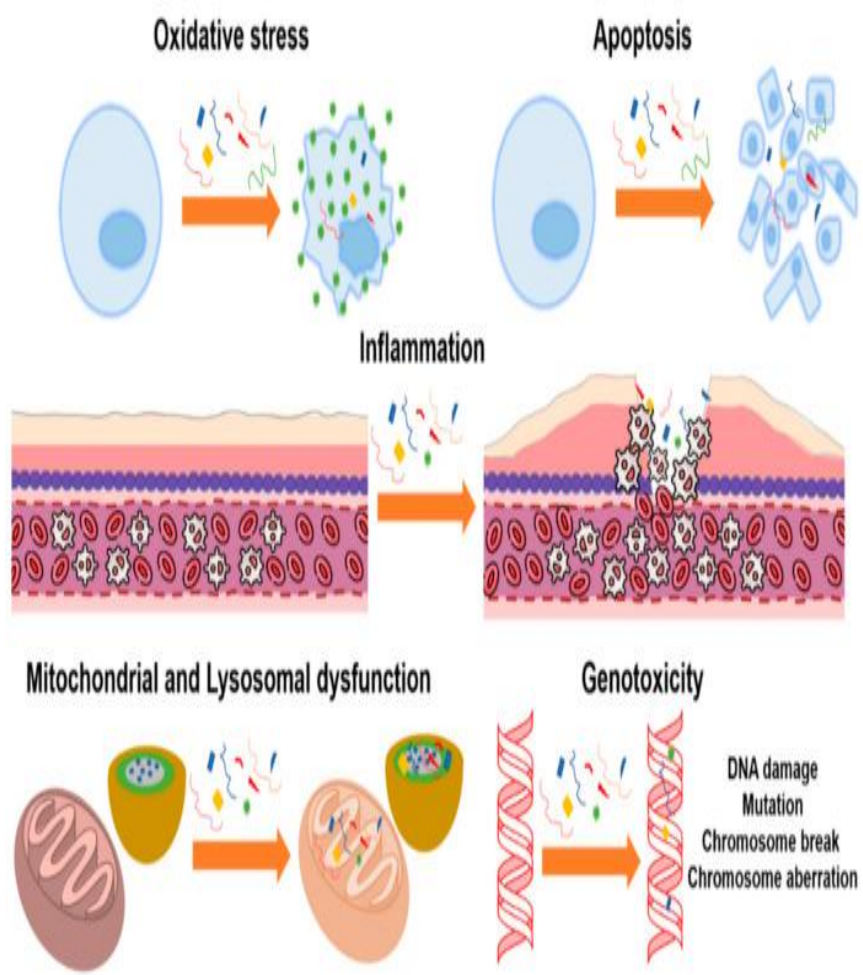
toxics

Microplastics in the Environment: Intake through the Food Web, Human Exposure and Toxicological Effects

Concetta Pironti, Maria Ricciardi, Oriana Motta*, Ylenia Miele,
Antonio Proto, and **Luigi Montano**

2021





Atmosphere

Aquatic ecosystem

Soil – sediments

Microplastics (MPs) are in all environmental compartments, including atmosphere, terrestrial, and aquatic environments as well as in marine organisms, foods, drinking water, and indoor and outdoor environments.

Microplastic in human samples: recent advances, hot-spots, and analytical challenges.

Malafaia G, Barcelo' D. Trends in Analytical Chemistry 161 (2023) 117016

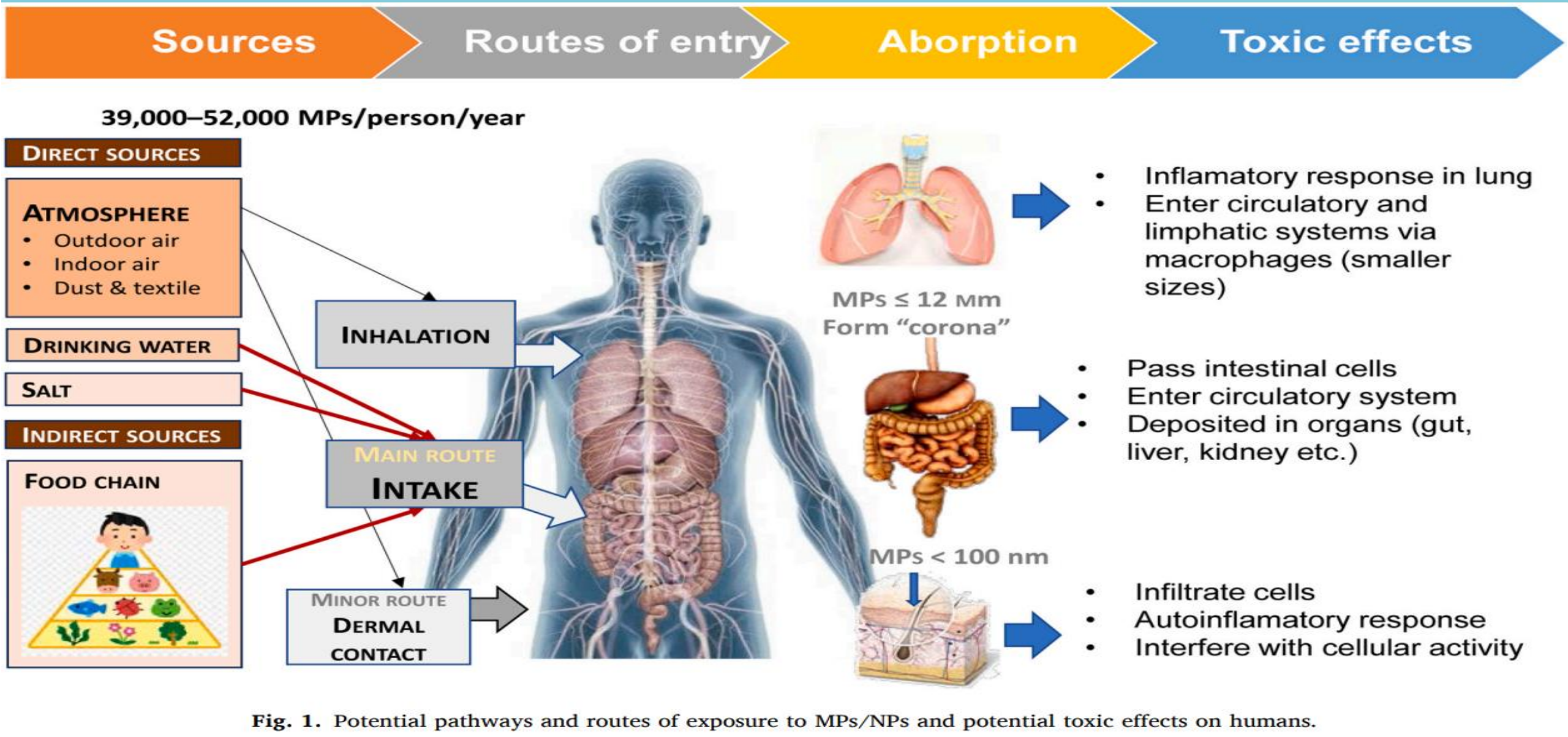


Fig. 1. Potential pathways and routes of exposure to MPs/NPs and potential toxic effects on humans.

Microplastics in fish, crustaceans, fruit vegetables

Microplastics in fillets of Mediterranean seafood. A risk assessment study.

Margherita Ferrante et al. Environ Res 2022 Mar;204(Pt C):112247

- **Microplastics (MPs) are considered as emergent threat to human health. No complete data still exists on MPs presence in fish tissue and their transmission to humans. The present study aims to detect and quantify the presence of MPs (<3 μm) in several edible seafood (Sardina pilchardus, wild and farmed Sparus aurata, Mullus surmuletus, Solea solea and mussel Mytilus gallo provincialis).**

Micro- and nano-plastics in edible fruit and vegetables. The first diet risks assessment for the general population

Gea Oliveri Conti, Margherita Ferrantea,∗, Mohamed Bannib,, Claudia Favaraa Ilenia Nicolosia, Antonio Cristaldi , Maria Fiore, Pietro Zuccarello

Environ Res 187 (2020) 109677

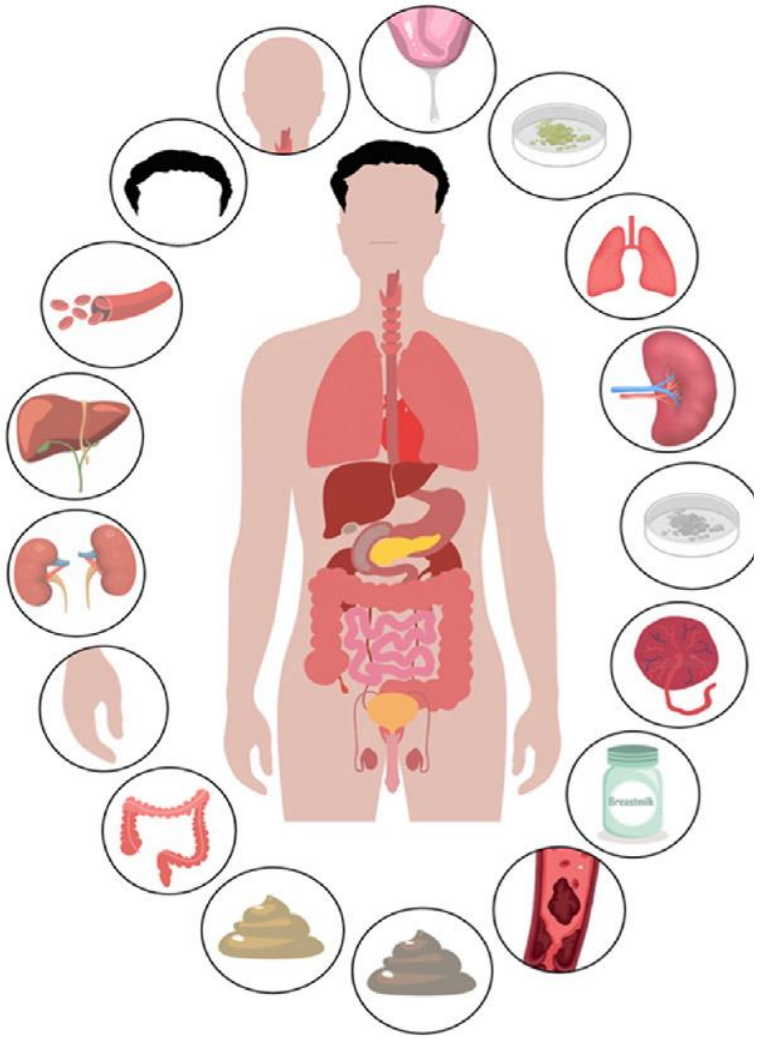
The higher median (IQR) level of MPs in fruit and vegetable samples was 223,000 (52,600–307,750) and 97,800 (72,175–130,500), respectively. In particular, apples were the most contaminated fruit samples, while carrot was the most contaminated vegetable. Conversely, the lower median (IQR) level was observed in lettuce samples 52,050 (26,375–75,425). Both vegetable and fruit samples MPs levels were characterized by wide variability. The smallest size of MPs was found in the carrot samples (1.51 μm), while the biggest ones were found in the lettuce

Human exposure to microplastics through the ingestion of contaminated food is inevitable and poses a risk to food safety and human health

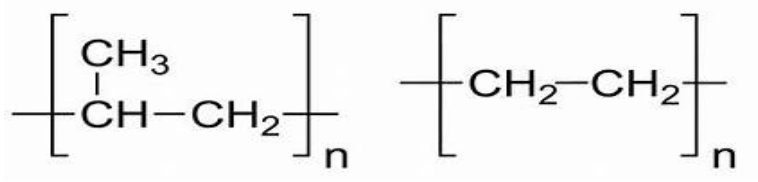
Microplastics: Detection in human samples, cell line studies, and health impacts.

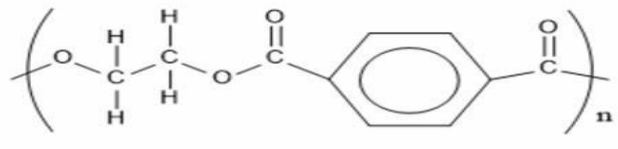
Barcelò D. et al. *Environmental Toxicology and Pharmacology* 101 (2023) 104204

Saliva	Placenta
Sputum	Meconium
Feces	Lung tissue
Breast milk	Liver
Hair/head	Kidney
Hand	Spleen
Blood	Colon
	Heart



PE
PP
PS
PET
PC
PU
PVC
PVA
PMMA
polyamide (nylon)
ABS
SEBS
POM
PTFE
Resin
Rubber





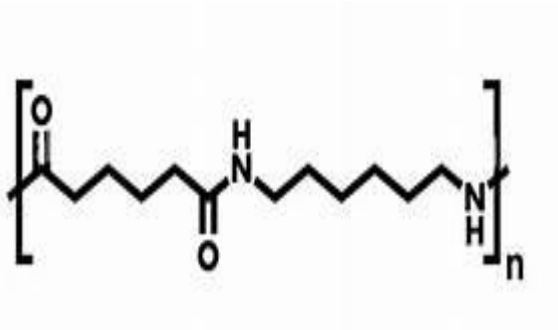


TABLE 5 Microplastics effects on the mammalian female reproductive system.

Plastic	Species	Consequences on the female reproductive system	References
MPs	Mice	Oxidative stress in ovaries, decrease the number of ovarian antral follicles and malondialdehyde [MDA] levels in ovaries	(96)
MPs	Mice	Decreased pregnancies and increased mortality	(97)
MPs	Mice	Spontaneous abortion, decreased diameter of uterine arterioles, decreased uterine blood supply	(98)
MPs	Rats	Granulosa cell apoptosis, ovary fibrosis, and pyroptosis	(99)
MPs	Rats	Granulosa cells pryptosis through NLRP3/Caspase-1 signaling mechanism,	(100)

TABLE 6 The effects of MPs additives on the female mammalian reproductive system.

Endocrine disrupters	Species	Consequences on the female reproductive system	References
Phthalates	Mice	Reduced LH, defective ovarian steroidogenesis	(108)
BPA	Humans	Inhibiting secretion of progesterone and oestradiol, decreases the expression of CYP11A1	(107)
PBDEs	Humans	Increased menstrual cycle and bleeding time	(109)
TBT	Rats	Irregular ovarian adipogenesis, Ovarian fibrosis	(110)
PCBs	Mice	Follicular atresia, suppressed level of LH, and progesterone	(111, 112)
Chromium, lead and Mercury	Mice and Rabbits	Follicular astresia, low follicle growth, corpus luteum	(90)

TABLE 3 MPs effects on the mammalian male reproductive system.

Plastics	Species	Consequences on male reproductive system	References
MPs	Mice	Recused sperm quality, abnormal testicular spermatogenesis	(67)
MPs	Mice	Testicular transcriptomic alterations, altered spermatogenesis	(68)
MPs	Mice	Decreased testosterone levels, disruption of Blood Testes Barrier [BTB], testicular inflammation	(66)
MPs	Swine	Increased apoptosis and necrosis in testes, decreased viability of testicular cells	(69)
MPs	Mice	Decreased testicle weight and sperm quality, altered sperm phenotype	(70)
MPs	Rats	Damaged seminiferous tubule, destruction of BTB, spermatogenic cell apoptosis	(71)
PS-MPs	Mice	Oxidative stress in testes reduced sperm motility	(72)

TABLE 4 MPs additives effects on the male mammalian reproductive system.

Endocrine disrupters	Species	Consequences on male reproductive system	Reference
Phthalates	Rats and Mice	Oxidative stress in testes, altered sperm's physiology, anti-androgenic effects	(68, 85)
BPA	Mice	Abnormal spermatogenesis, blood-testis-barrier [BTB] disruption, poor semen quality, DNA damage in sperm cells	(84)
PBDEs	Male	Dysregulated sperm DNA methylation, altered spermatogenesis	(86)
TBT	Syrian hamsters	Adverse steroidogenic enzymes activity, impaired testosterone production, defective spermatozoa	(87)
PCBs	Harbour porpoises	Decreased testes weight, Reduced sperm and spermatid numbers, small seminal vesicles	(88, 89)
Chromium, lead and Mercury	Mice, Rabbits	Leydig cell tumors, attenuates serum level of luteinizing hormone [LH], testosterone, follicle-stimulating hormone, testicular stroma	(90)

Il ruolo della contaminazione pervasiva da plastica e dell'esposizione a MNP come fattore di rischio per la fertilità può riconoscere tre grandi modalità

- Effetto "**Cavallo di Troia**", tramite il quale la plastica veicola altre sostanze come Ftalati, Bisfenoli, Pesticidi, Diossine, Metalli pesanti, noti come Interferenti Endocrini che sono notoriamente riconosciuti come deleteri per la fertilità maschile e femminile
- Effetto **diretto delle MNP** (i polimeri in sé) che arrivano ai tessuti riproduttivi incrementando il rischio di infiammazione e stress ossidativo. Ciò è ben dimostrato su cellule e su modelli animali, pesci e topi. Tanto che l'esposizione a Polistirene nel topo maschio per esempio induce riduzione della motilità ed un aumento delle forme anomale degli spermatozoi, una diminuzione dei livelli di testosterone ed anche un'importante riduzione dei livelli di LH e FSH, ormoni che controllano la spermatogenesi.
- Effetto delle **MNP sul microbiota** e sulle funzioni intestinali (ad es. l'assorbimento di micronutrienti): è noto, in particolare, come un'alterazione del microbiota possa avere ripercussioni sistemiche significative, anche sulla salute riproduttiva.

Queste tre modalità non si escludono affatto a vicenda, anzi, è plausibile che possano operare in sinergia

Toxic effects

- Although the published studies report important findings on the presence of MPs in several human biological samples, our know-how in this area still needs to be improved.

- Little is known about the role of MPs as an etiological agent of human diseases or their influence on the aggravation of pre-existing pathological conditions.

- Health risks associated to MPs exposure include the onset of inflammation, oxidative stress, and DNA damage, potential leading to cardiovascular and respiratory diseases, as well as cancer, as suggested by in vitro and in vivo studies

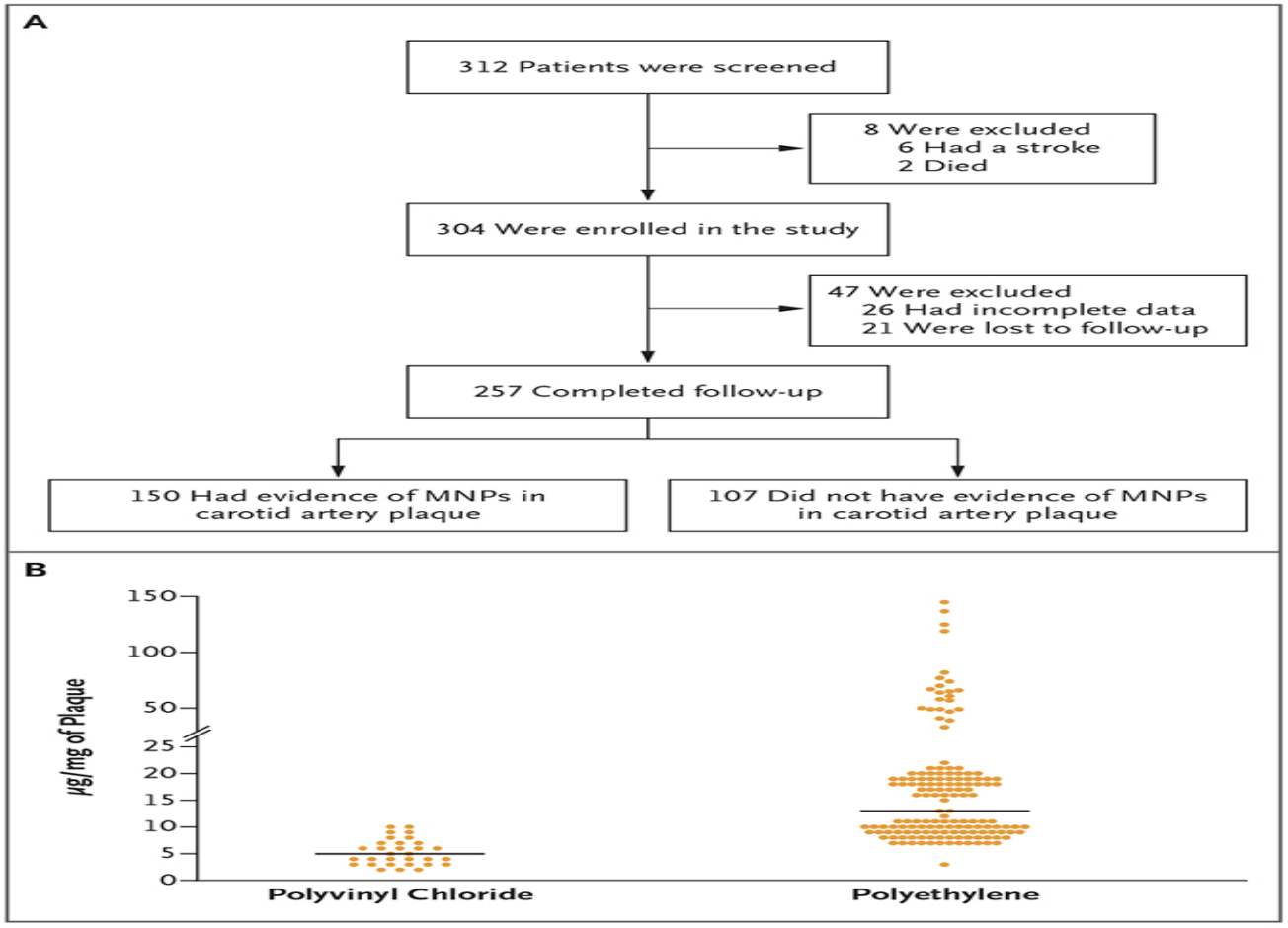
The MP concentrations in liver samples derived from cirrhosis were 87.9% higher than those from patients without cirrhosis.

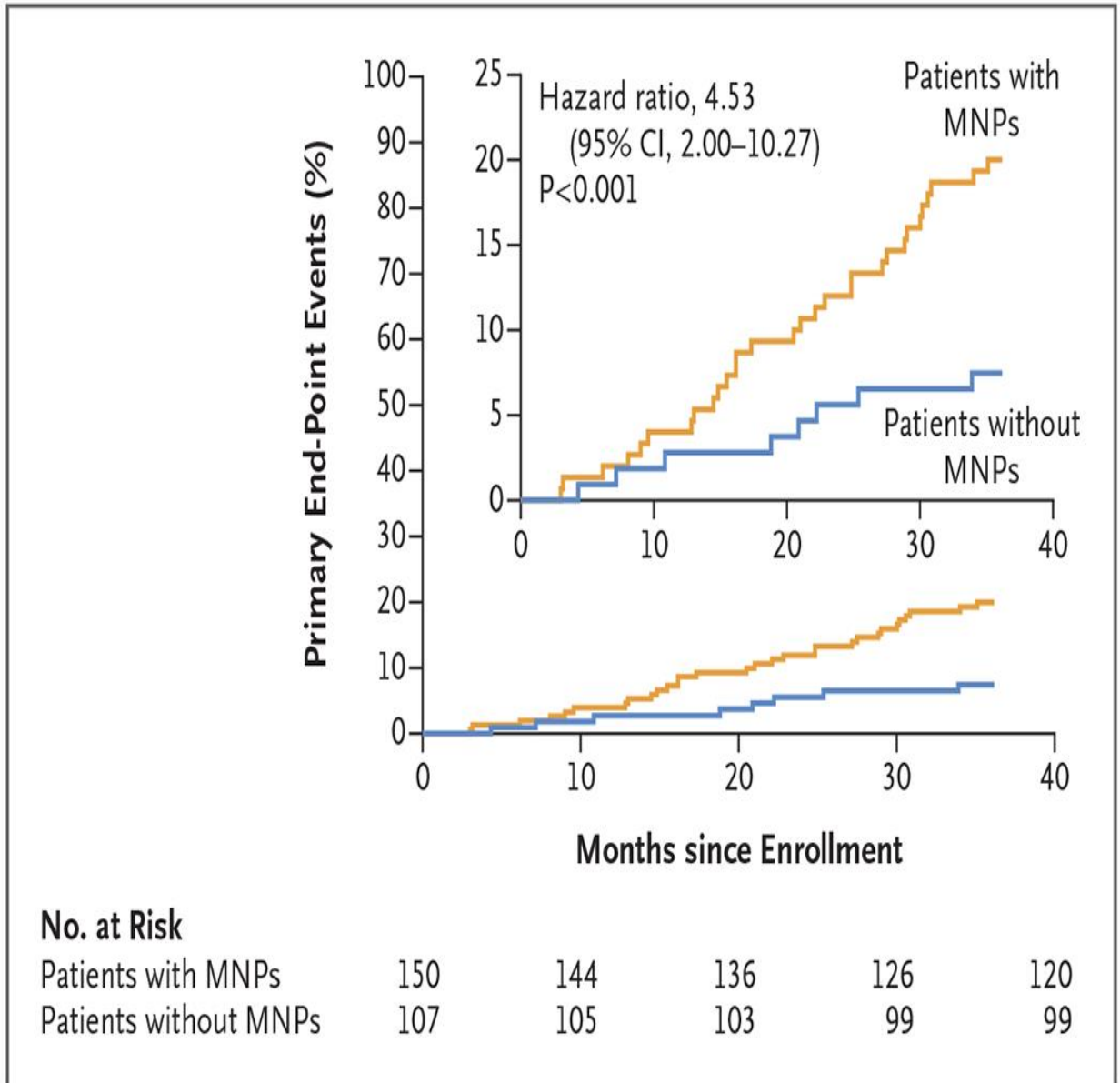
Microplastics detected in cirrhotic liver tissue.
Horvatits T et al. EBioMedicine 2022, 82, 104147

Microplastics and Nanoplastics in Atheromas and Cardiovascular Events

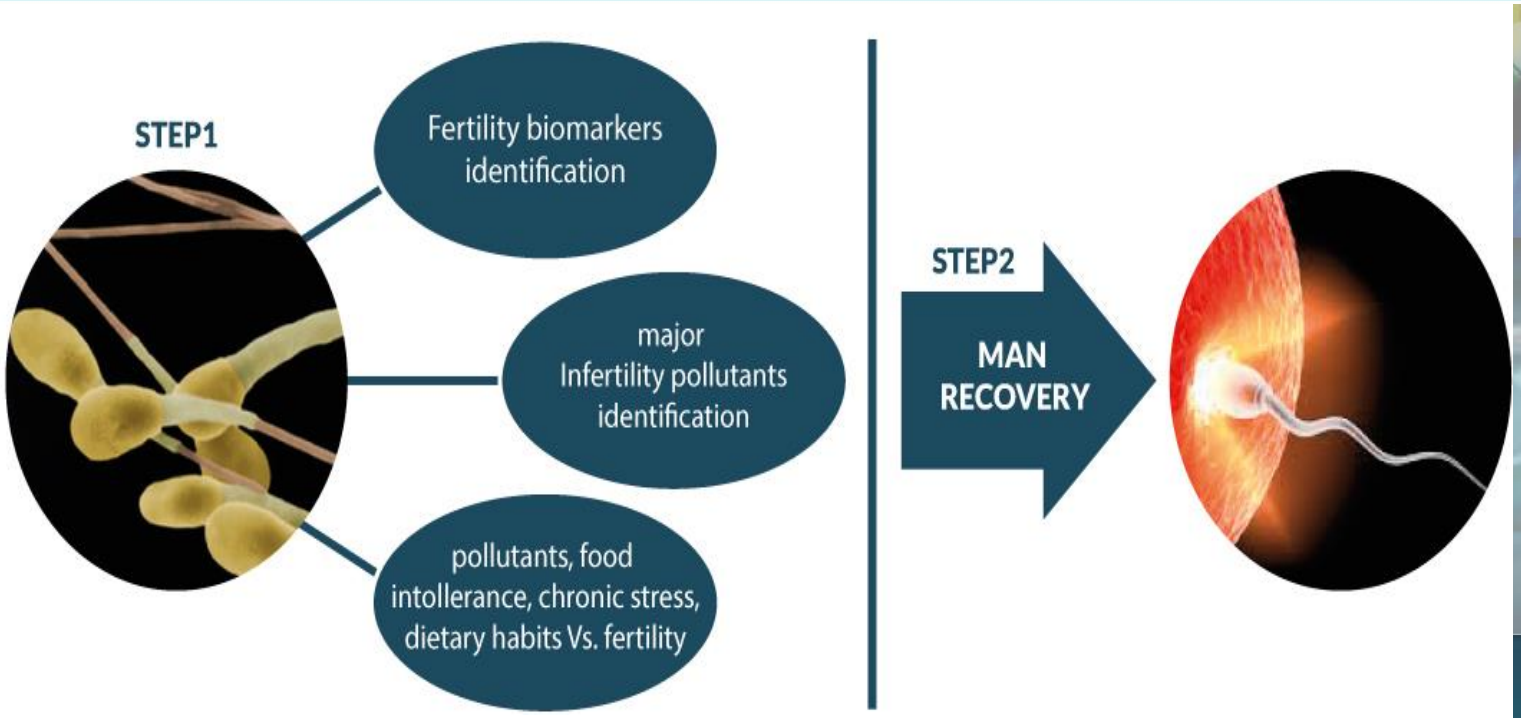
Marfella et al. 2024. New England Journal of Medicine doi: 10.1056/NEJMoa2309822

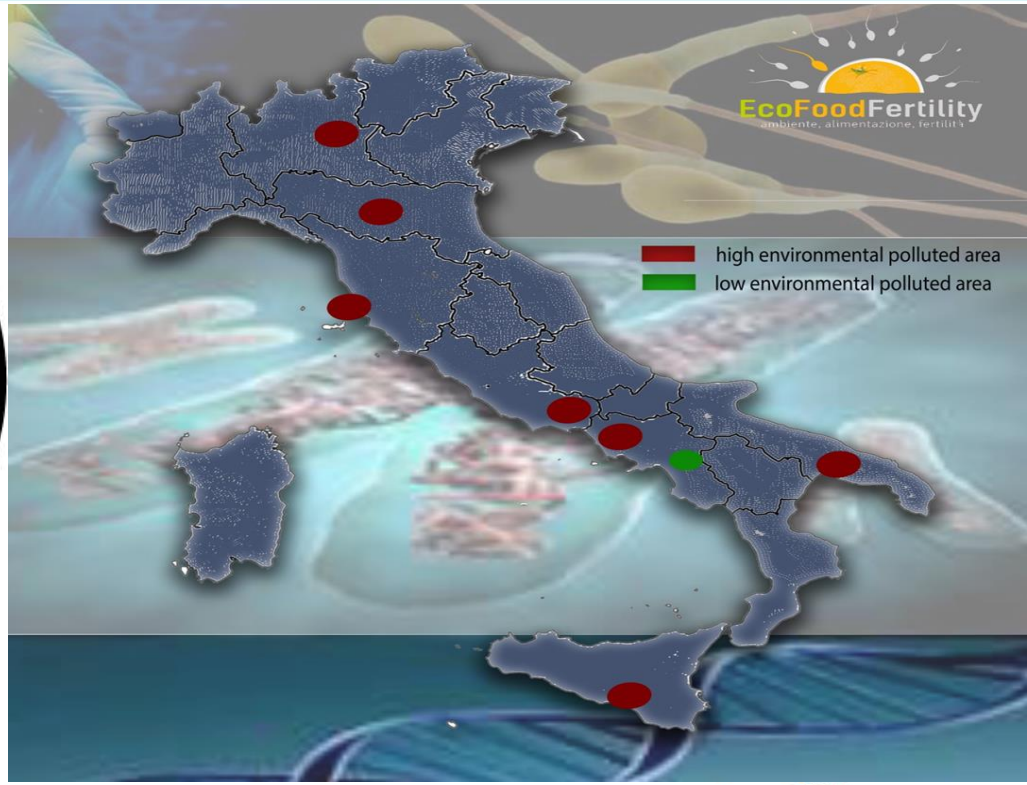
Patients with carotid artery plaque in which MNPs were detected had a higher risk of a composite of myocardial infarction, stroke, or death from any cause at 34 months of follow-up than those in whom MNPs were not detected.





A NEW MODEL FOR ASSESSING ENVIRONMENTAL IMPACT ON HUMAN HEALTH, PRIMARY PREVENTION AND RESILIENCE IN RISK AREAS

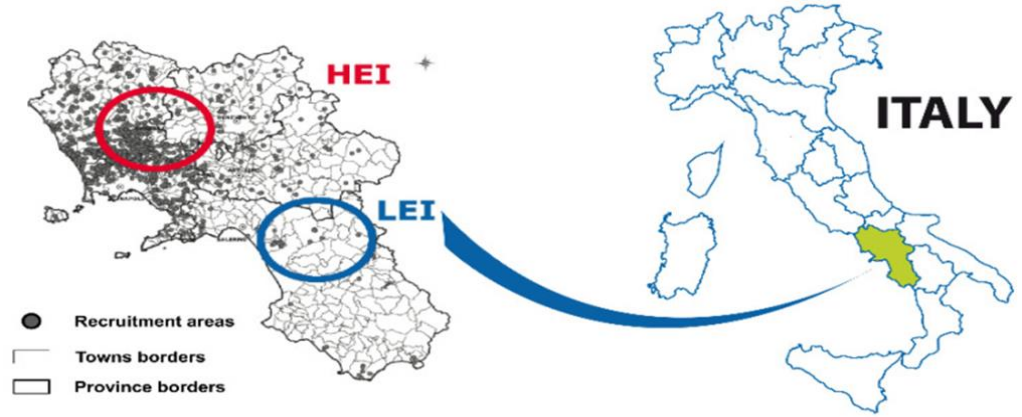




Human biomonitoring study with omics multidisciplinary approaches involving, environment, life-style and diet, with the aim of:

i) **developing a better understanding of the effects of environmental pollutants on human health considering reproductive biomarkers, especially human semen, as early flags of environmental pressure and enhanced risk of chronic adverse effects on health**

ii) **identifying dietary, nutraceutical and/or functional food approaches to reduce or modulate the effects of pollutants on human health**



EcoFoodFertility

Brescia, Modena, Valle del sacco, Terra dei Fuochi, Taranto, Vicenza (HIGH Impact)
Valle del Sele (SA), Provincia Campobasso, Area Madonie (LOW Impact),

RECRUITING SUBJECTS

18-35 healthy men and women, no smokers, no drinkers , no professional exposed, no chronic deseases

Clinical examination

Withdraw

Food and LifeStyle Questionnaire

SEMEN | Urine | BLOOD | Hair | Microbiome | Female Protocol Follicular fluid

Semen analysis (number, motilty, morphology); sperm nDNA and mtDNA integrity.
Heavy metals, PAHs, Dioxins, PCBs, PCB-Dioxin-like, nanoparticles, Bisphenols, Phthalates, Parabens,Pfoas,Pesticides,Mycotoxins, Microplastics
RedOx status, antioxidant enzymes, sperm lipidomic status, epigenetics, metabolomics, proteomics.

Blood analysis and hormone dosage Heavy metals, PAHs, PCBs, Pcb-Dioxin-like,Dioxins, nanoparticles, bisphenols, Phthalates, Parabens, Pesticides; Micotoxins, Microplastics.
Polymorphisms of genes involved in the metabolic detoxification mechanisms and DNA repair (individual susceptibility);
RedOx state, epigenetics, eritrocyte lipidomic status, epigenetics, metabolomics, proteomics

FASE DUE DEL PROGETTO

APPROCCIO NUTRIZIONALE E ALTRE STRATEGIE DI DIFESA DALL'INQUINAMENTO

STUDI CLINICI RANDOMIZZATI (RTC) PER VALUTARE L'EFFETTO DELLE MODIFICHE DI DIETA, STILI DI VITA E/O SOSTANZE NUTRACEUTICHE-FUNZIONALI E/O ALIMENTI FUNZIOANLI SUI BIOMARCATORI DI ESPOSIZIONE ED EFFETTO

- Gruppo di INTERVENTO
- Gruppo di CONTROLLO A
- Gruppo di CONTROLLO B

OBIETTIVO

- Favorire l'eliminazione di sostanze tossiche,
- aumentare i meccanismi di cito-protezione e detossificazione,
- migliorare gli indici dei biomarcatori ossidativi, immunologici, epigenetici, proteomici lipidomici, metabolomici

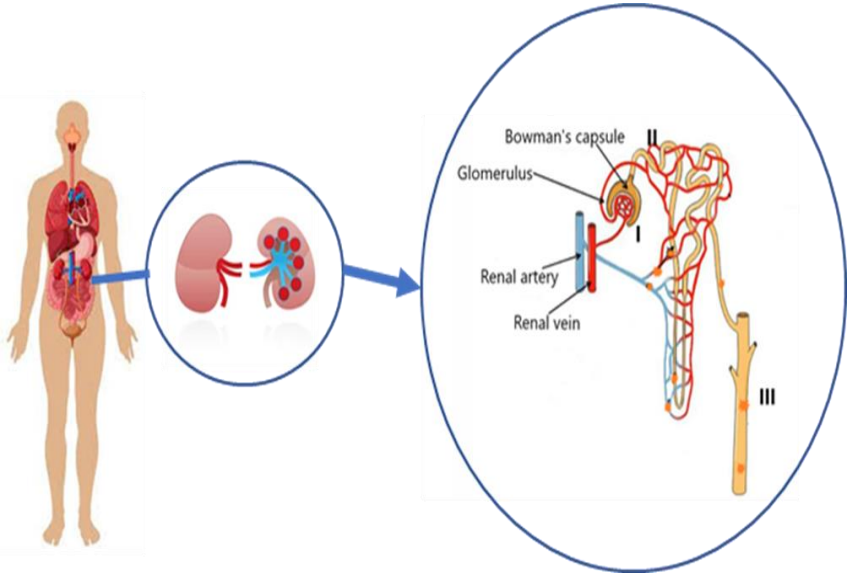
FARE PREVENZIONE PER PATOLOGIE CRONICO-DEGENERATIVE

EcoFoodFertility

INVASIONE DELLE MICRO E NANOPLASTICHE NEGLI ORGANI RIPRODUTTIVI UN'EMERGENZA… NELL'EMERGENZA…

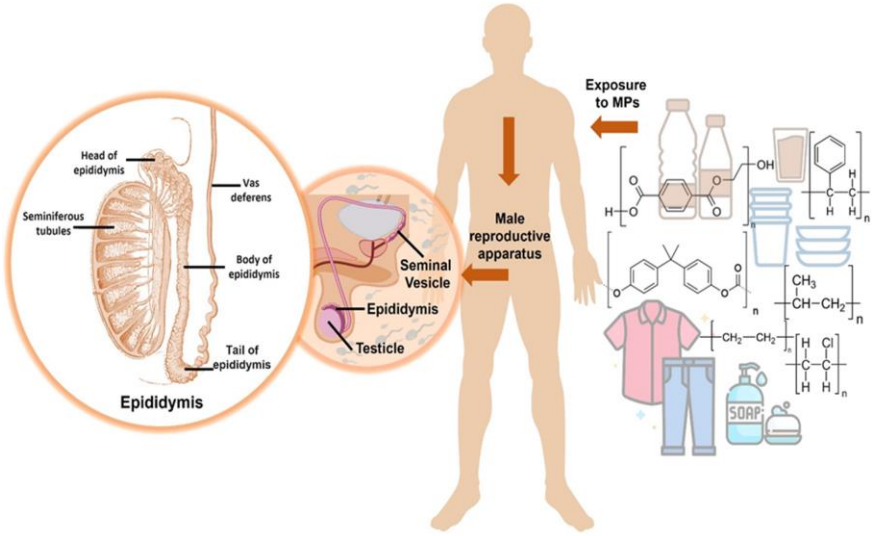
FIRST EVIDENCE OF MICROPLASTICS IN:

HUMAN URINE (2023)



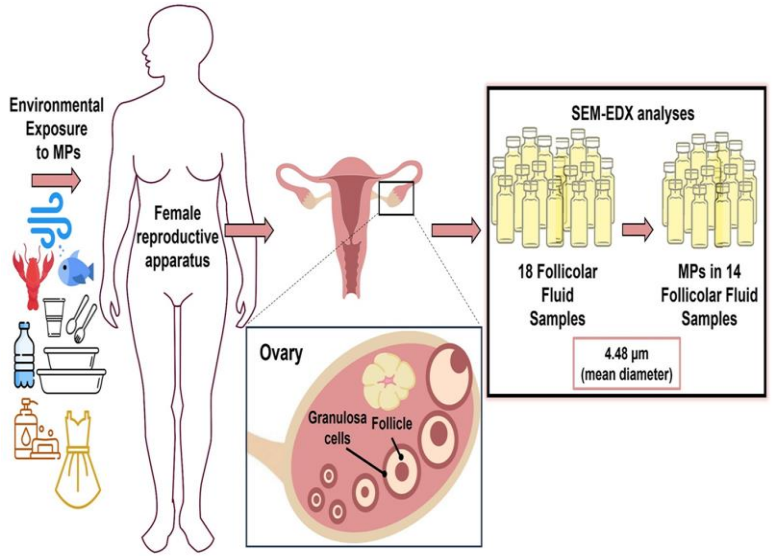
Concetta Pironti, Valentina Notarstefano, Maria Ricciardi, Oriana Motta, Elisabetta Giorgini, **Luigi Montano**.
First evidence of microplastics in human urine, a preliminary study of intake in the human body **Toxics 2023**, 11(1), 40

HUMAN SEMEN (2023)



Montano L, Giorgini E, Notarstefano V., Ricciardi M., Notari T., Piscopo M., Motta O.
Raman Microspectroscopy evidence of microplastics in human semen: ***Science of the Total Environment*** (2023) 165922

FOLLICULAR FLUID (2024)



Montano L, Raimondo S, Piscopo M, Ricciardi M, **Guglielmino A**, Chamayou S, Gentile R, Gentile M, Rapisarda P, Oliveri Conti G, Ferrante M, Motta O.
First evidence of microplastics in human ovarian follicular fluid:an emerging threat to female fertility *MedRxiv* (2024) doi: https://doi.org/10.1101/2024.04.04.24305264

MICROPLASTICHE NELLE URINE UMANE (Gennaio 2023)

EcoFoodFertility

toxics

MDPI

Article

First Evidence of Microplastics in Human Urine, a Preliminary Study of Intake in the Human Body

Concetta Pironti [1,†], Valentina Notarstefano [2,†], Maria Ricciardi [3], Oriana Motta [1,*], Elisabetta Giorgini [2] and Luigi Montano [4,5,*]

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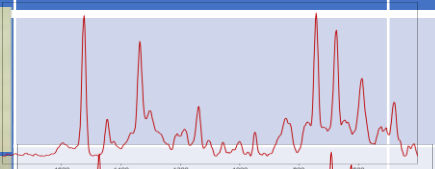
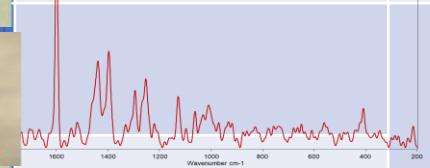
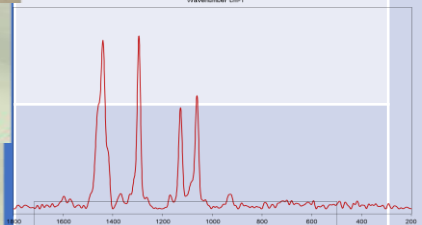
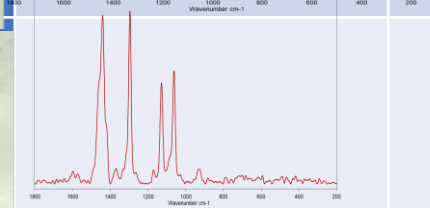
2 Department of Life and Environmental Sciences, DiSVA, Università Politecnica Delle Marche, 60121 Ancona, AN, Italy
3 Department of Chemistry and Biology, University of Salerno, Via Giovanni Paolo II, 84084 Fisciano, SA, Italy
4 Andrology Unit and Service of Lifestyle Medicine in UroAndrology, Local Health Authority (ASL) Salerno, Coordination Unit of the Network for Environmental and Reproductive Health (Eco-Food Fertility Project), "S. Francesco di Assisi Hospital", 84020 Oliveto Citra, SA, Italy
5 PhD Program in Evolutionary Biology and Ecology, University of Rome "Tor Vergata", 00133 Rome, RM, Italy
* Correspondence: omotta@unisa.it (O.M.); l.montano@aslsalerno.it (L.M.); Tel.: +39-089-963-083 (O.M.)
† These authors contributed equally as first author.

Sample	Micro-imags	Raman spectrum and identified polymer matrix
		polyethylene vinyl acetate
		polyvinyl chloride
		polypropylene
		polyethylene
		polypropylene
		

MICROPLASTICHE NELLE URINE UMANE (Gennaio 2023)

L'analisi sulle urine di 6 volontari ha individuato quattro frammenti pigmentati (dimensioni 4-15 µm), di forma irregolare, che sono stati caratterizzati in termini di morfologia e composizione chimica. Polietilene vinilacetato (PVA), cloruro di polivinile (PVC),polipropilene (PP) e polietilene (PE) sono stati trovati in quattro campioni (PVA e PVC in un campione femminile e PP e PE in tre campioni maschili). Questo studio preliminare suggerisce che le MP possano passare attraverso il tratto gastrointestinale e vengano eliminati attraverso processi biologici.

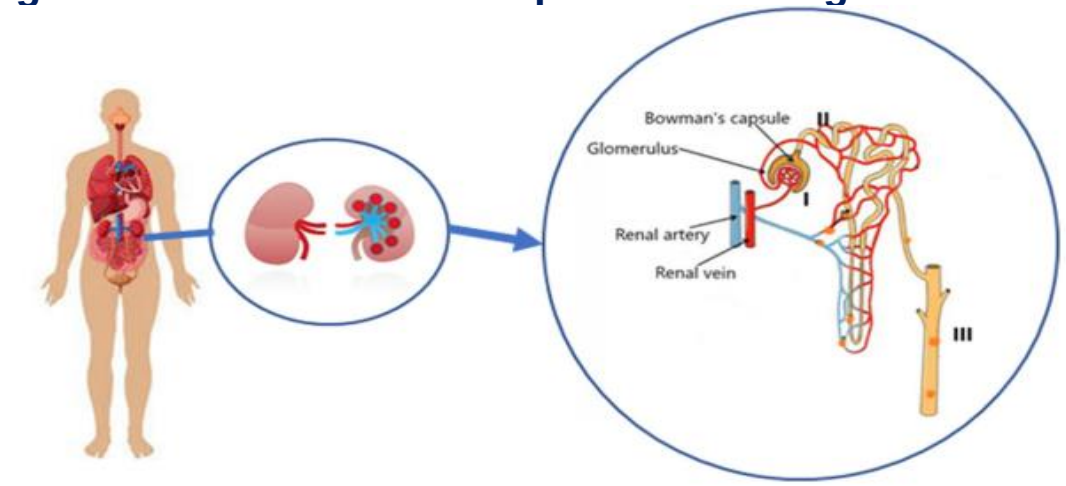


Figure 1. Description of the renal excretion of MPs: (I) through the bloodstream, MPs can flow inside of the glomerular tuft, without passing across the intact filtration barrier due to their size; (II) MPs are uptaken by the epithelial cells of the proximal convoluted tubules through endo- or macropinocytosis and then secreted into the tubular lumen; (III) MPs pass through the tubular system to be excreted with urine [39–42].

Table 1. MPs presence in individual samples, including morphology, size, color, and polymer matrix.

Sample	N. of MPs	Shape	Size	Color	Polymer Matrix
#1 Female	0	-	-	-	-
#2 Female	2	irregular fragment	~15 µm	transparent	polyethylene vinyl acetate
		sphere	~7 µm	brown	polyvinyl chloride
#3 Female	0	-	-	-	-
#4 Male	3	irregular fragment	~5 µm	blue	polypropylene
		irregular fragment	~10 µm	blue/grey	polypropylene
		irregular fragment	~15 µm	green	polypropylene
#5 Male	1	irregular fragment	~4 µm	red	polyethylene
#6 Male	1	irregular fragment	~10 µm	green	polypropylene

MICROPLASTICHE NELLO SPERMA UMANO (luglio 2023)

Science of The Total Environment
Volume 901, 25 November 2023, 165922

Raman Microspectroscopy evidence of microplastics in human semen

Luigi Montano [a b 1], Elisabetta Giorgini [c 1], Valentina Notarstefano [c], Tiziana Notari [d], Maria Ricciardi [e], Marina Piscopo [f 2], Oriana Motta [g 2]

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https://doi.org/10.1016/j.scitotenv.2023.165922

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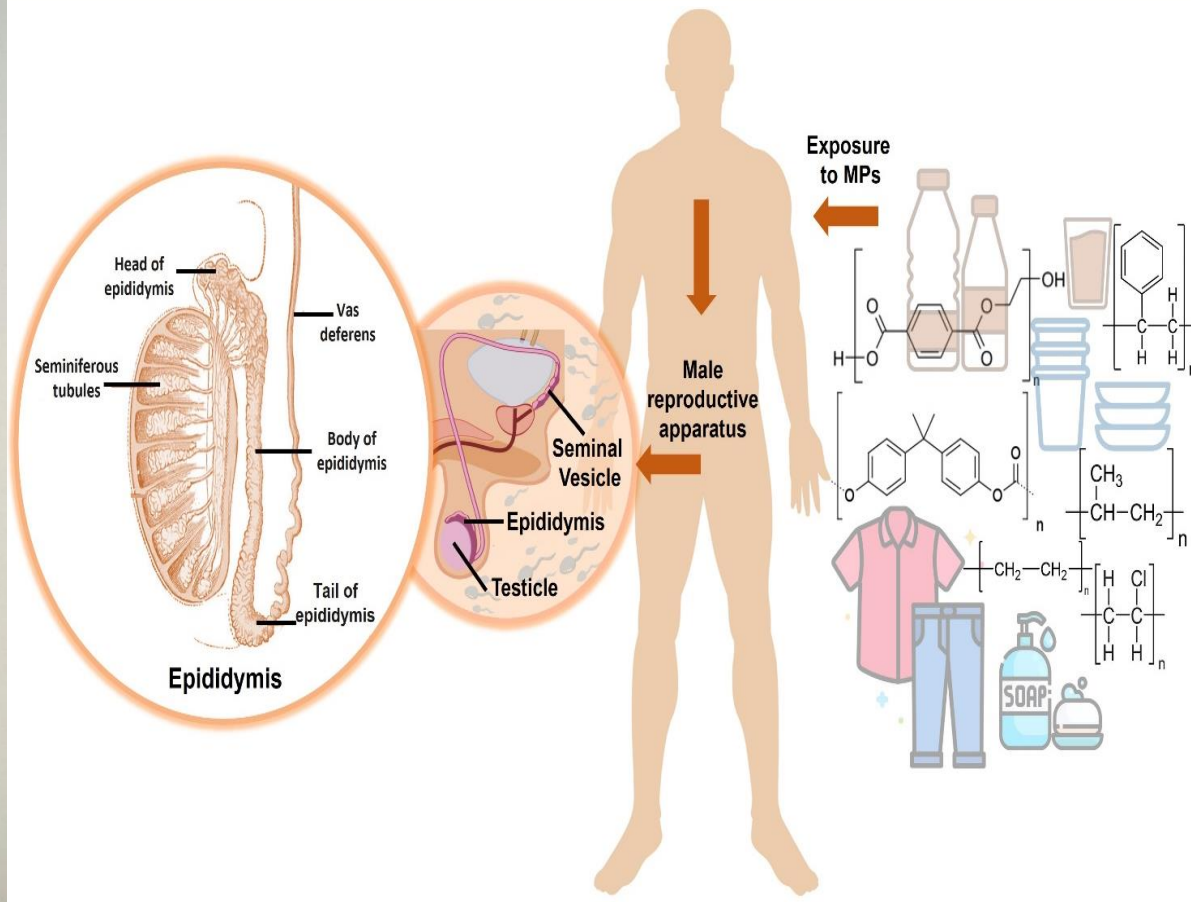

In this study, human semen samples, collected from consenting men, were analyzed by Raman Microspectroscopy to evaluate the presence of microplastics. In total, **16 pigmented microplastic fragments (ranging from 2 to 6 µm in size**), with spheric or irregular shape were found in six out of ten samples; all microplastic particles were characterized in terms of chemical composition and morphology. Chemical composition showed the presence of PP, PE, PET, PS, PVC, PC, POM and acrylic, suggesting ingestion and/or inhalation as a route of exposure to environmental MPs. In this paper, we propose for the first time a mechanism through which MPs pass the testicular barrier, epididymis, seminal vesicles and prostate gland reaching the semen.

MICROPLASTICHE NELLO SPERMA UMANO (luglio 2023)

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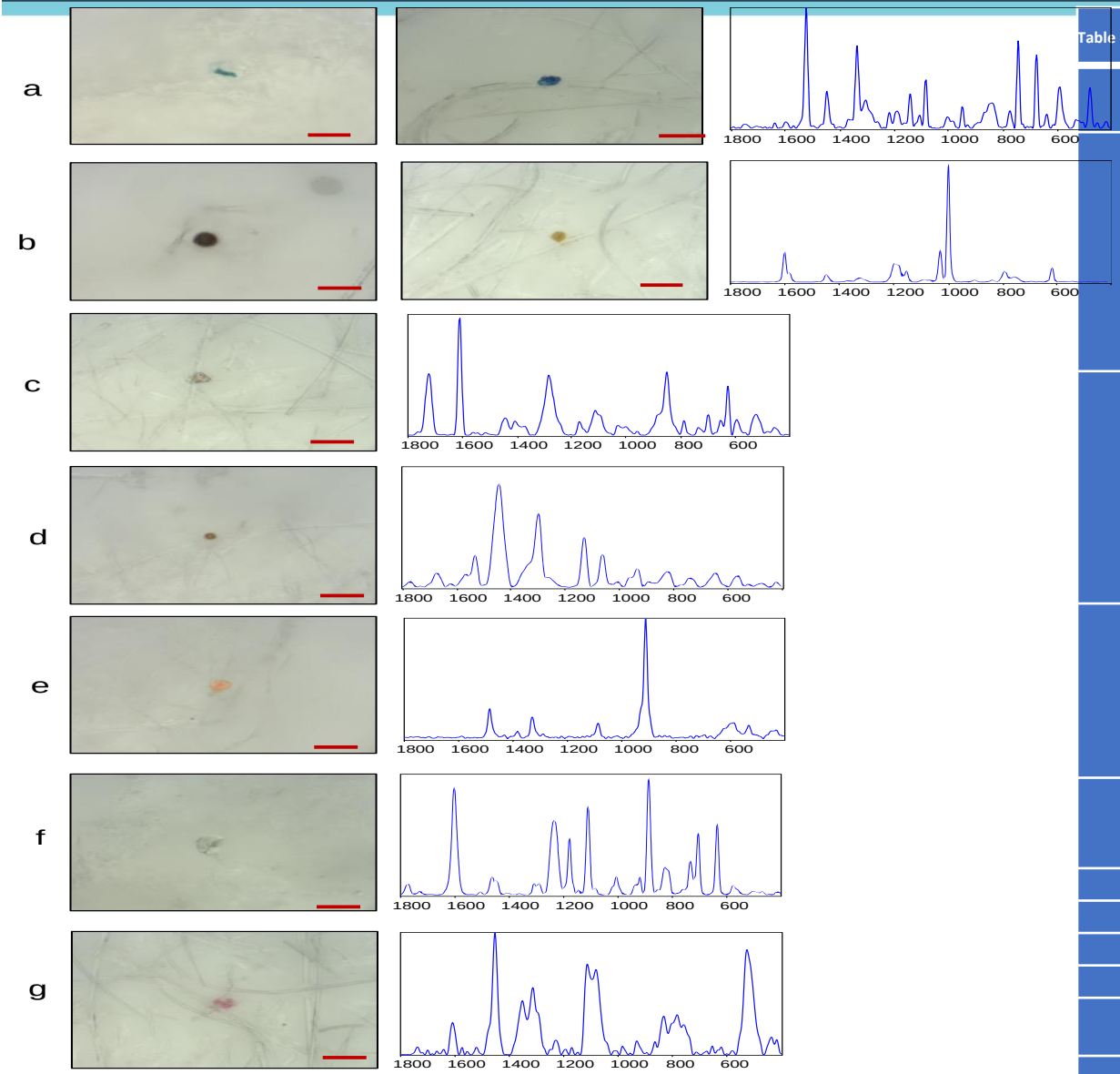

Table 1. Number, morphological (shape, size, color) and chemical (polymer matrix) features of MPs found in human sperm samples.

Sample	N. of MPs	Shape	Size	Colour	Polymer Matrix
#1	5	elongated fragment	~4 µm	green	polypropylene
		sphere	~4 µm	black	polystyrene
		irregular fragment	~3 µm	grey	polyethylene terephthalate
		sphere	~2 µm	orange	polyethylene
		irregular fragment	~3 µm	orange	polyoxymethylene
#2	4	irregular fragment	~6 µm	green	polyethylene terephthalate
		irregular fragment	~3 µm	black	polycarbonate
		irregular fragment	~5 µm	clear	polycarbonate
		irregular fragment	~4 µm	orange	polyvinylchloride
#3	3	irregular fragment	~3 µm	grey	polystyrene
		irregular fragment	~4 µm	blue	polyethylene
		irregular fragment	~3 µm	orange	polypropylene
#4	2	irregular fragment	~6 µm	blue	polyethylene
		sphere	~2 µm	yellow	polystyrene
#5	0	-	-	-	-
#6	0	-	-	-	-
#7	0	-	-	-	-
#8	0	-	-	-	-
#9	1	irregular fragment	~5 µm	blue	polypropylene
#10	1	irregular fragment	~4 µm	magenta	acrylic

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MICROPLASTICHE NELLO SPERMA UMANO (luglio 2023)

Table 2. Results of spermiograms on participants' samples.

ID	Volume (mL)	N°SPS/mL	Rapidly Progressive (%)	Slowly progressive (%)	Non-progressive (%)	Immotile (%)	Morphology (%)	Round cells
#1	2.0	0	0	0	0	0	-	0
#2	2.2	12	5	10	5	80	3	3
#3	1.3	6	25	10	30	35	3	3
#4	1.1	45	20	25	10	45	5	8
#5	1.9	96	15	15	25	45	5	14
#6	2.5	42	25	30	15	30	6	2
#7	3.5	112	35	20	25	20	9	2
#8	2.5	55	25	25	10	40	7	2
#9	3.3	74	30	10	25	35	6	4
#10	2.3	66	20	25	15	40	5	3

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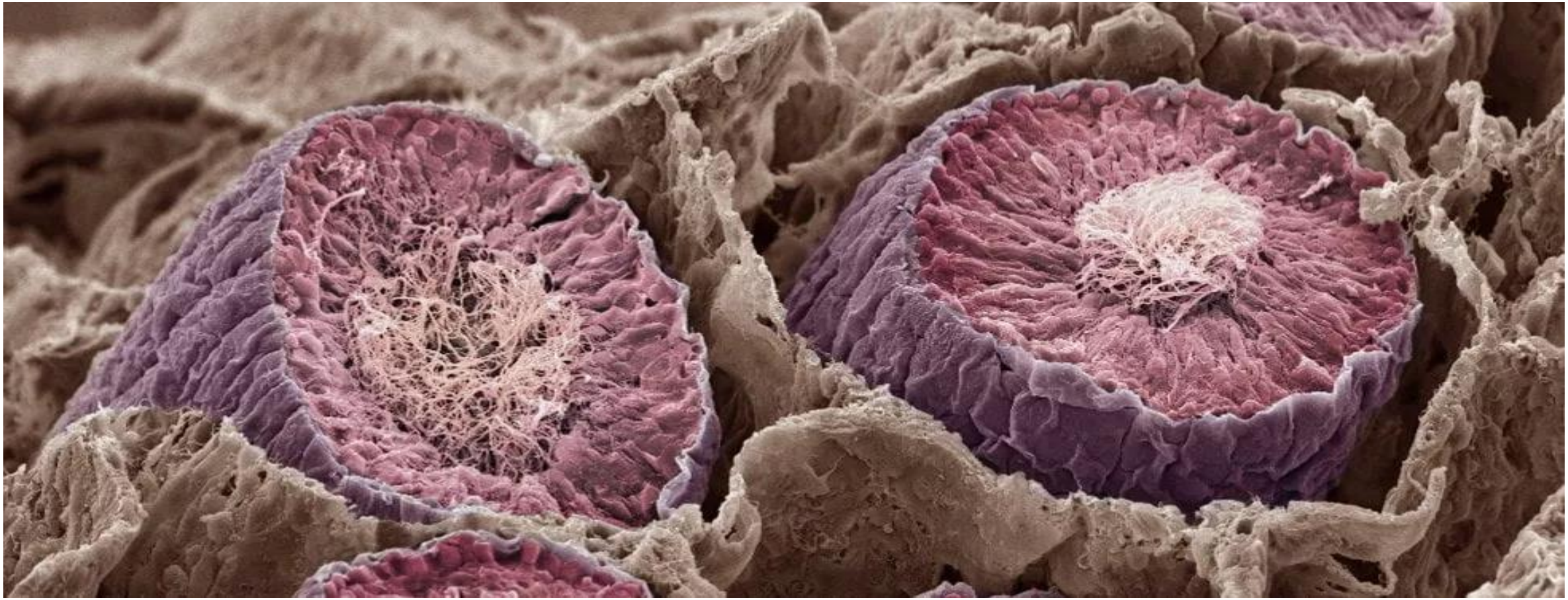
Microplastic presence in dog and human testis and its potential association with sperm count and weights of testis and epididymis.

Toxicological Sciences, 2024 https://doi.org/10.1093/toxsci/kfae060

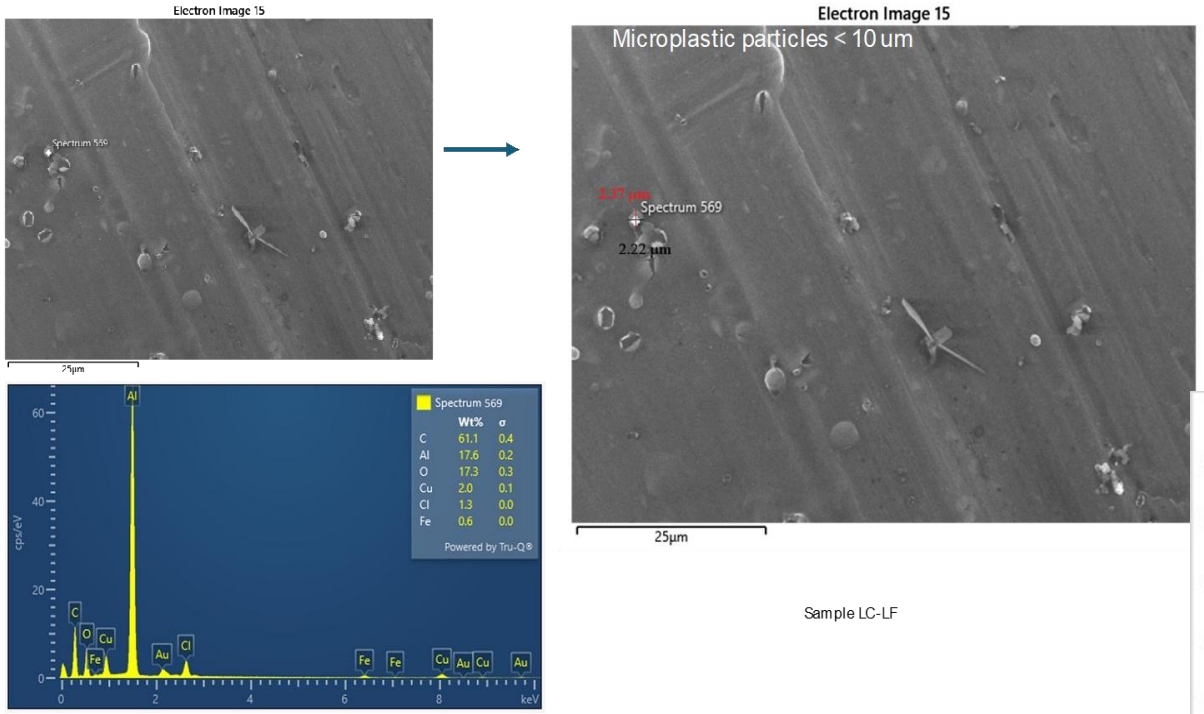
MICROPLASTICA NEI TESTICOLI UMANI: IL POLIETILENE LA PIÙ DIFFUSA



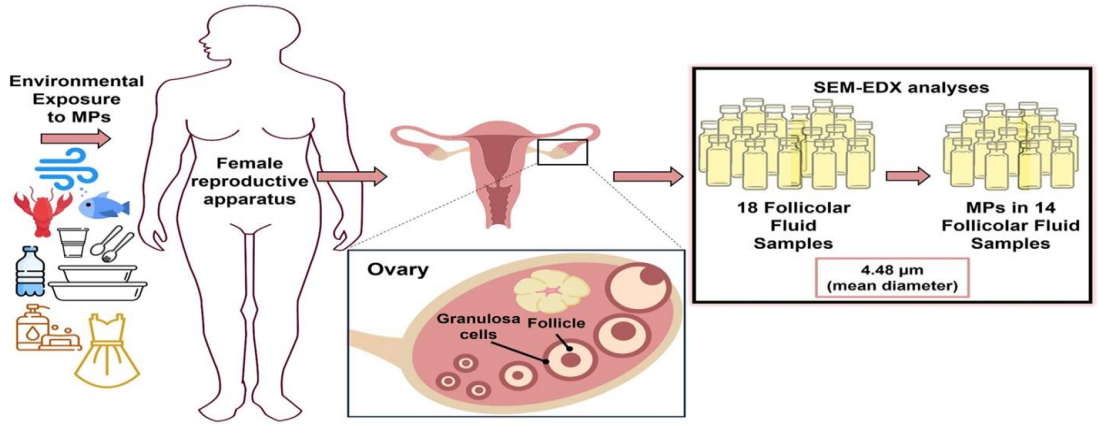
In media i testicoli umani avevano una concentrazione di plastica quasi tre volte superiore a quella riscontrata nei testicoli dei cani, dove la qualità spermatica era risultata ridotta

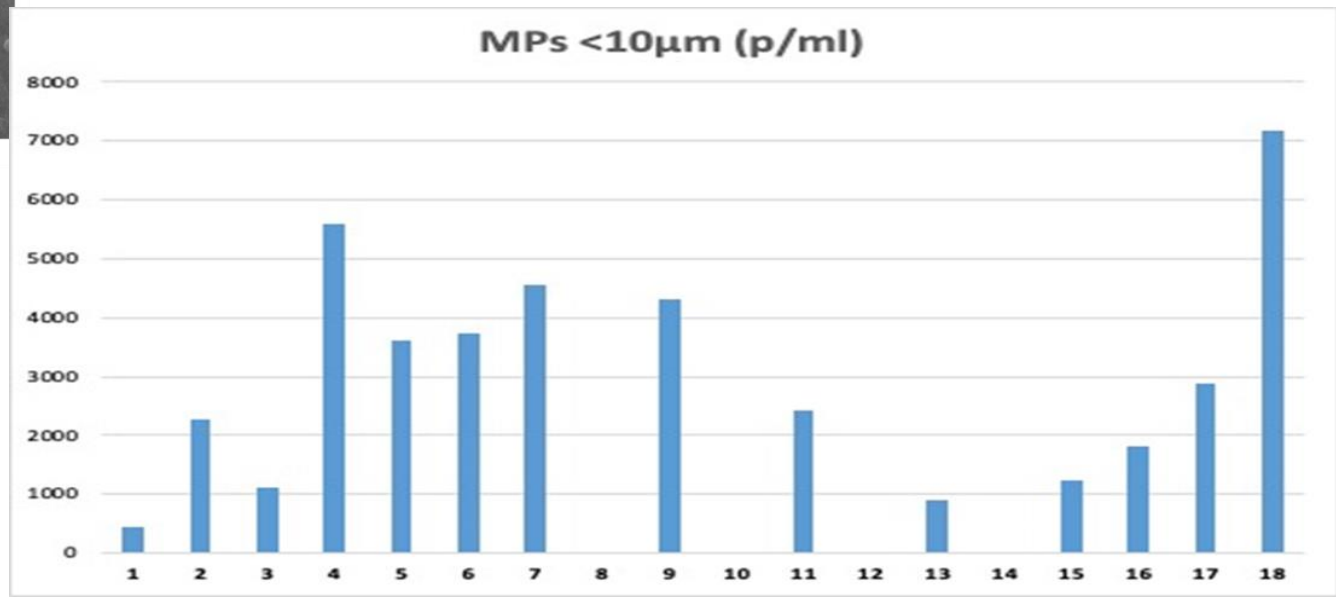
First evidence of microplastics in human ovarian follicular fluid (14 out of 18 samples)

Selected SEM-EDX image microplastics in follicular fluid



Sample LC-LF





N. 442 ~ 7181 p/ml

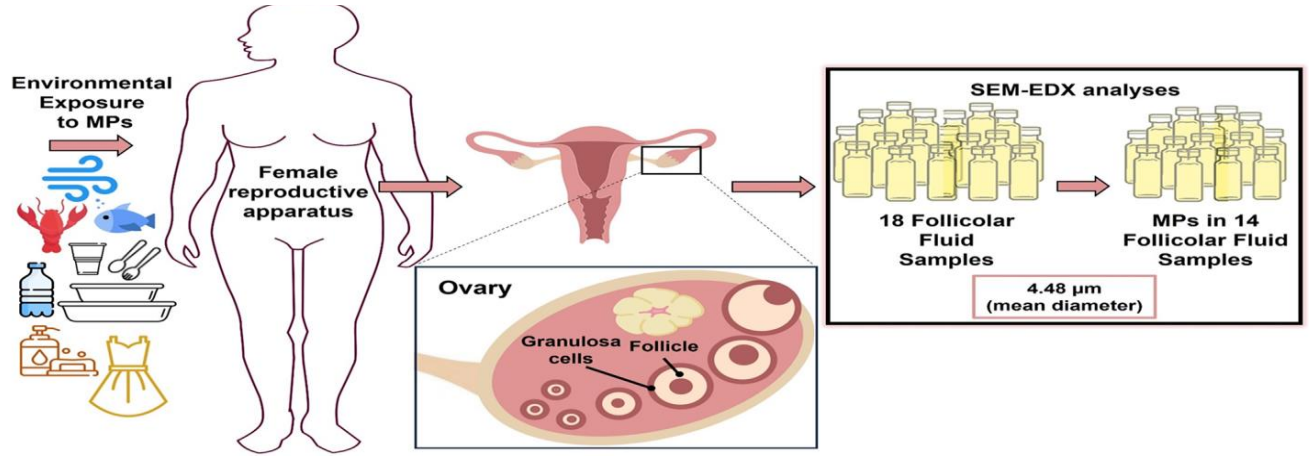
(**mean 2191 p/ml**)

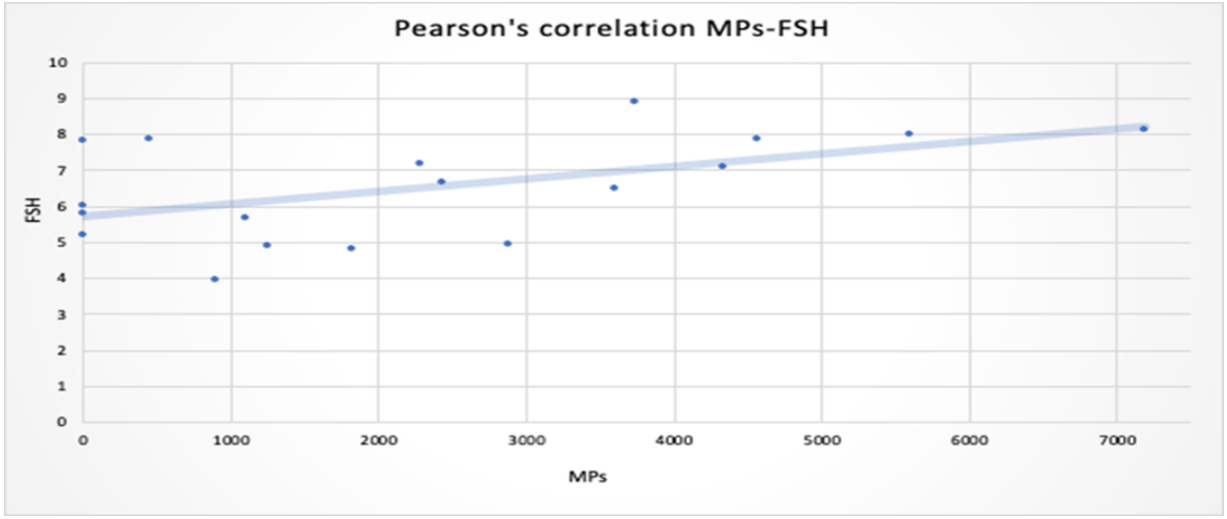
(mean dm: 4.48 µm

Size 3 – 6 µm

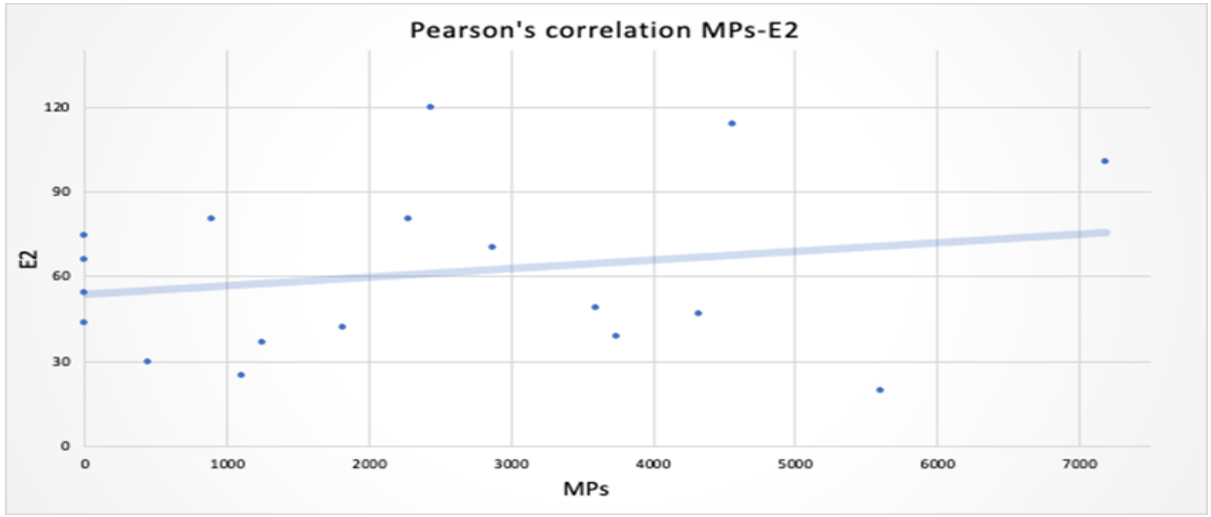
Montano L, Raimondo S, Piscopo M, Ricciardi M, Guglielmino A, Chamayou S, Gentile R, Gentile M, Rapisarda P, Oliveri Conti G, Ferrante M, Motta O.
First evidence of microplastics in human ovarian follicular fluid:an emerging threat to female fertility *MedRxiv* (2024) doi: https://doi.org/10.1101/2024.04.04.2430526

First evidence of microplastics in human ovarian follicular fluid (14 out of 18 samples)





Correlation graph between number of MPs and FSH



Correlation graph between number of MPs and E2

Montano L, Raimondo S, Piscopo M, Ricciardi M, Guglielmino A, Chamayou S, Gentile R, Gentile M, Rapisarda P, Oliveri Conti G, Ferrante M, Motta O.
First evidence of microplastics in human ovarian follicular fluid:an emerging threat to female fertility *MedRxiv* (2024) doi: https://doi.org/10.1101/2024.04.04.2430526

HUMAN SEMEN

EcoFoodFertility

Human Semen

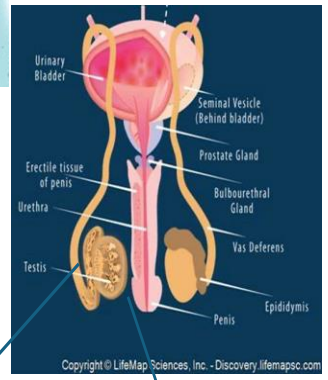
Mean: 3292,00 p/ml

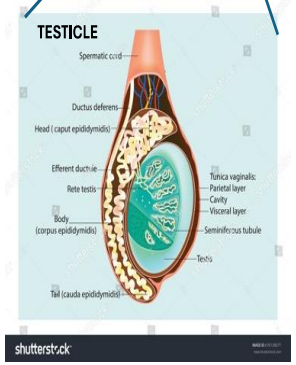
Mean dm: 4,01 µm

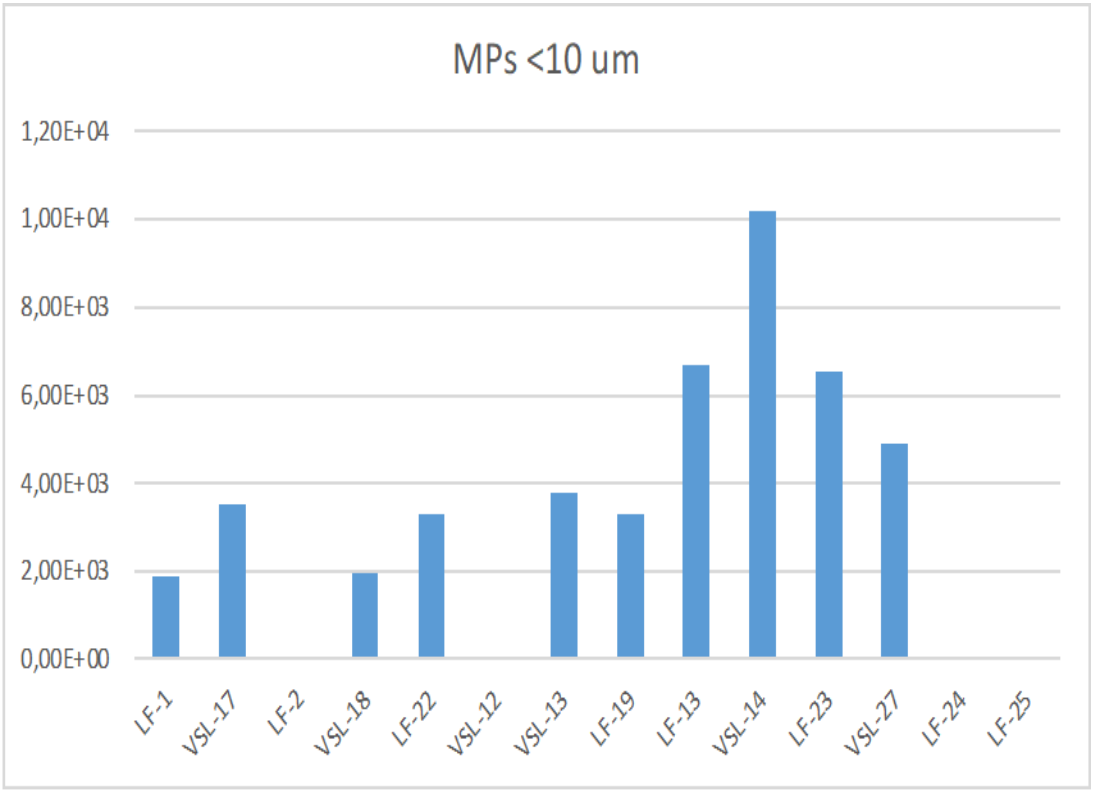
Follicular fluid

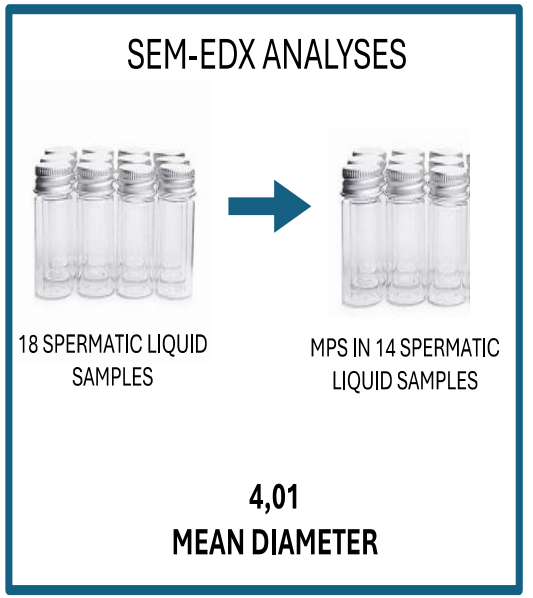
Mean 2191 p/ml

Mean dm: 4.48 µm









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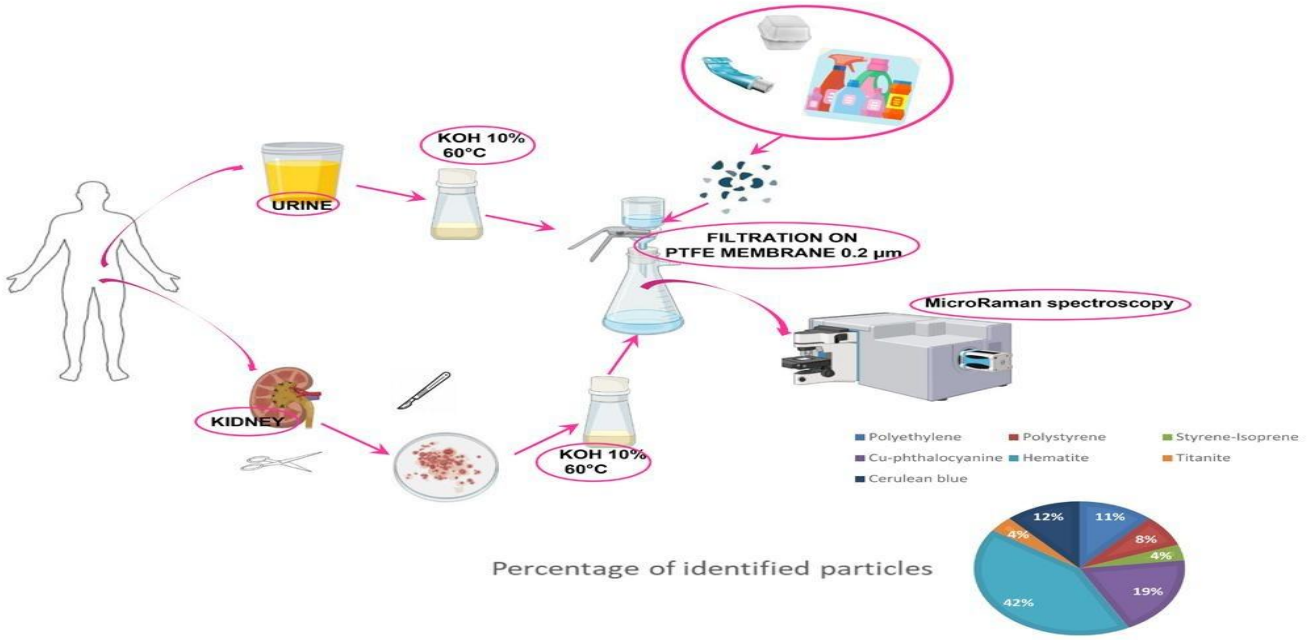
MicroRaman spectroscopy detects the presence of microplastics in human urine and kidney tissue

Environment International Volume 184, February 2024, 108444

Highlights

- Recent evidence reports microplastics' presence in human tissues and fluids.
- MicroRaman spectroscopy is employed to detect microplastics in biological samples.
- 66 microparticles fragments were found **in 10 kidney tissues and 10 urine samples and 26** out 66 were characterized.
- The most often detected pieces and pigments are polyethylene, polystyrene, hematite.



- Few studies investigated the possible toxic effects of MPs in kidney tissues and cells. Wang et al. showed **PS-MPs induced renal histological changes (inflammatory infiltration, tubular and glomerular damage) and alterations of the kidney function in juvenile rats**that, mainly through the stimulation of oxidative stress and inflammation (Wang et al., 2023). These results confirmed other studies observing that mice treated with PS microspheres present increased oxidative stress and inflammatory mediators' activation leading to kidney damage (Meng et al., 2022, Wang et al., 2021). Interestingly, in these studies it seems that plastic particles with smaller size have a more toxic effect on cells (Hwang et al., 2020). Overall, **data suggest that exposure to MPs may constitute a high-risk condition for kidney health.**

Mechanisms of glomerular filtration and tubular secretion or re-absorption for small size MPs and NPs cannot be excluded, while **bigger MPs could undergo passive diffusion and endocytosis and macropinocytosis mechanisms** (Katsumiti et al., 2021, Yang et al., 2022) to be then secreted into the tubules.

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frontiers in Endocrinology

Comparative analysis of the bioaccumulation of Bisphenol A in blood serum and follicular fluid in women living in two areas with different environmental impact

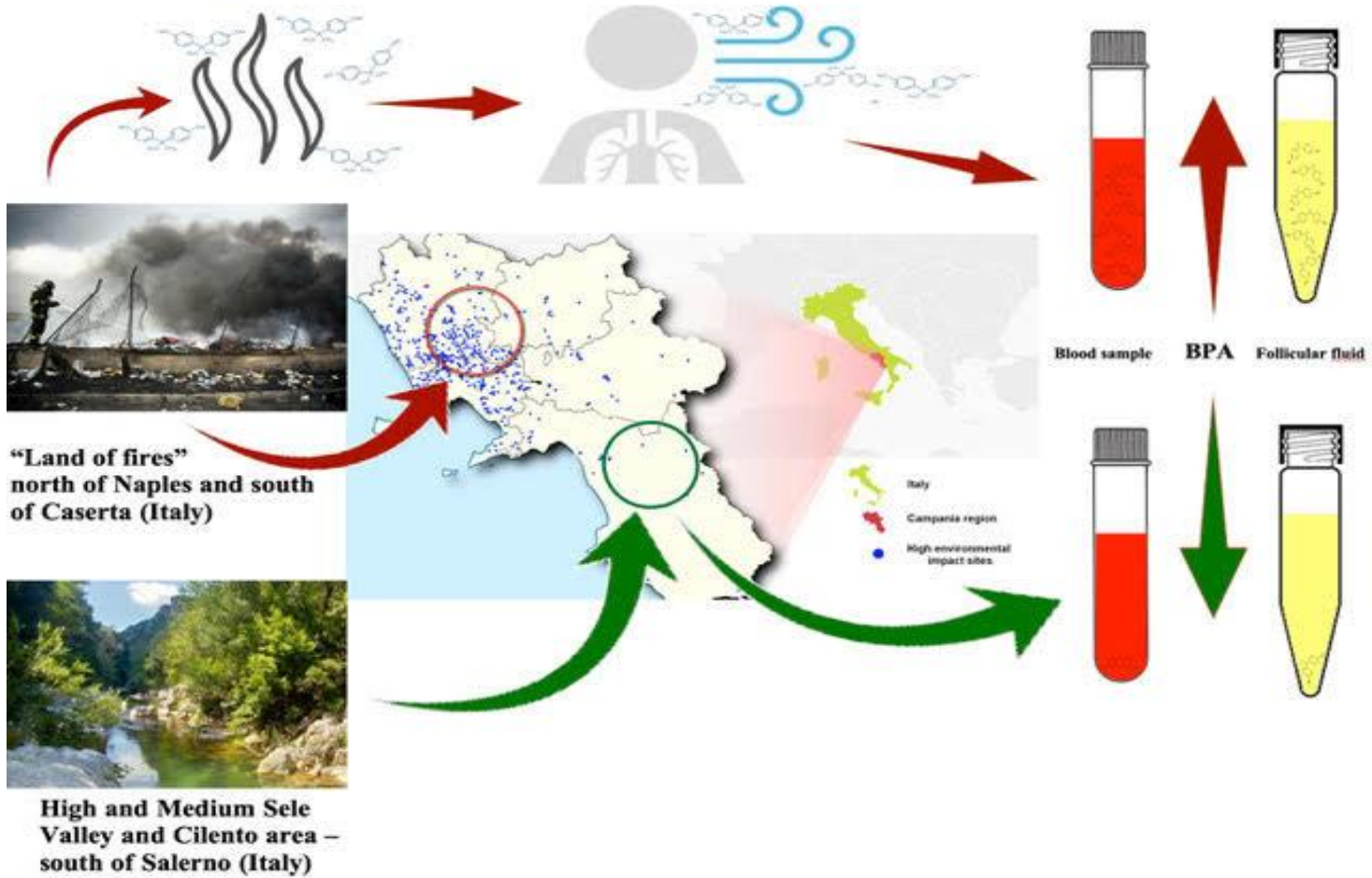
Raimondo et. Al…….. Montano L*Frontier in Endocrinology. Volume 15 - 2024 | doi: 10.3389/fendo.2024.1392550

HIGHLIGHTS

1) Higher BPA levels in blood and follicle fluid in women living in a polluted area

1) BPA in air, can strongly impact BPA accumulation in the body fluids

1) BPA bioaccumulation in blood serum and follicle fluid are not correlated.



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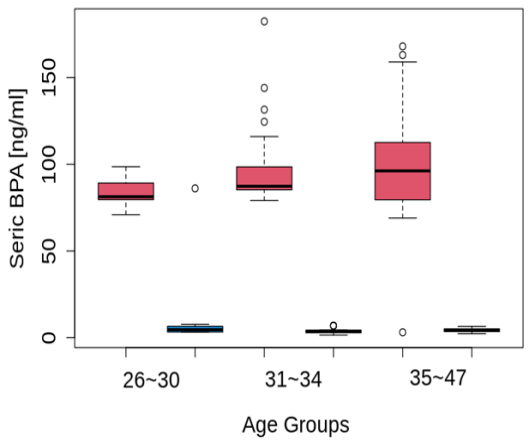
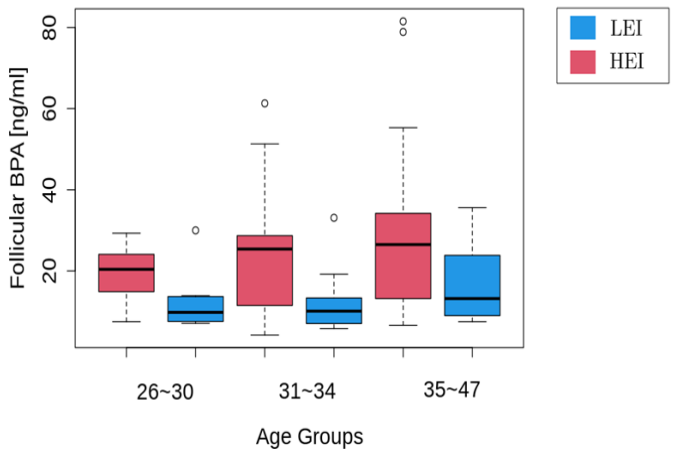
frontiers in Endocrinology

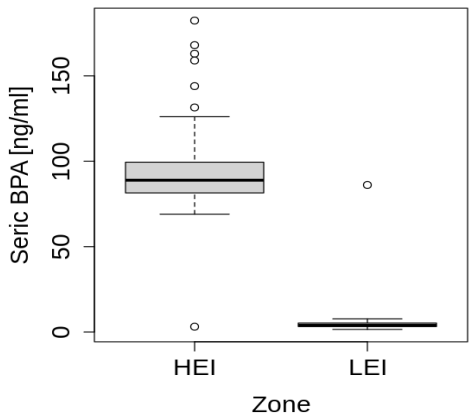
Seric BPA HEI Vs. LEI stratified for Age groups



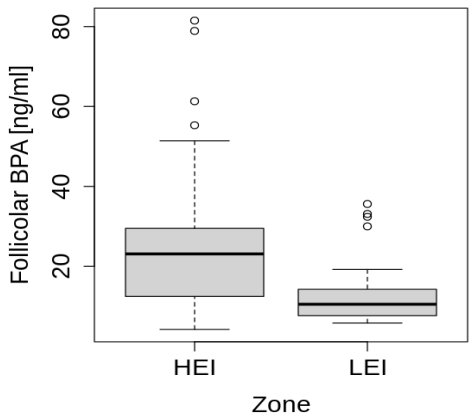
Follicular BPA HEI Vs. LEI stratified for Age groups



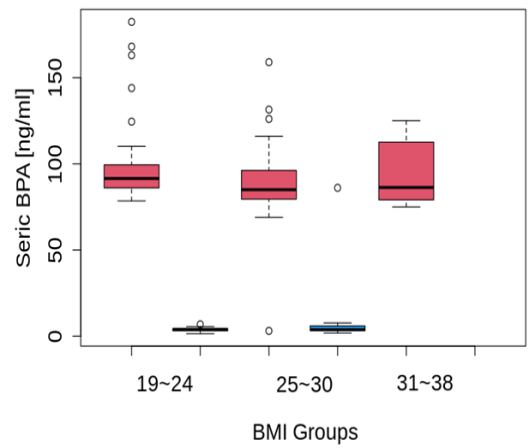
Seric BPA HEI vs LEI



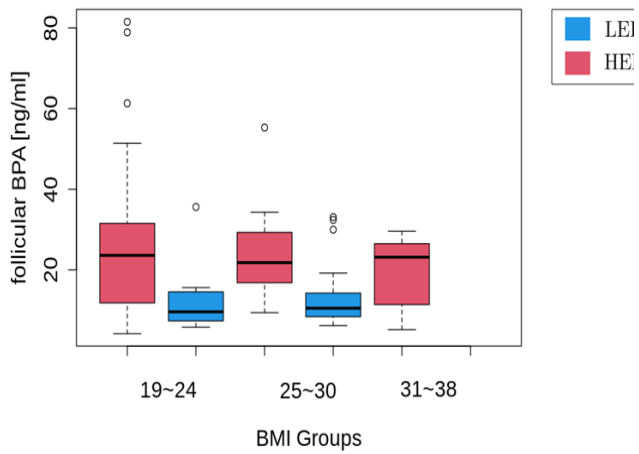
Follicular BPA HEI vs LEI



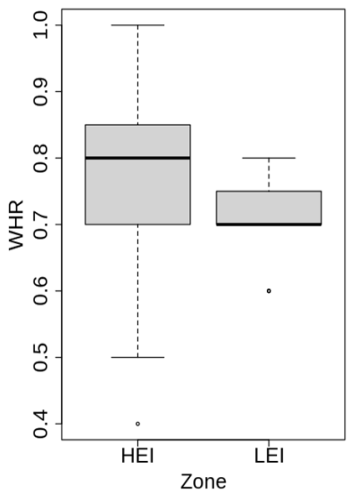
Seric BPA HEI Vs. LEI stratified for BMI groups



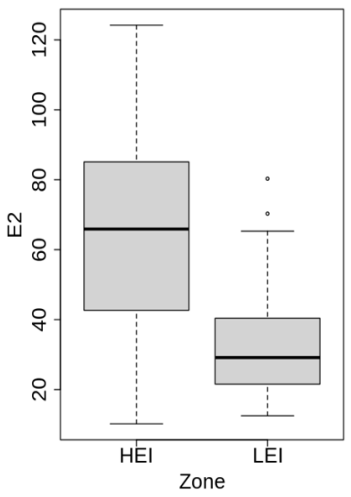
Follicular BPA HEI Vs. LEI stratified for BMI groups



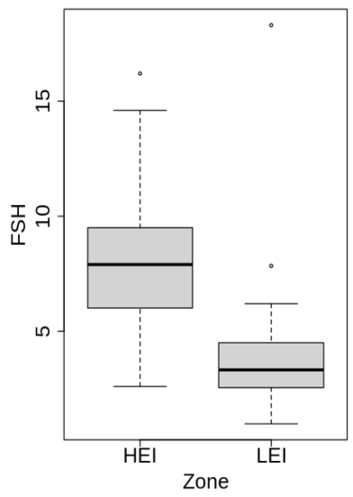
WHR vs. Zone



E2 vs. Zone



FSH vs. Zone



Influence of microplastics on the bioconcentration of organic contaminants in fish: Is the “Trojan horse” effect a matter of concern?☆

Author links open overlay panel, , ,

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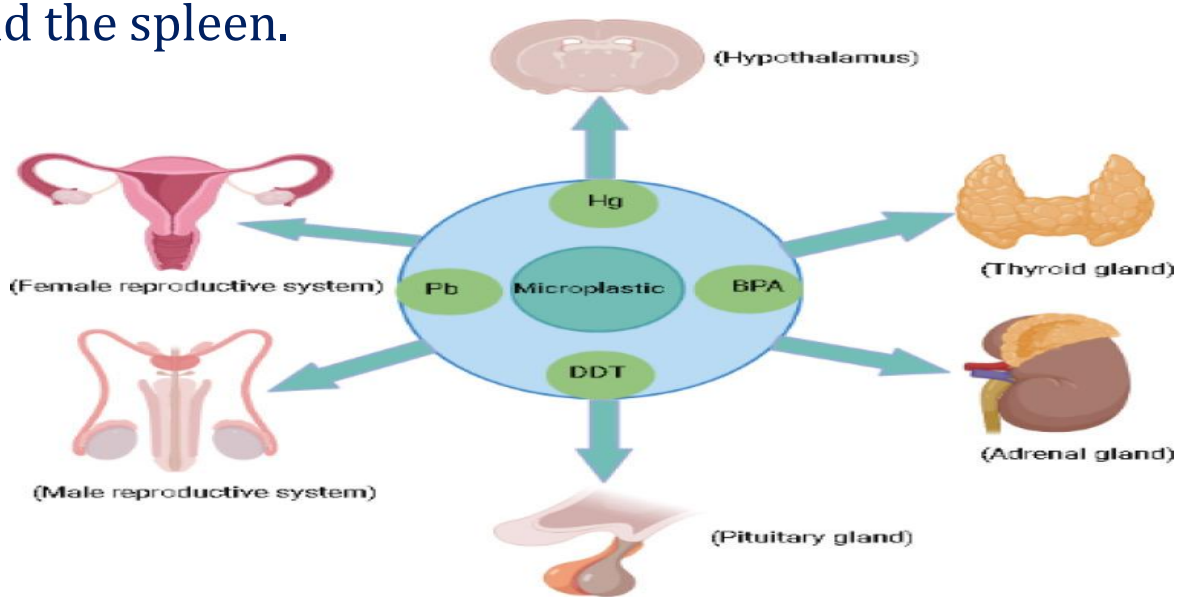
The large surface area and **hydrophobic surface** of MPs make them a suitable medium for carrying many **pollutants such as EDCs, heavy metals, and other toxic organic chemicals**, making them harmful to mammals through bioaccumulation and biomagnification processes . **These are called “Trojan Horse Effects” of MPs, and induce several synergistic, behavioral, histological, and biomolecular alternations.** Studies have shown that MPs of size **0.1-10 µm** can cross biological membranes, blood-brain barrier, and even placenta, enhancing the possibilities of their bio-accumulation in secondary tissues such as the liver and brain . While MPs **<150µm** can cross the gastrointestinal tract, those **<5µm** can accumulate in macrophages and be carried to the blood circulation and the spleen.



- Influence of microplastics on the bioconcentration of organic contaminants in fish: Is the “Trojan horse” effect a matter of concern? Scell A et al. Environmental Pollution. Volume 306, 1 August **2022,** 119473
- A review of the endocrine disrupting effects of micro and nano plastic and their associated chemicals in mammals. Ullah S et al, Front Endocrinol. **2022**. 13: 1084236.

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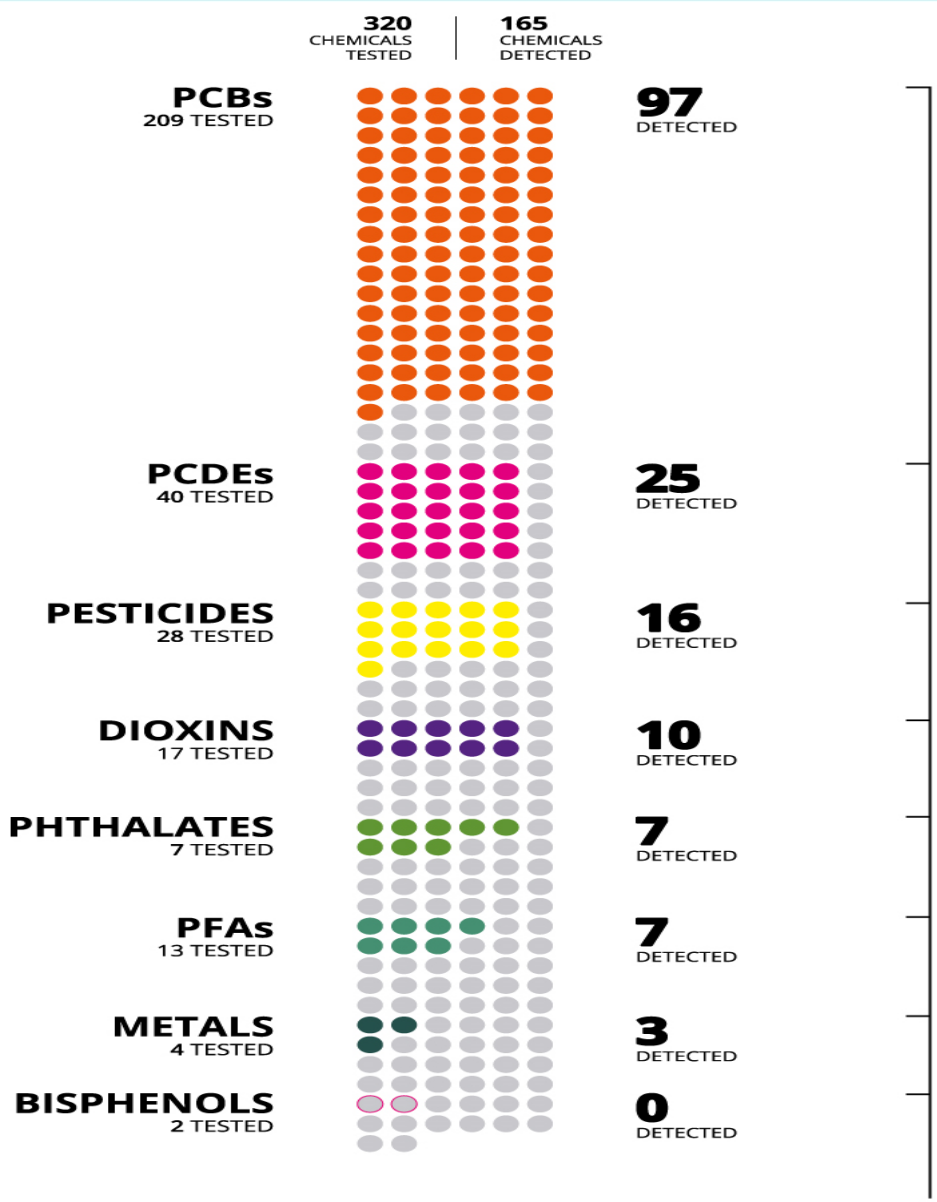
1251 reproductive hazards

Int J Environ Res Public Health. 2019 Jan 28;16(3



RESULT OF CONCER

BDE- 47 (Tetra)
*Test Result: 249 ppb**
CDC Mean: n/a

HEALTH EFFECTS (SUSPECTEL
- thyroid
- neurodevelopmental

Now being phased out, this fire retardant is in many products and resists environmental degradation.

Dieldrin
Test Result: 5.11 ppb
CDC Mean: n/a

HEALTH EFFECTS
- neurological
- kidney

A pesticide once used to kill termites and other soil insec it still lingers in the environment.

p.p.-DDE
Test Result: 256 ppb
CDC Mean: 295 ppb

HEALTH EFFECTS (SUSPECTEL
- reproductive
- liver

A breakdown product of DDT (now banned) that lingers in the body, it has health effect similar to those of the pesticide.

mMeP
Test Result: 34.8 ppb
CDC Mean: 1.15 ppb

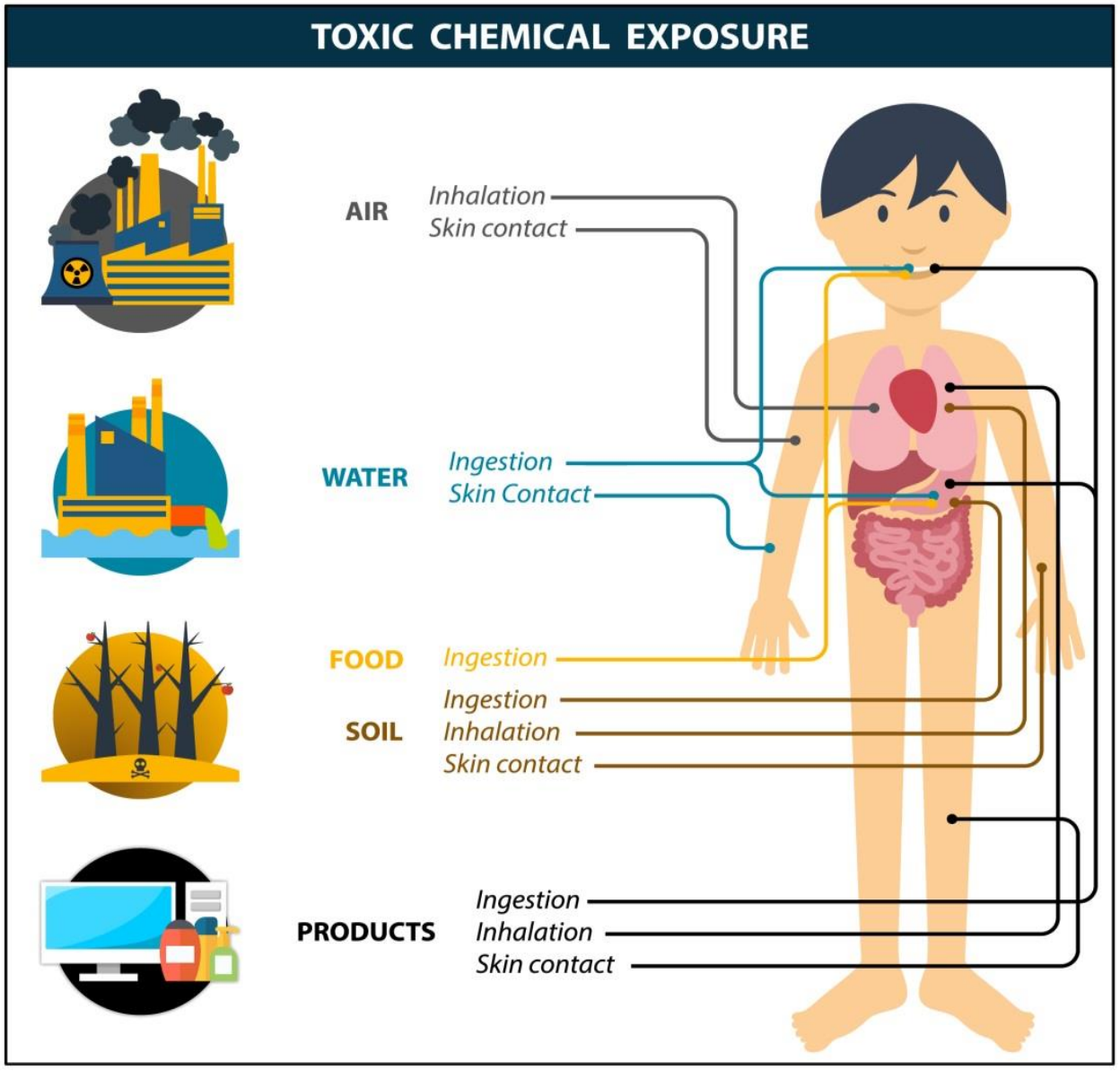
HEALTH EFFECTS (SUSPECTEL
- reproductive

It's a member of a class calle phthalates, used to thicken lotions and make plastics flexible

Mercury
Test 1: 5 micrograms/liter
Test 2: 12 micrograms/l
CDC Poisoning Level: 10

HEALTH EFFECTS
- neurological
- reproductive

Duncan's blood level of the toxic metal more than doubled after he ate two meals of swordfish and halibut.



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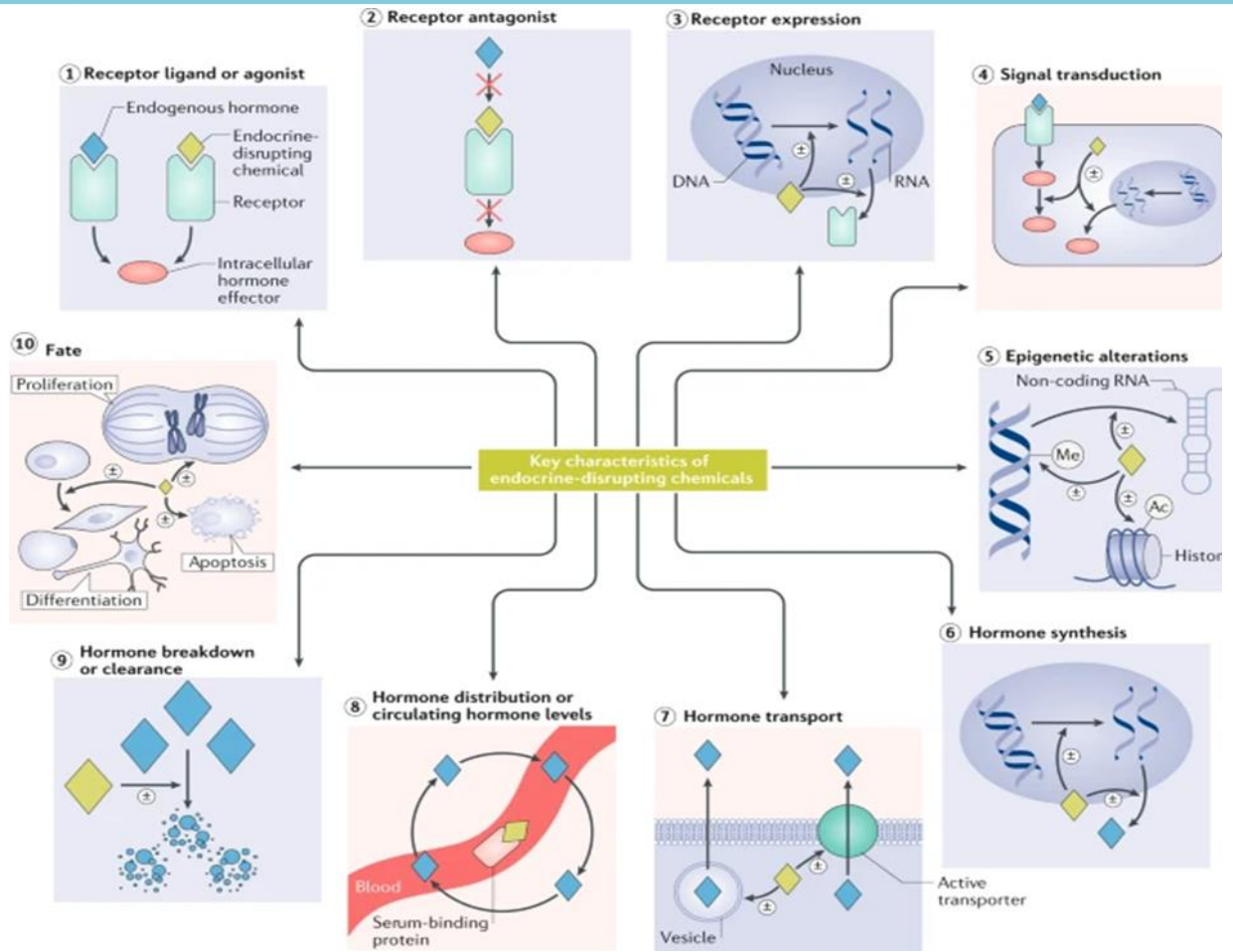
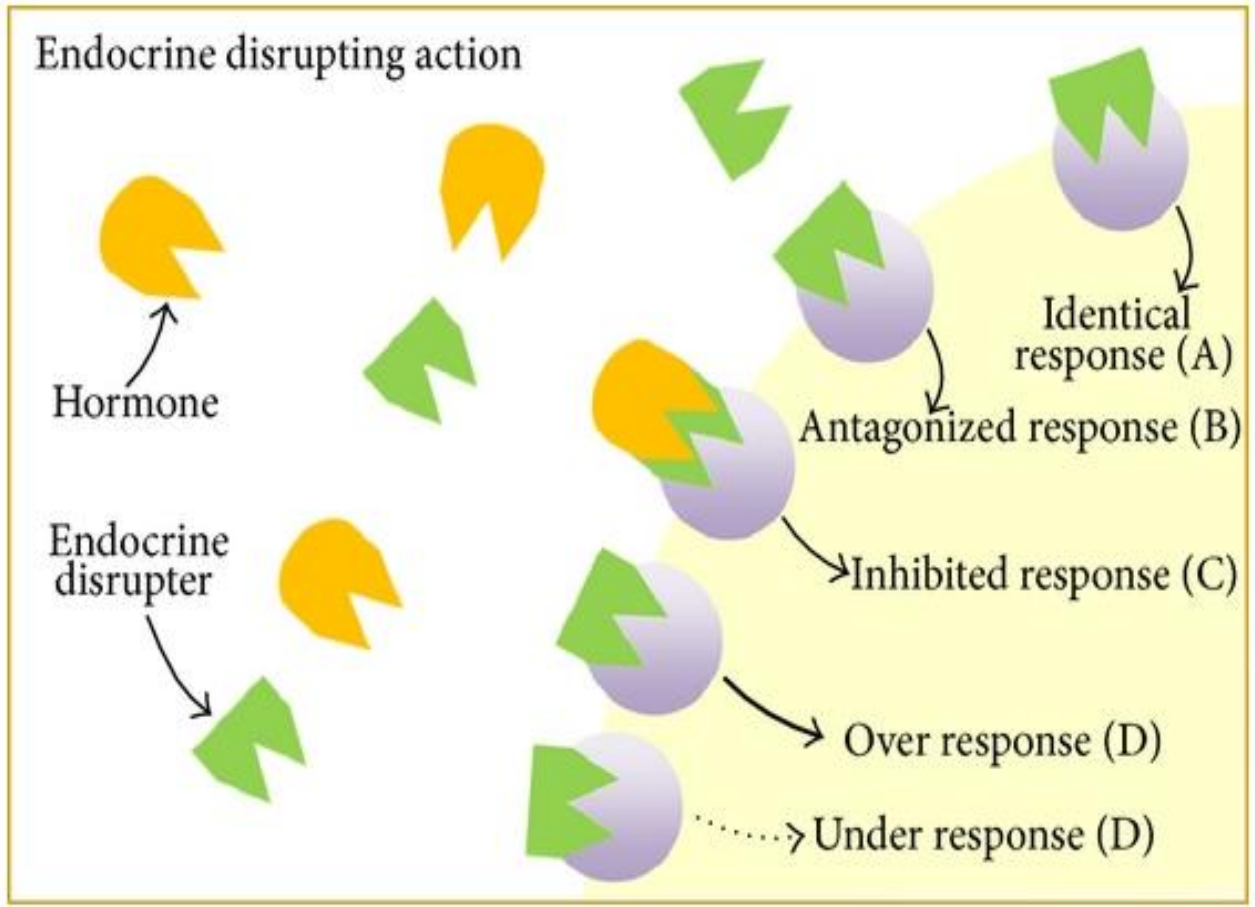
Consensus on the key characteristics of endocrine- disrupting chemicals as a basis for hazard identification.

Michele A. La Merrill et al. Nature Endocrinology, 2020





Heterogeneous group of exogenous substances characterized by their ability to negatively interfere with the processes of synthesis, secretion, transport, metabolism, receptor interaction, or elimination of hormones, causing adverse effects on the health of an organism, its progeny, or a (sub)population.

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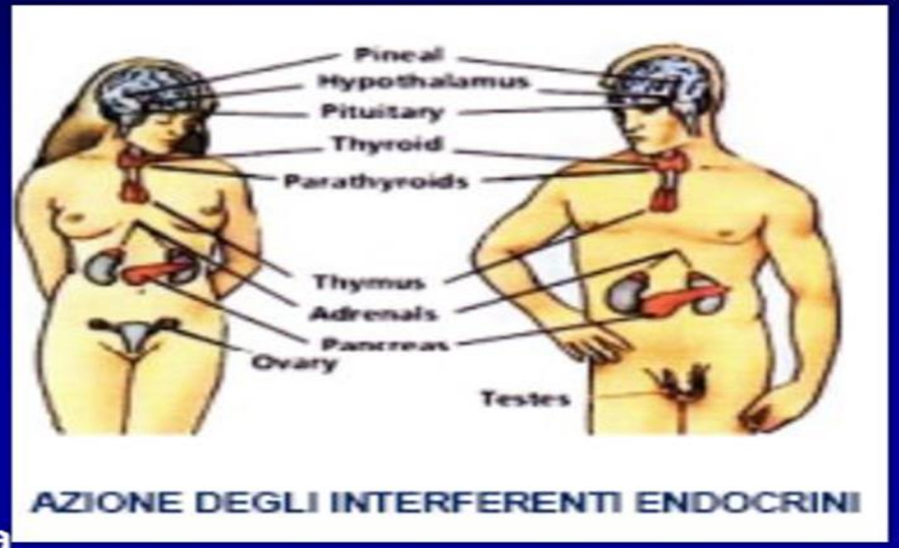
EFFETTI SULLA SALUTE RICONDUCIBILI ALL'AZIONE DI *INTERFERENTI ENDOCRINI*

- disfunzioni ormonali (specie alla tiroide) e metaboliche
- sviluppo puberale precoce
- diminuzione fertilità
- abortività spontanea, endometriosi, gravidanza extrauterina, parto pre termine
- disturbi autoimmuni
- aumentato rischio di criptorchidismo e ipospadia
- diabete/ alcune forme di obesità
- elevato rischio di tumori
- deficit cognitivi e disturbi comportamentali
- patologie neurodegenerative
- danni *transgenerazionali*



AZIONE DEGLI INTERFERENTI ENDOCRINI

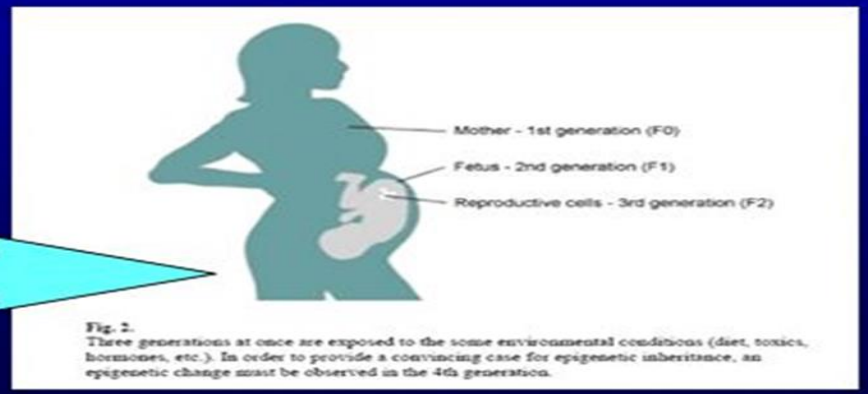


Fig. 2.
Three generations at once are exposed to the same environmental conditions (diet, toxics, hormones, etc.). In order to provide a convincing case for epigenetic inheritance, an epigenetic change must be observed in the 4th generation.

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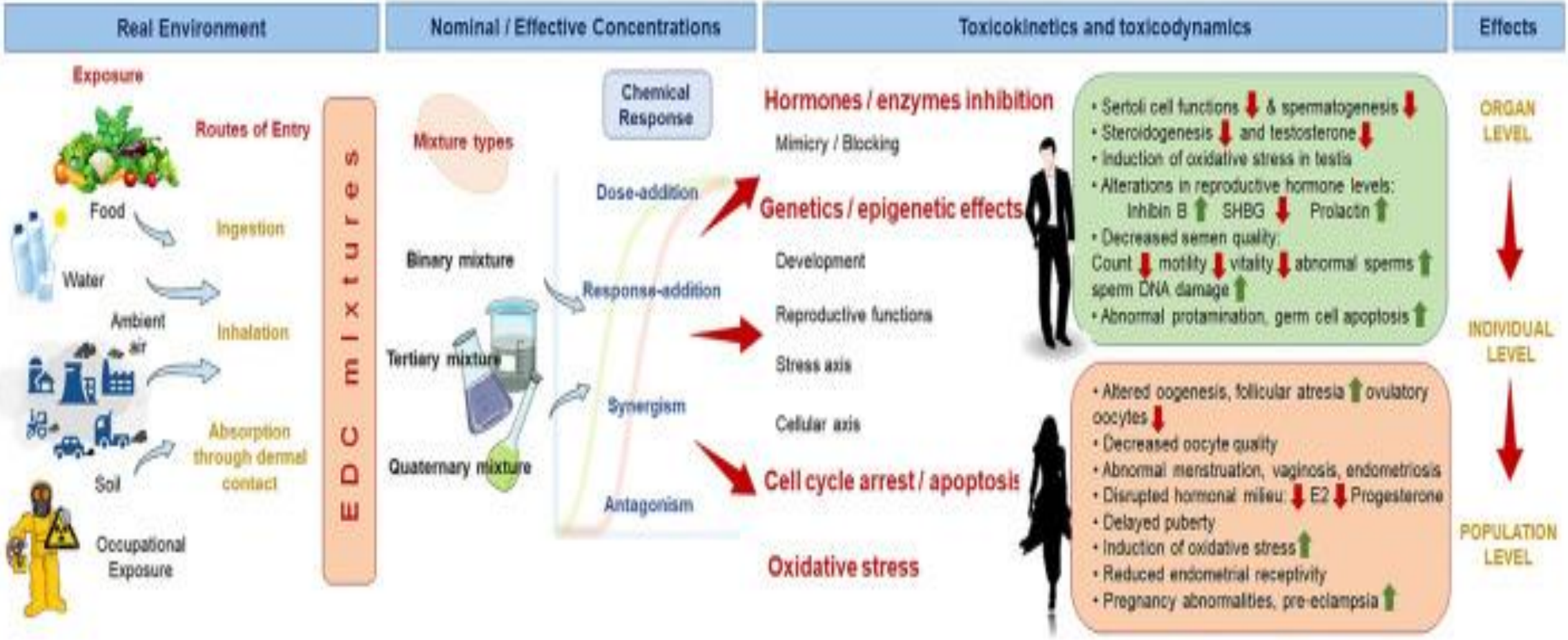
Reproductive toxicity of combined effects of endocrine disruptors on human reproduction

Sulagna Dutta et al. Front Cell Dev Biol. 2023; 11: 1162015



EcoFoodFertility

Effects of lifestyle factors on fertility: practical recommendations for modification

Reproduction and Fertility **(2021) 1** R13–R26
https://doi.org/10.1530/RAF-20-0046

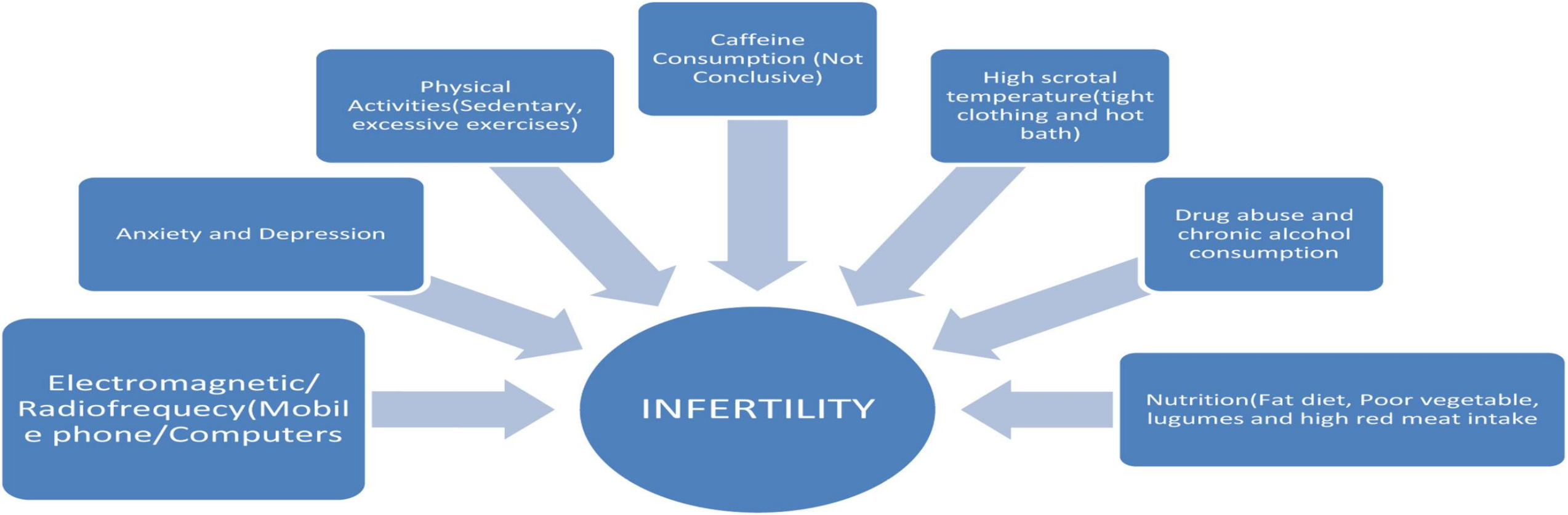


Figure 1 Schematic representation of lifestyle behaviors on infertility in both males and females.

EcoFoodFertility

Impact of environmental factors on human semen quality and male fertility: a narrative review.

Naina Kumar & Amit Kant Singh

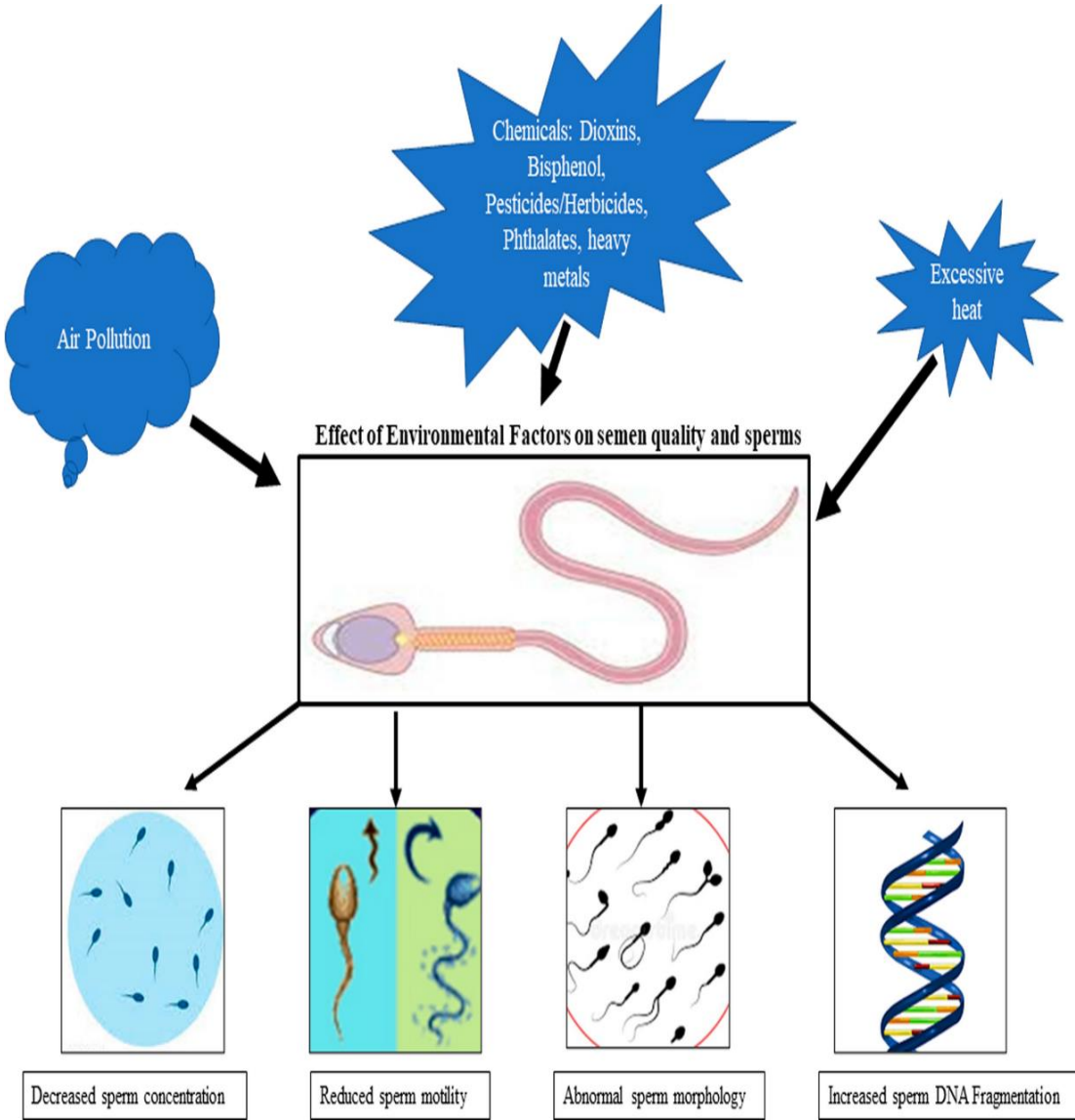
Environmental Sciences Europe volume 34, Article number: 6 (2022)

Background

Worldwide rising trend in infertility has been observed in the past few years with male infertility arising as a major problem.

The present **review** focuses on some of these environmental factors that affect semen quality and hence, can cause male infertility. The literature from **2000 till June 2021** was searched from various English peer-reviewed journals Conclusion

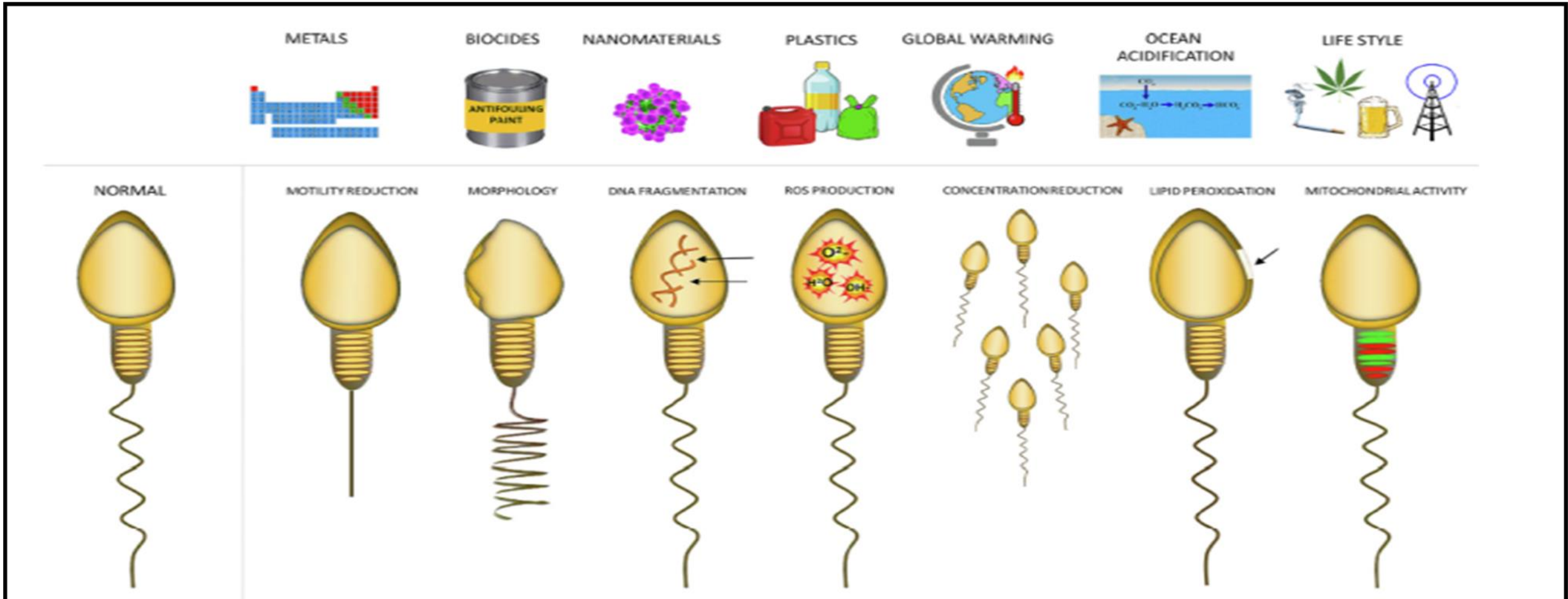
Adverse environmental factors have a significant impact on semen quality, leading to decreased sperm concentration, total sperm count, motility, viability, and increased abnormal sperm morphology, sperm DNA fragmentation, ultimately causing male infertility. However, all these factors are modifiable and reversible, and hence, by mere changing of lifestyle, many of these risk factors can be avoided.



EcoFoodFertility

Gamete Quality in a Multistressor Environment

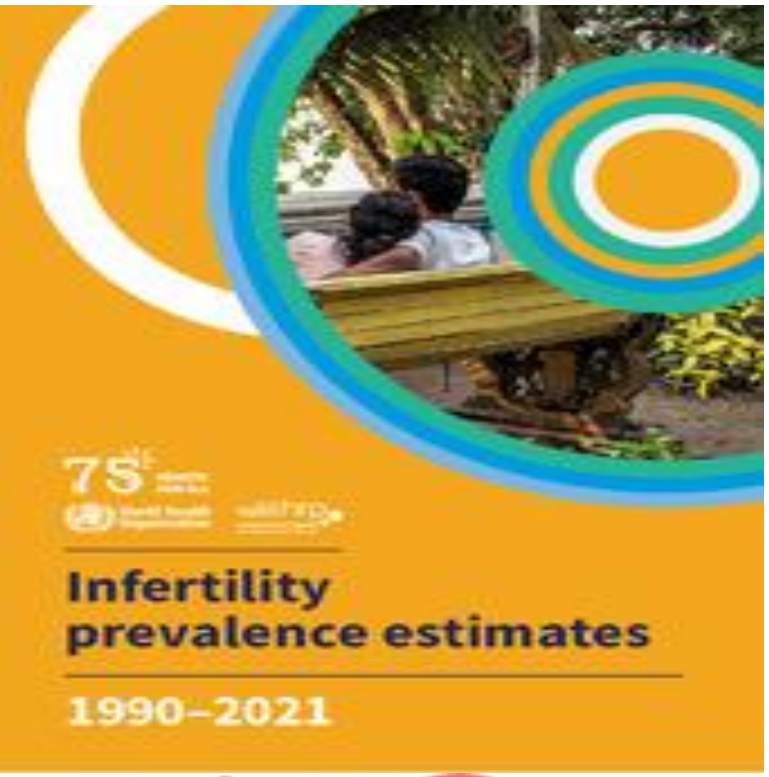
Review, 2020 May;138:105627.
doi: 10.1016/j.envint.2020.105627

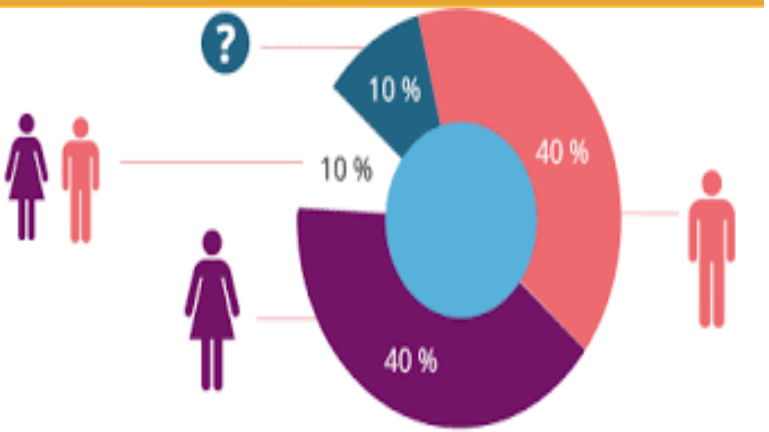


EcoFoodFertility

3 Aprile 2023

Report OMS su prevalenza infertilità basata sU 133 studi a livello globale, dal 1990 al 2021 (1 COPPIA SU 6 INFERTILE)





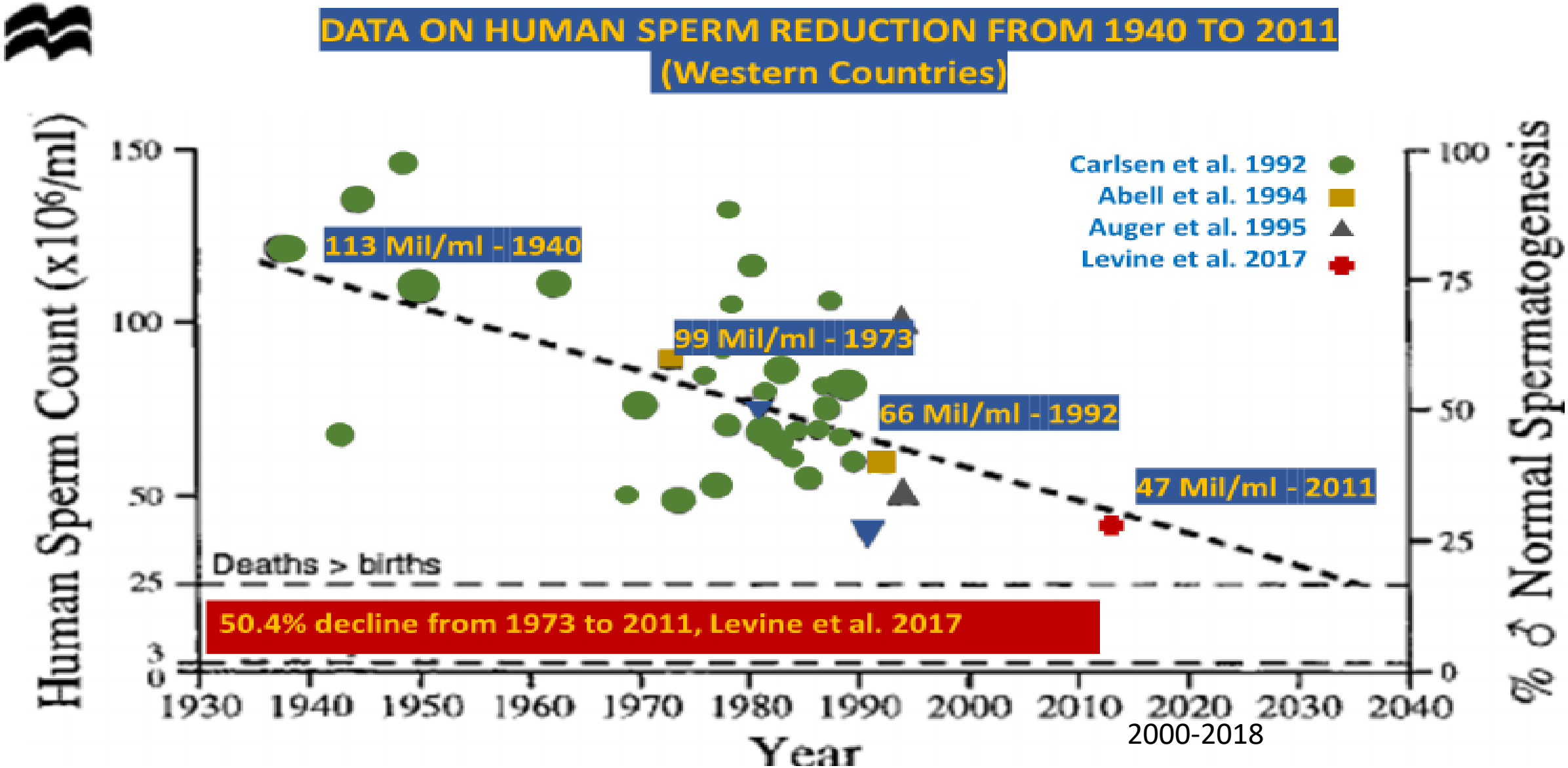
1) **Il fenomeno è globale con una prevalenza del 17.5 %**
2) **Variazione limitata di prevalenza fra regioni, stimata al 17,8% nei paesi ad alto reddito e al 16,5% nei paesi a basso e medio reddito.**
3) **monito ai governi per attivare politiche e finanziamenti pubblici adeguati per campagne di prevenzione, per percorsi diagnostici adeguati e cure, comprese il trattamento con tecnologie di riproduzione assistita spesso inaccessibili per molti a causa dei costi molto elevati**

MA IL FENOMENO E' SOTTOSTIMATO...PERCHE'

- ***Studi prevalentemente basati sull'infertilità femminile, pochi sulla coppia ed ancor meno sul fronte maschile, che oggi sembra prevalente***
- ***Mancanza di dati da diversi paesi molto popolosi come India, Bangladesh, diversi africani e sudamericani***
- ***Sono dati prepandemia***
- ***Esistono differenze fra paesi e anche all'interno della stessa regione per fattori anche di nocività ambientale (prevalenza molto più alta, anche 1 coppia su 4)***

EcoFoodFertility

This decline leads us to consider human semen as the most faithful mirror of lifestyle and environmental changes in the last 70 years in western countries

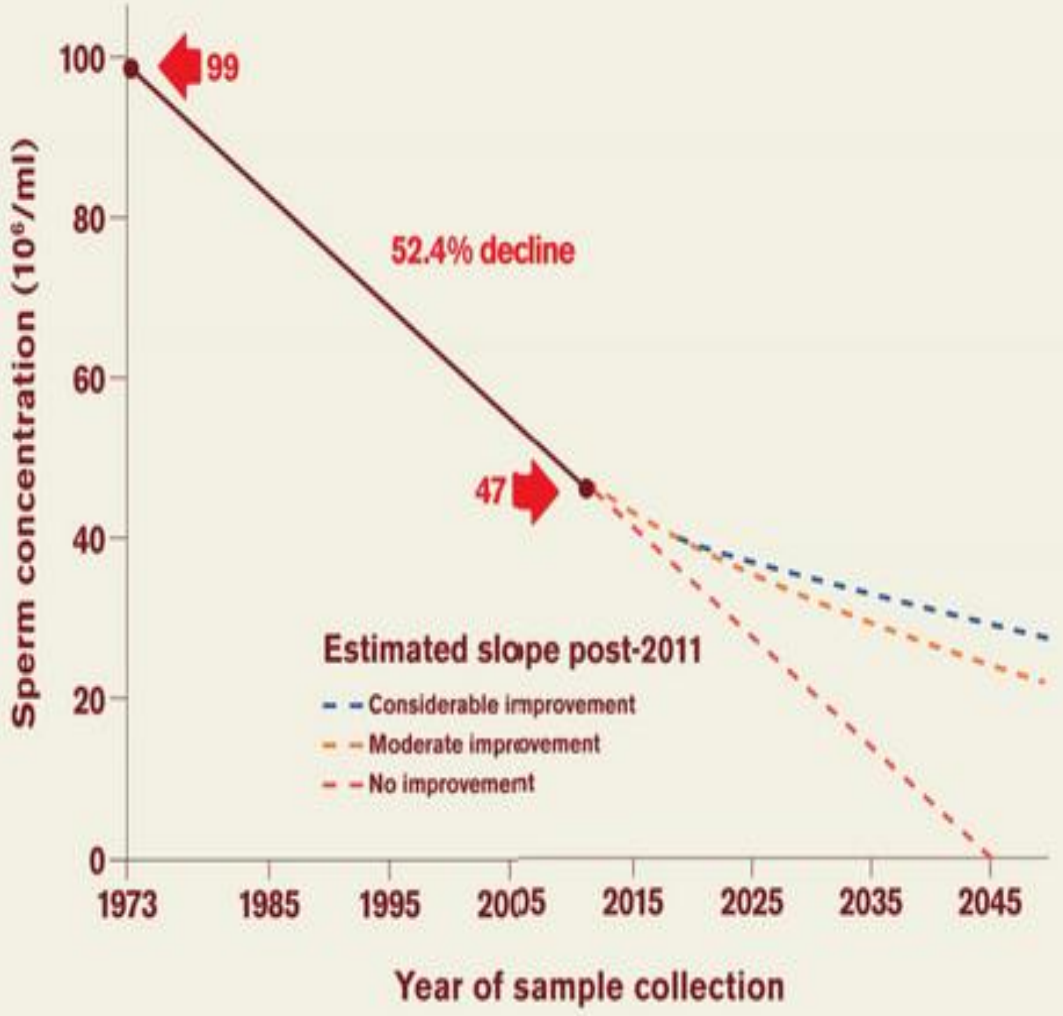


2000-2018

Declino spermatico dal 1973 al 2011 nei paesi occidentali (Nord America, Europa, Australia) (Levine et al. 2017)

EcoFoodFertility

Sperm Decline in Western Countries



In dimunuzione la concentrazione di spermatozoi

1973
99
milioni per ml

2011
47,1
milioni per ml

in 38 anni
concentrazione dello sperma
-52,4%

Fonte: Human Reproduction Update

EcoFoodFertility

Declino spermatico nei vari paesi del mondo

Evidence for decreasing sperm count in African population from 1965 to 2015

Pallav Sengupta[1,2], Uchenna Nwagha[2], Sulagna Dutta[1], Elzbieta Krajewska-Kulak[3], Emmanuel Izuka[4]

RESEARCH Open Access

Decline in seminal quality in Indian men over the last 37 years

Priyanka Mishra[1], Mahendra Pal Singh Negi[2], Mukesh Srivastava[2], Kiran Singh[3] and Singh Rajender[1*]

human reproduction update

Temporal trends in sperm count: a systematic review and meta-regression analysis of samples collected globally in the 20th and 21st centuries

Hagai Levine[1,*], Niels Jørgensen[2,3], Anderson Martino-Andrade[4], Jaime Mendiola[5], Dan Weksler-Derri[6,7], Maya Jolles[1], Rachel Pinotti[8], and Shanna H. Swan[9]

Nel mondo

SCIENTIFIC REPORTS

nature research

OPEN Changes in seminal parameters among Brazilian men between 1995 and 2018

Sarreyra Siqueira, Anne Caroline Rapelle, Josiane A. A. Nascimento, Francisco A. T. Fazano, Luis Guillermo Baharmendes, José Roberto Gabiatti, Lucia Costa-Paiva & Luiz Francisco Baccaro

Brasile

scientific reports

OPEN Trends in semen parameters of infertile men in South Africa and Nigeria

Nigeria e Sud Africa

Research Article

Iranian temporal changes in semen quality during the past 22 years: A report from an infertility center

Serajeddin Vahidi[1] M.D., Mohammad Reza Moein[2] M.D., Fatemeh Yazdinejad[3] M.Sc., Saeed Ghasemi-Esmailabad[1,2] M.Sc., Nima Nariman[1,3] M.D.

Nel mondo

Iran

Europa

Decline in sperm count in European men during the past 50 years

P Sengupta[1,2], E Borges Jr[3], S Dutta[4] and E Krajewska-Kulak[2]

SAGE

Article

The Disappearing Sperms: Analysis of Reports Published Between 1980 and 2015

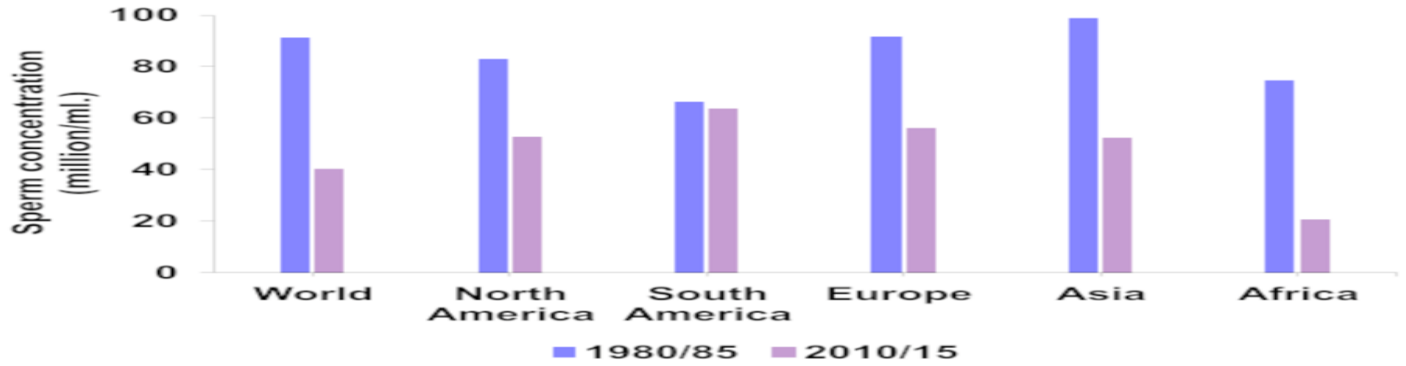
Pallav Sengupta, MSc, PhD[1], Sulagna Dutta, MSc[1], and Elzbieta Krajewska-Kulak, MD, PhD[2]

SAGE

Montano L et al. 2021. Environmental Science and Pollution Research

Springer

a



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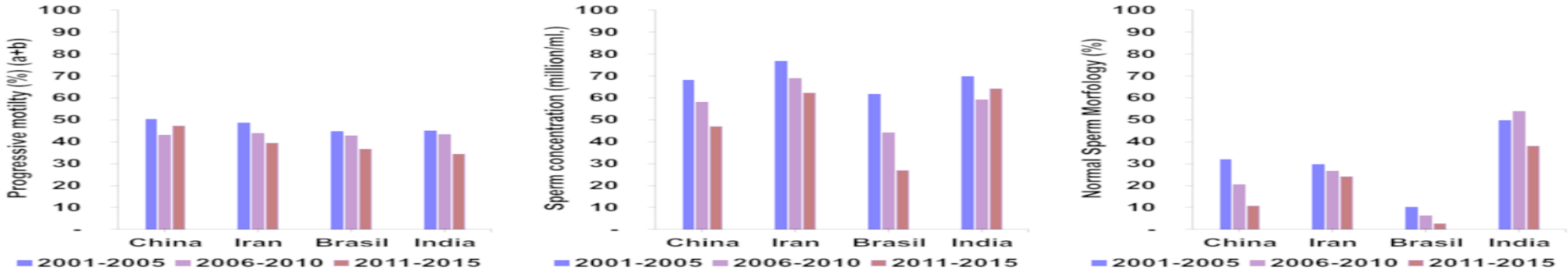
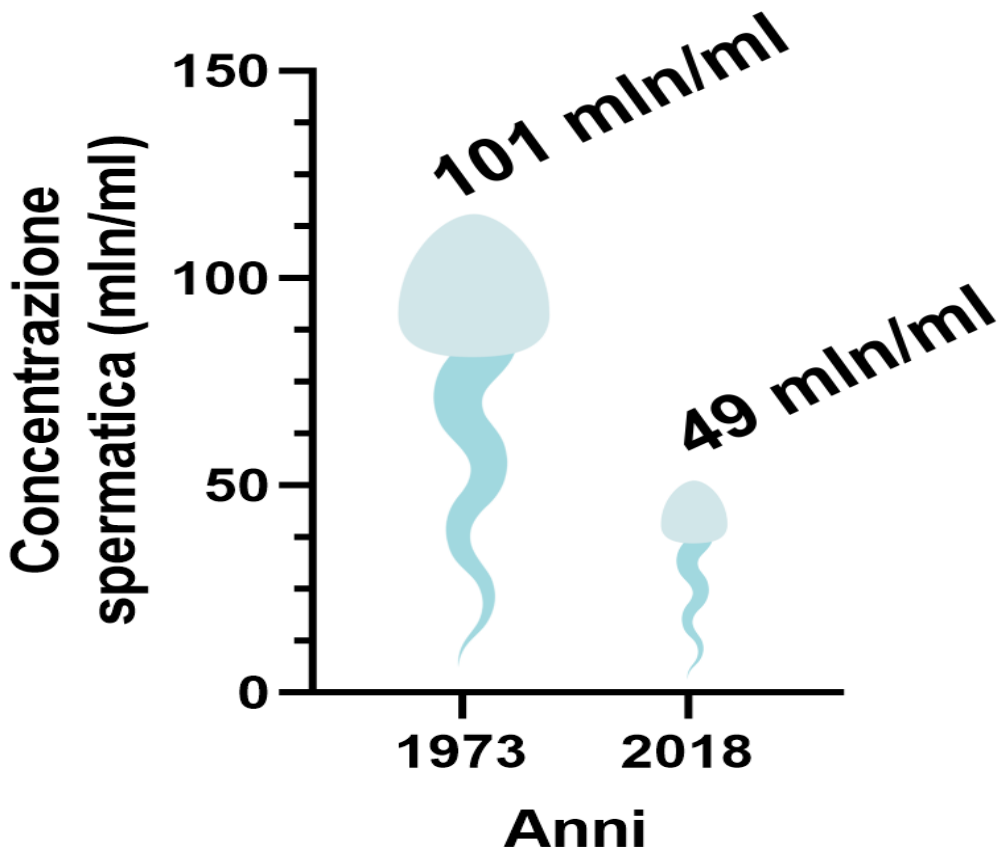


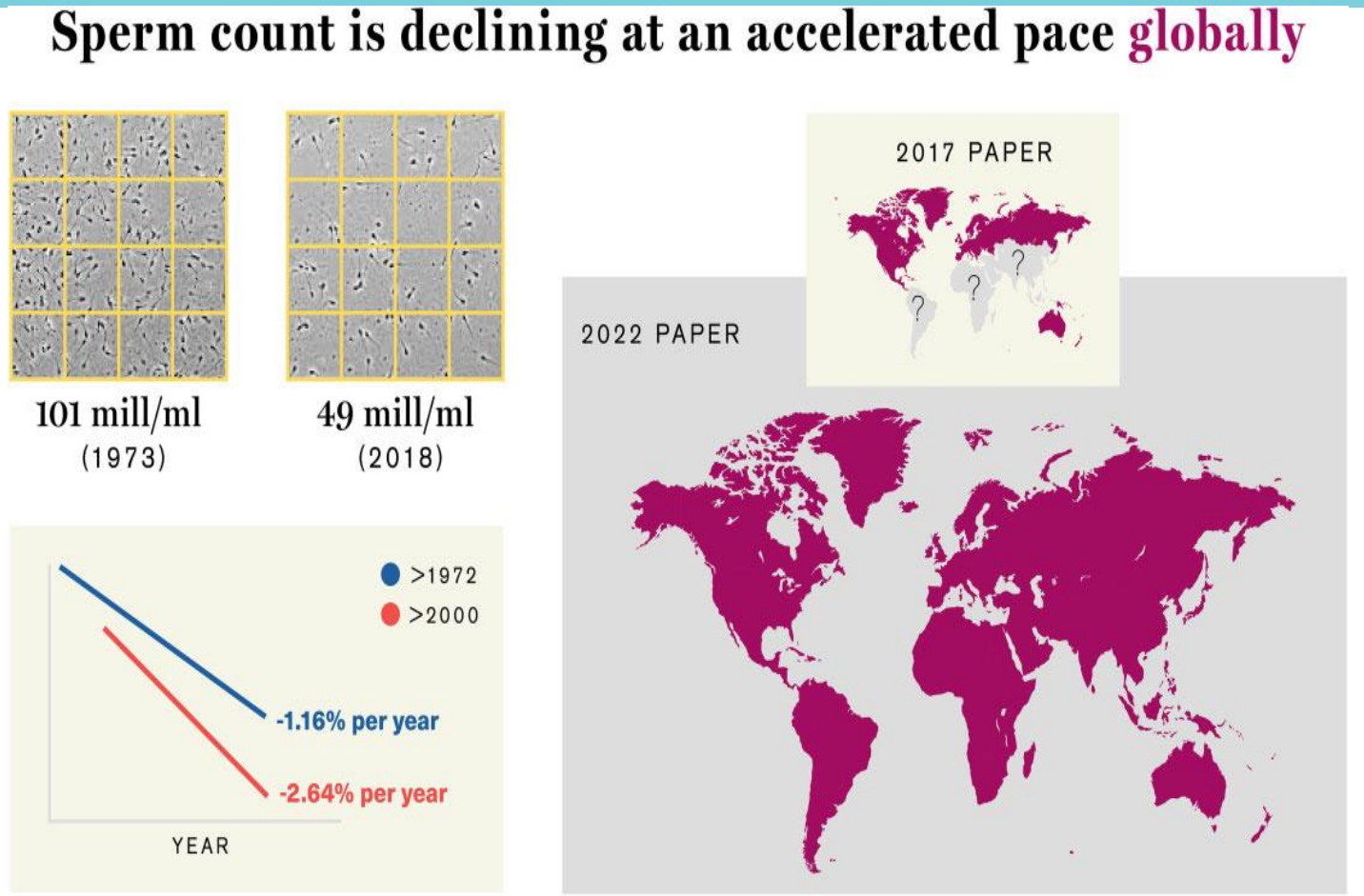
Si registra oltre al declino spermatico, a livello globale, un aumento di incidenza di: Ipospadia, Criptorchidismo, Cancro testicolare

EcoFoodFertility

Il Declino spermatico a livello globale

Levine et al. Human Reproduction Update, nov. 2022





Dal 1973 al 2018 a livello globale
-51.6% di spermi per ml
-62.3% di spermi totali

Il declino spermatico riguarda anche Africa, Asia, Sud America. Anzi, dal 2000 al 2018 vi è stato un accelerazione del declino con valori di perdita di spermatozoi per anno doppia rispetto al periodo 1973-2000.

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Effects of a Lifestyle Change Intervention on Semen Quality in Healthy Young Men Living in Highly Polluted Areas in Italy: The FASt Randomized Controlled Trial.

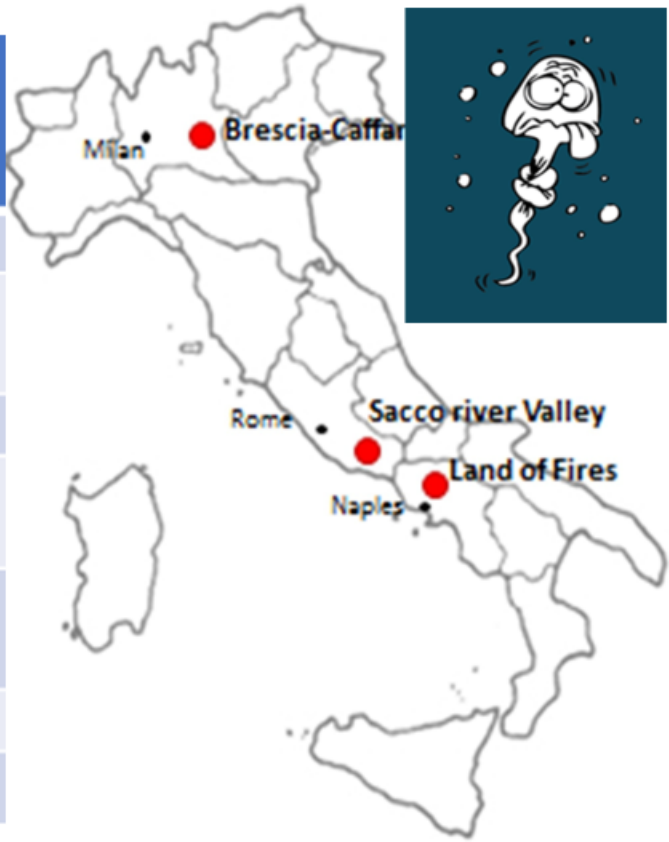
Montano L*. et al. Eur. Ur. Focus Feb. 2021

Parametri spermatici nelle aree a rischio in ITALIA

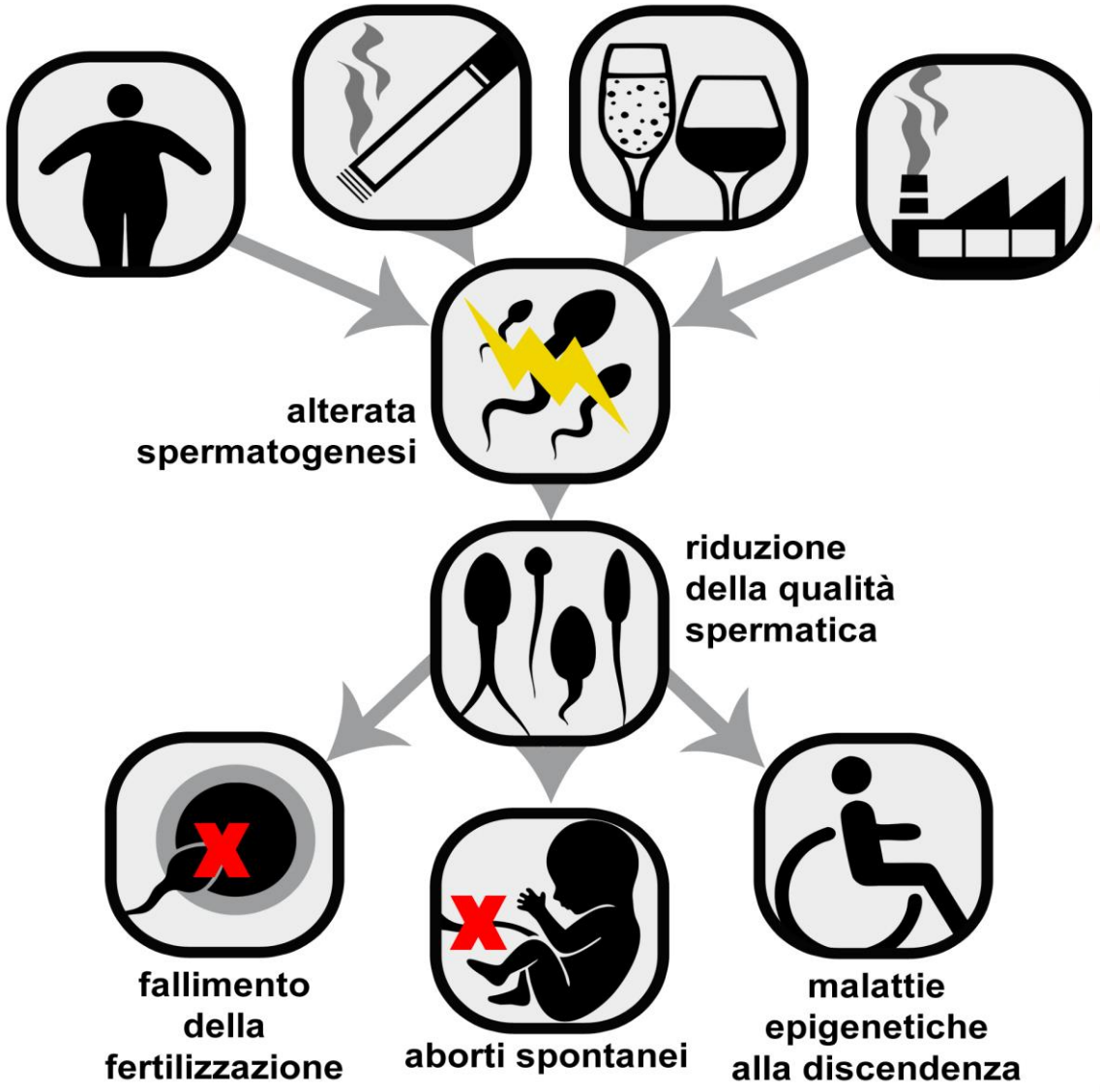
Semen parameters	Brescia mean ± SD	Land of Fires mean ± SD	Sacco River mean ± SD	Whole cohort mean ± SD	p*
Volume (ml)	2.90 ± 1.39	2.53 ± 1.13	2.81 ± 1.50	2.73 ± 1.32	0.0976
Sperm concentration (10^6/ml)	67.30 ± 45.86	45.23 ± 32.89	50.32 ± 36.07	55.29 ± 40.52	0.0001
Total motility (%)	40.86 ± 19.37	45.43 ± 24.08	31.43 ± 23.17	4[illegible]09 ± 2[illegible].55	0.0003
Progressive motility (%)	27.88 ± 17.78	30.74 ± 19.32	20.40 ± 17.56	27.75 ± 18.69	0.0015
Cell with normal morphology (%)	6.58 ± 4.37	7.42 ± 7.05	5.63 ± 3.16	6.76 ± 5.51	0.1249
Round cells (10^6/ml)§	5.03 ± 3.28	6.81 ± 5.60	5.95 ± 4.68	6.12 ± 4.89	0.3166
TAC (mM) #	1.14 ± 0.22	0.97 ± 0.27	1.02 ± 0.30	1.06 ± 0.26	0.0001

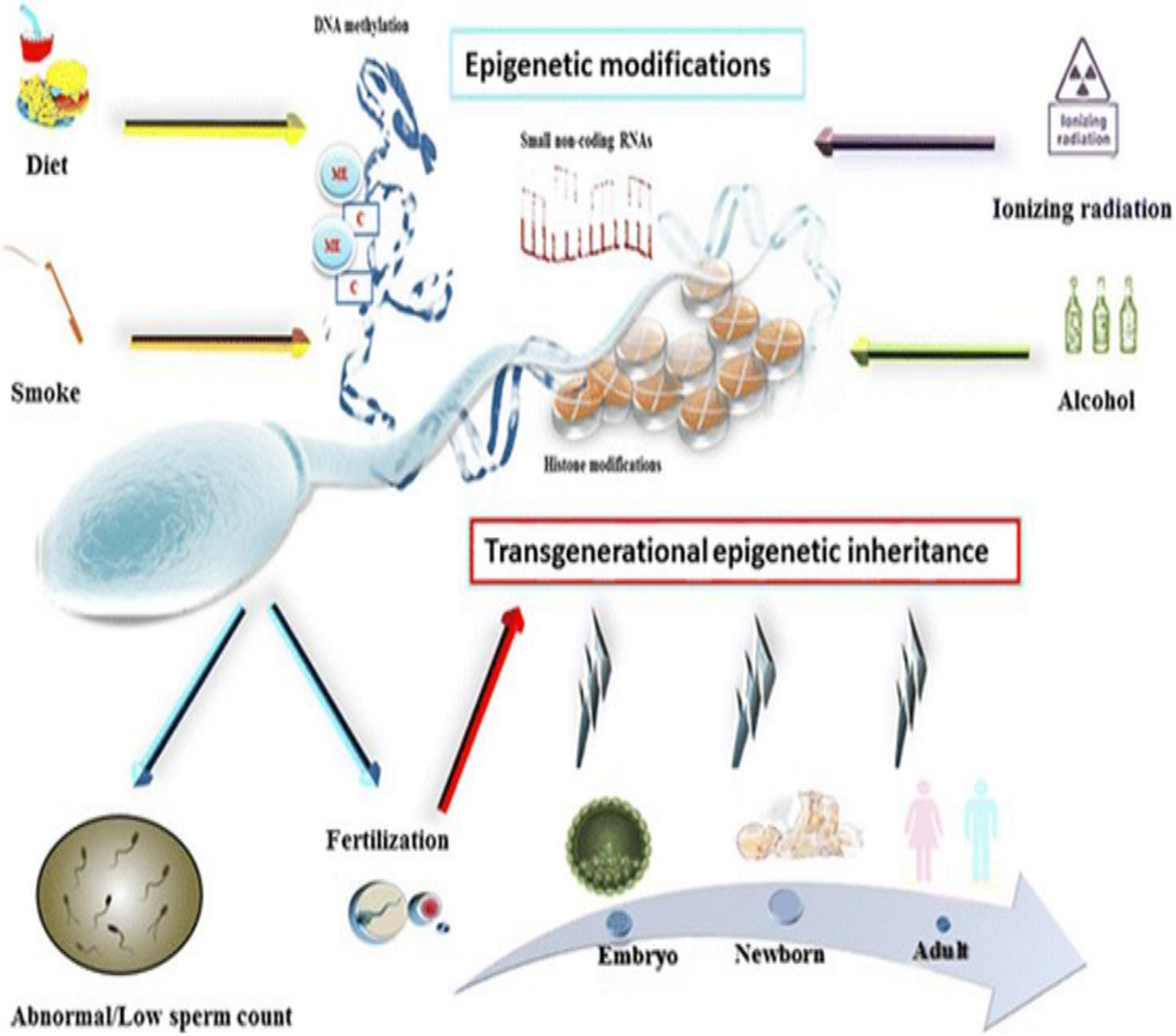
STUDIO FASt

Fertilità, Ambiente, Stili di Vita



La maggioranza dei ragazzi con età media di 19 anni, sani, non fumatori, non bevitori di alcolici, omogenei per indice di massa corporea, presentano nel complesso una qualità seminale più bassa rispetto a quanto ci si aspetterebbe a tale età, in particolare il parametro della motilità progressiva è mediamente più basso del 30% (limite sec. manuale del WHO 2021)

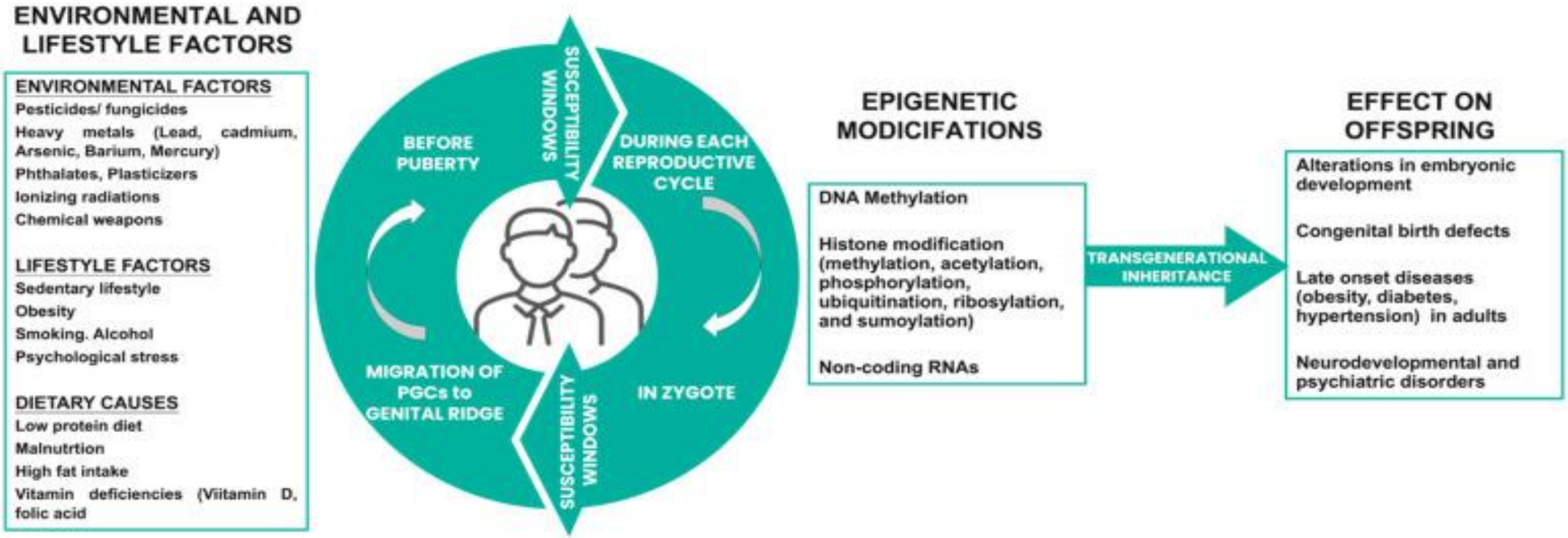

alterata
spermatogenesi
riduzione
della qualità
spermatica
fallimento
della
fertilizzazione
aborti spontanei
malattie
epigenetiche
alla discendenza


DNA methylation
Epigenetic modifications
Small non-coding RNAs
Diet
Smoke
Ionizing radiation
Alcohol
Histone modifications
Transgenerational epigenetic inheritance
Fertilization
Embryo
Newborn
Adult
Abnormal/Low sperm count

EcoFoodFertility

Environmental and Genetic Traffic in the Journey from Sperm to Offspring

Pallav Sengupta et al. 2023. Biomolecules. 2023 Dec; 13(12): 1759.



This evidence-based study comprehensively discussed how the genetic and epigenetic (DNA methylation) marks created in response to environmental stress events exert a post-fertilization function in affecting the phenotype of the offspring

Dal DOhaD al POhaD

Dalle origini delle malattie in ambiente «**uterino**» a quelle «**paterne**». Un passo Indietro…

- However if there are more evidences that a healthy environment and lifestyle of the mother is crucial for offspring health and the utero window represent a field of study of **Developmental Origins of Health and Disease (DOHaD)**, begin to be interesting the **Paternal Origins of Health and Disease paradigm (POHaD**. This term is introducted on the basis of transgenerational epigenetic **effect of contaminants through the paternal germ line** on animal studies and even if there are few epidemiological studies on humans, the perspective that opens the systematic study of reproductive biomarkers in environmental impact assessment and early and predictive health risk assessment is enormous

EcoFoodFertility

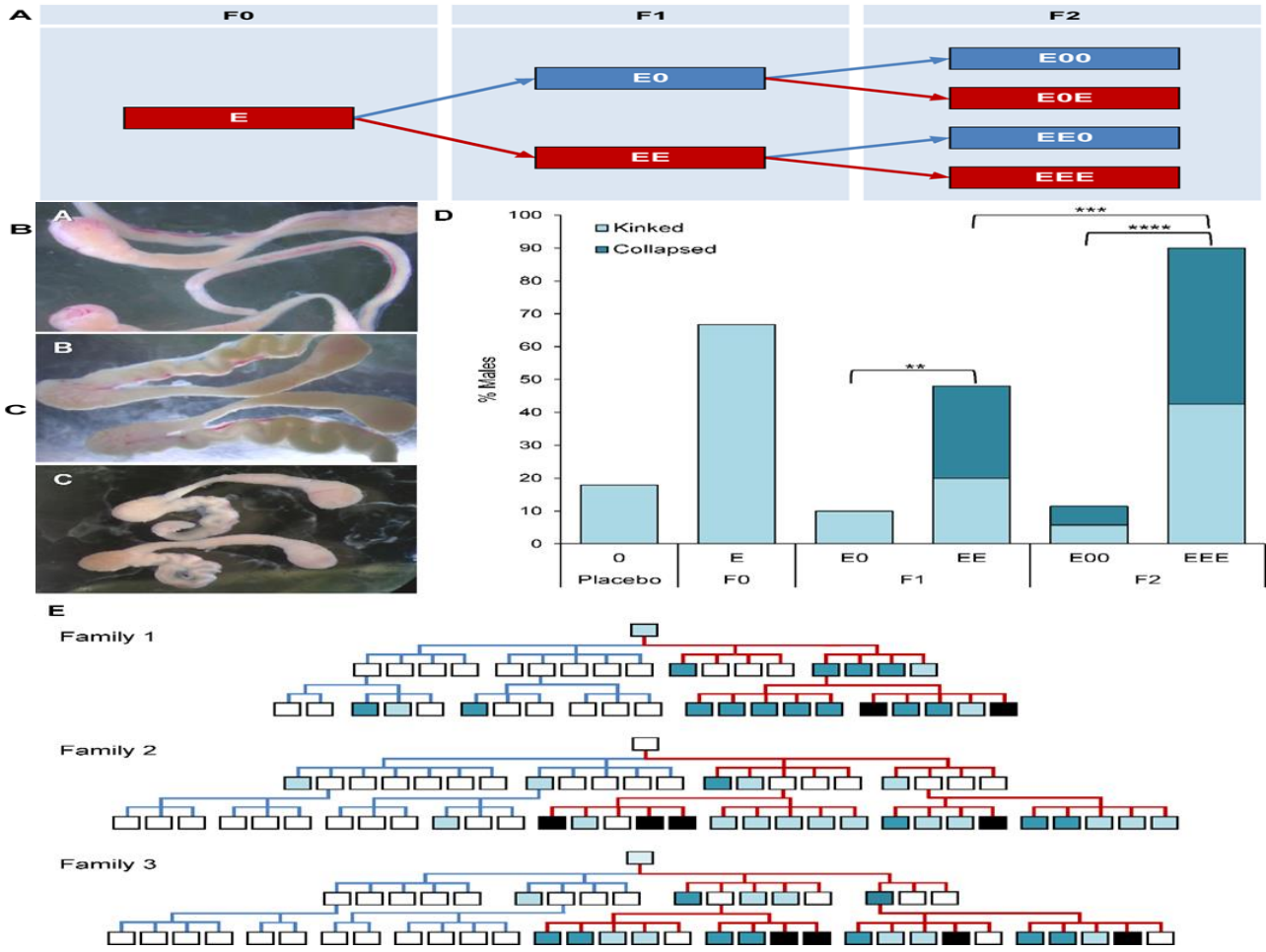
PLOS | GENETICS

Germline and reproductive tract effects intensify in male mice with successive generations of estrogenic exposure. Tegan S. Horan et al. 2017

PERCHE' QUESTO CONTINUO CALO?

L'esperimento di esposizione nel periodo postnatale e quindi non in utero, indica che la linea germinale non solo risente dell'effetto, ma questo effetto è trasmissibile per la generazione dei gameti successivi, ed anzi, l'esposizione continua anche **a dose più basse esacerba gli effetti**, con maggiore incidenza e gravità del tratto riproduttivo.

In sintesi la **sensibilità maschile agli EDC aumenta di generazione in generazione e ci permette di dare una spiegazione al progressivo peggioramento** che si registra in termini di calo della qualità spermatica ed aumento di incidenza di tutte le patologie dell'apparato riproduttivo, che rappresenta la spia e quindi specchio fedele di quanto tali sostanze stanno progressivamente alterando la fisiologia umana e del perché dell'aumento esponenziale di tutte le patologie cronico-degenerative



The male sensitivity to environmental estrogens is increased by successive generations of exposure

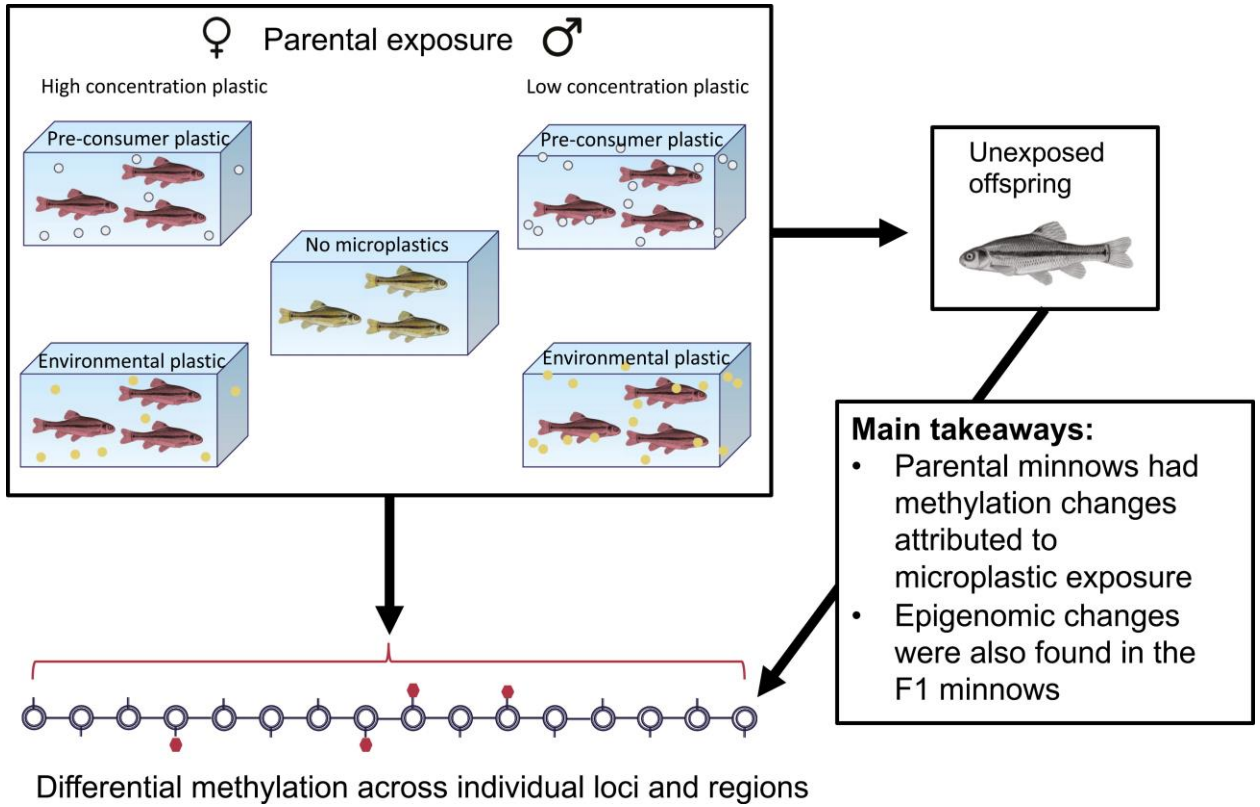
. 2024 May 14:esae027. doi: 10.1093/jhered/esae027.

EcoFoodFertility

Microplastic exposure is associated with epigenomic effects in the model organism Pimephales promelas (fathead minnow).

Miranda J et al. 2024. J Hered 2024 May 14:esae027. doi: 10.1093/jhered/esae027.

- **Abstract**
- Microplastics have evolutionary and ecological impacts across species, affecting organisms' development, reproduction, and behavior along with contributing to genotoxicity and stress. As plastic pollution is increasing and ubiquitous, gaining a better understanding of organismal responses to microplastics is necessary. Epigenetic processes such as DNA methylation are heritable forms of molecular regulation influenced by environmental conditions. Therefore, determining such epigenetic responses to microplastics will reveal potential chronic consequences of this environmental pollutant. We performed an experiment across two generations of fathead minnows (Pimephales promelas) to elucidate transgenerational epigenetic effects of microplastic exposure. We exposed the first generation of fish to four different treatments of microplastics: two concentrations of each of pre-consumer polyethylene (PE) and PE collected from Lake Ontario. We then raised the first filial generation with no microplastic exposure. We used enzymatic methylation sequencing on adult liver tissue and homogenized larvae to evaluate DNA methylation differences among treatments, sexes, and generations. Our findings show the origin of the plastic had a larger effect in female minnows whereas the effect of concentration was stronger in the males. We also observed transgenerational effects, highlighting a mechanism in which parents can pass on the effects of microplastic exposure to their offspring. Many of the genes found within differentially methylated regions in our analyses are known to interact with estrogenic chemicals associated with plastic and are related to metabolism. This study highlights the persistent and potentially serious impacts of microplastic pollution on gene regulation in freshwater systems

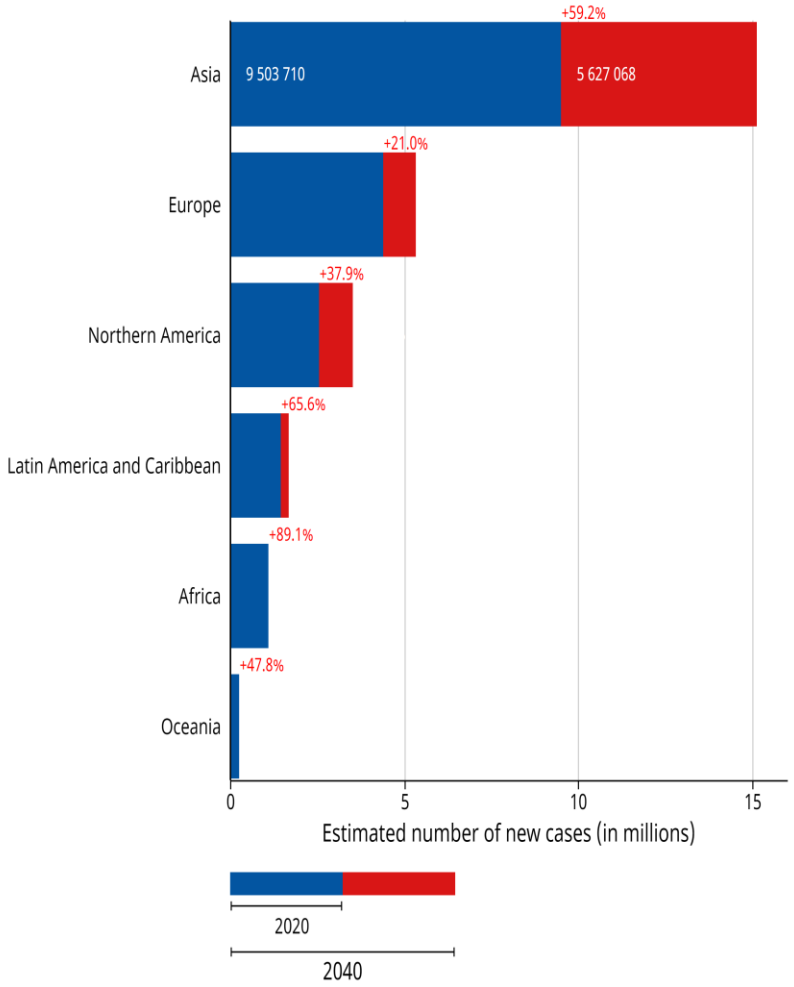


Our study presents evidence that exposing even a single generation of fish to microplastics can have chronic and multigenerational methylation effects, even once the microplastic exposure is removed.

Estimated number of new cases from 2020 to 2040, Both sexes, age [0-85+]

All cancers

GLOBAL CANCER OBSERVATORY



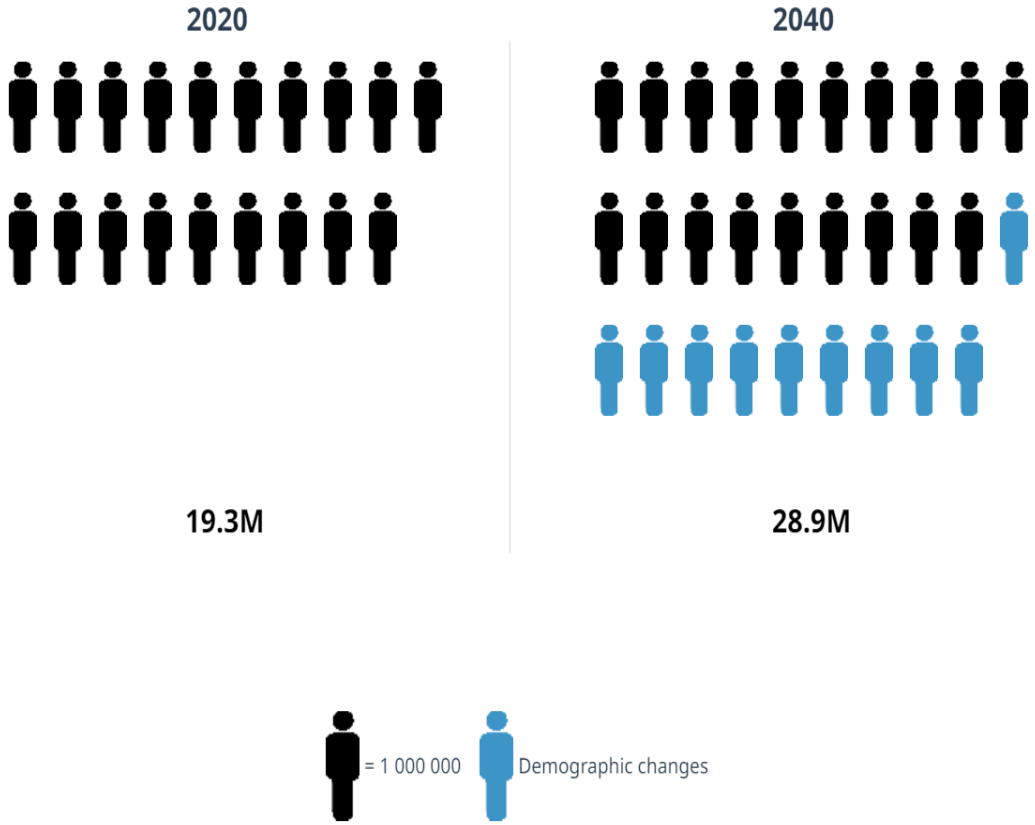
International Agency for Research on Cancer
World Health Organization

Estimated number of new cases from 2020 to 2040, Both sexes, age [0-8

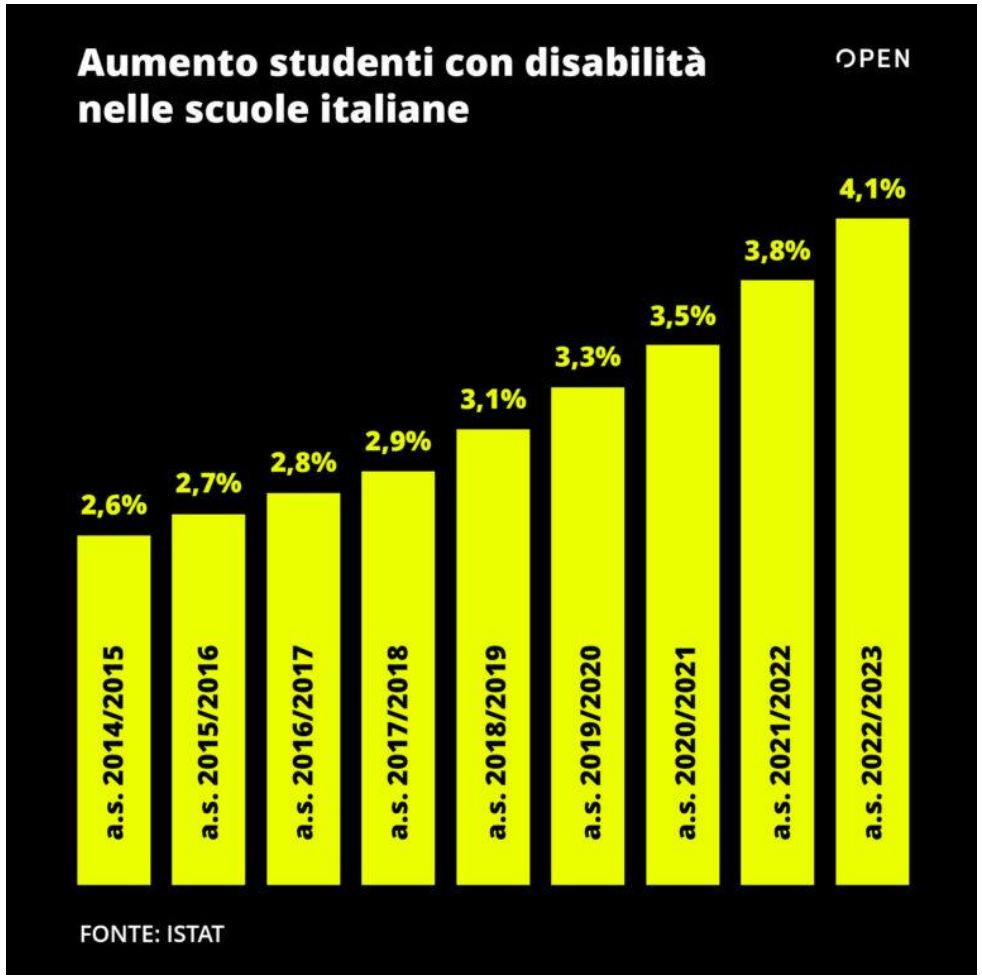
All cancers

Africa + Latin America and Caribbean + Northern America + Europe + Oceania + Asia

GLOBAL CANCER OBSERVATORY



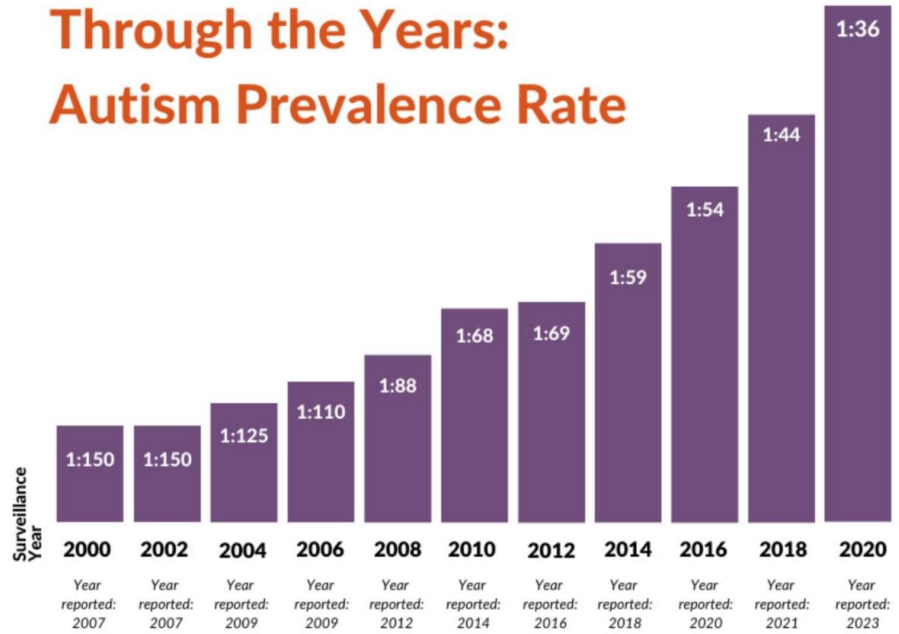
International Agency for Research on Cancer
World Health Organization



◂ Gmail 18:56 Sab 27 apr

autismcenter.org

86%



Il 23 marzo, i Centri per il controllo e la prevenzione delle malattie (CDC) hanno pubblicato nuovi dati dell'Autism and Developmental Disabilities Monitoring Network (ADDM) che riportavano che circa 1 bambino su 36 di 8 anni negli Stati Uniti era affetto da disturbo dello spettro autistico. ASD) nel 2020. Questo nuovo tasso è superiore rispetto alla prevalenza segnalata nel 2018 di 1 su 44.

REPORT ISTAT 29 marzo 2024

Popolazione quasi stabile grazie alle immigrazioni dall'estero

- **Natalità in discesa**, mortalità in forte calo: sei neonati e 11 decessi per 1.000 abitanti.

- Più immigrati e meno emigrati dell'anno precedente: il saldo migratorio netto sale da +261mila nel 2022 a +274mila nel 2023

- **Calo demografico più sensibile nei Comuni delle Aree interne del Mezzogiorno**: variazione di circa il 5 per mille in meno sull'anno precedente; riduzione della popolazione in quattro comuni su cinque.

- Popolazione residente straniera in crescita: 5 milioni e 308mila individui al 1° gennaio 2024, +166mila sull'anno precedente.

EcoFoodFertility

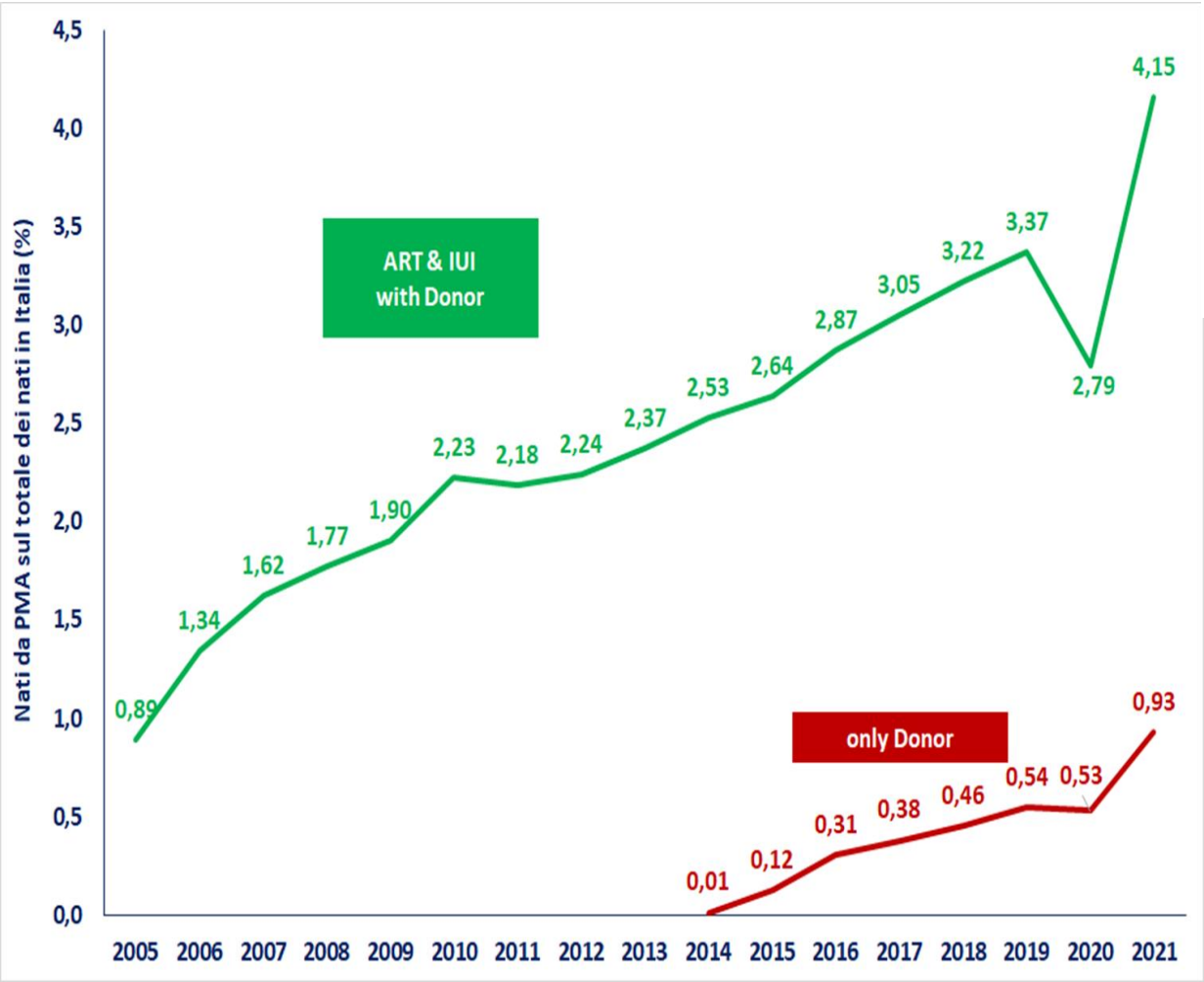
PERICOLOSA SINERGIA FRA INQUINANTI E SPOSTAMENTO DELL'ETA' DEL CONCEPIMENTO

INSULTI AMBIENTALI CRESCENTI INDUCONO UN ACCELERAZIONI DEI PROCESSI DI INVECCHIAMENTO DEGLI STESSI GAMETI, SE A QUESTO SI AGGIUNGE L'ETA' AVANZATA NEL CONCEPIMENTO, COME E' DI FATTO, NON SOLO AUMENTA IL RISCHIO DI INFERTILITA', MA AUMENTA LA SUSCETTIBILITA' A TUTTE LE MALATTIE PER LA PROGENIE

IN QUESTA CONDIZIONE DI PRESSIONE AMBIENTALE CRESCENTE E' IMPORTANTE CERCARE DI CONCEPIRE NELL'ETA' BIOLOGICA PER RIDURRE I TASSI DI INFERTILITA' E IL CARICO DI PATOLOGIE CRONICO-DEGENERATIVE PER LE FUTURE GENERAZIONI

EcoFoodFertility

% DI BAMBINI NATI VIVI DA PROCEDURE PMA SUL TOTALE DEI BAMBINI NATI VIVI IN ITALIA. 2005-2021



frontiers | Frontiers in Reproductive Health

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Charles Pineau,

What is driving the global decline of human fertility? Need for a multidisciplinary approach to the underlying mechanisms

Robert John Aitken[1,2*]

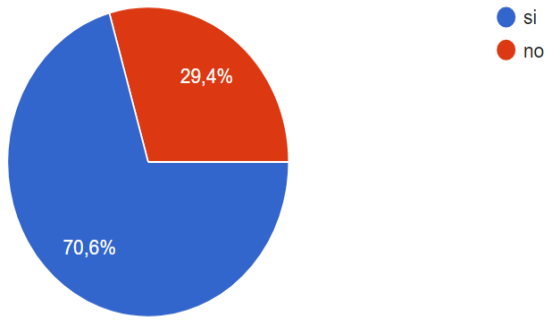
Tuttavia, anche se le misure socioeconomiche possono avere successo nel breve termine, ci sono ancora fattori come gli inquinanti che nel lungo termine determinano una perdita di genotipi ad alta fertilità dalla popolazione. Paradossalmente, l'adozione su larga scala delle tecnologie di procreazione assistita, potrebbe anche contribuire a tale perdita di fecondità, favorendo genotipi di bassa fertilità all'interno della popolazione. Poiché il declino del tasso di fertilità che accompagna la transizione demografica sembra essere ubiquitario, le implicazioni per la salute pubblica della nostra specie potrebbero essere devastanti.

EcoFoodFertility

1) Visita andrologica a tutti i maggiorenni attraverso i Medici di Medicina Generale: un'opportunità per la salute pubblica
2) Spermiogramma gratuito per tutti al 18esimo anno
3) Registro della Fertilità

16)Ritieni possibile il coinvolgimento diretto dell'intera categoria dei Medici di Medicina Generale nel percorso della Prevenzione Andrologica anche presso gli Istituti Scolastici, considerando la facilità della stessa visita con l'immediata valutazione ispettiva e palpatoria dei genitali "simil visita di leva"?

326 risposte



EcoFoodFertility

Educare per Prevenire: un Patto fra Scuola e Sanita'

Docenti, Studenti e Medici insieme nella Scuola per una grande opera educativa alla Salute che contempli la conoscenza sui temi della tutela ambientale, la conoscenza dei rischi espositivi da insulti nocivi chimici e fisici, oltre a quelli per errati stili di vita, alimentari, comportamentali

OBIETTIVO

Formare giovani consapevoli: dalla tutela ambientale alla prevenzione dei rischi per la salute

Rendere le nuove generazioni consapevoli non solo della propria salute complessiva, ma anche della propria funzione sociale per la crescita e l'avanzamento complessivo nel territorio di pratiche e azioni volte alla sostenibilità che, nell'insieme, permettono di ridurre il carico ambientale e di conseguenza il carico delle patologie da quelle riproduttive a quelle cronico-degenerative

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LINEE DI RICERCA DEL PROGETTO «*MADRE*» ECOFOODFERTILITY

- **EXPOMAP (Studio di esposomica integrato multimatrici) (completato)**
- **FAST (Fertilità, Ambiente, Alimentazione, Stili di Vita) (completato)**
- **ECO-NUTRAPREVENTION (alimento funzionale detox) (completato)**
- **ECOFOODFERTILITY –ISDE (Studio Caso-Controllo su PFAS in Veneto) (completato)**
- **ECOFOODFERTILITY FOR WOMEN (in corso)**
- **ECOFOODFERTILITY FOR VETERINARY (in corso)**
- **ECOFOODFERTILITY FOR ENVIRONMENTAL JUSTICE (in corso)**
- **ECOFOODFERTILITY FOR NUTRACEUTICAL DETOX (in avvio)**
- **STUDIO MULTILIVELLO INTEGRATO (Microplastiche, derivati plastiche, terre rare) (in avvio)**
- **LONGEVITY AND FERTILITY ALGORITHM (LAFA) (in avvio)**
- **MEDBIODETOX (in programma)**
- **ECOFOODFERTILITY FOR DIABETES TYPE 1 (in programma)**
- **ECOFOODFERTILITY FOR FUTURE GENERATIONS (in programma)**
- **ECOFOODFERTILITY FOR AGROECOLOGY (in programma)**

Progetto di Educazione alla Salute Ambientale e Riproduttiva per le Scuole Italiane

"ECOFOOD FOR LIFE"

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Take home message

APPARATO RIPRODUTTIVO ORGANO SENTINELLA

- IL SEME UMANO COME SENSORE DELLA QUALITÀ AMBIENTALE E DELLA SALUTE GENERALE
  - LA FERTILITA' IN GENERALE QUALE INDICATORE FONDAMENTALE DI SALUTE
  - Salvaguardare l'integrità dei gameti significa fare Prevenzione Primaria e PREprimaria per tutte le malattie cronico-degenerative per le presenti e future generazioni
  - PRESIDIO DI PREVENZIONE PRIMARIA E PRE-PRIMARIA PER TUTTE LE MALATTIE CRONICO-DEGENERATIVE DELL'ATTUALE E FUTURA GENERAZIONE
  - NUOVO RUOLO DELLA FERTILITA' VISTA IN UNA PROSPETTIVA PIÙ AMPIA DI PROTEZIONE DELLA SALUTE PUBBLICA
- OPERATORI DEL MONDO DELLA RIPRODUZIONE SONO AL PRIMO LIVELLO DI PREVENZIONE COL PIÙ ALTO LIVELLO DI RESPONSABILITÀ

UN'ALLEANZA FRA ISTITUZIONI MEDICI DI MEDICINA GENERALE, PEDIATRI, BIOLOGI PER LA TUTELA DELLA SALUTE RIPRODUTTIVA DEI GIOVANI DI OGGI E DI DOMANI

- VERSO UN PERCORSO STRUTTURALE ED ISTITUZIONALIZZATO PER LA PREVENZIONE ANDROLOGICA CHE CONSENTA A TUTTI GLI ADOLESCENTI DI EFFETTUARE LA VISITA ANDROLOGICA E LO SPERMIOGRAMMA

«La salute è troppo importante per lasciare che se ne occupino solo i medici»
Verso la One Health!

Thanks for your kind attention