

# INVECCHIAMENTO E UNA LONGEVITÀ SANA **FOCUS** SULL'ACQUA DA BERE



## Acqua da bere e longevità: stato dell'arte

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10 ottobre 2022

- L'acqua è essenziale per la vita
- Senza acqua l'uomo sopravvive per pochi giorni
- L'acqua comprende una alta % del peso corporeo dal 75% dei neonati al 50% dell'anziano

*Il contenuto di acqua a seconda dell'età e del sesso:*



**Volume totale dell'acqua in base all'età, sesso**

feto	85-90%
nascita	75-80%
uomo	60%
donna	55%
anziano	40-50%

Bere è importante:

1. Per prevenire le malattie
2. Per promuovere lo stato di salute

# L'acqua che introduciamo: le fonti

L'acqua che introduciamo deriva da 3 fonti principali:

- l'acqua che beviamo (acqua e liquidi ad alto contenuto d'acqua, 85 - >90%);
- l'acqua che mangiamo (cibi ad alto contenuto d'acqua, 40 - >80%);
- l'acqua che produciamo (acqua endogena/metabolica).

**Table 1** Water balance in sedentary adults living in temperate climate

	Water inputs (ml/day)				Water outputs (ml/day)		
	Min	Max	Average		Min	Max	Average
Beverages	1400 <sup>a</sup>	1750 <sup>a</sup>	1575	Urine	1200	2000	1600
Foods <sup>b</sup>	600 <sup>a</sup>	750 <sup>a</sup>	675	Skin	450	450	450 <sup>c</sup>
Subtotal	2000 <sup>d</sup>	2500 <sup>e</sup>	2250	Respiration	250 <sup>c</sup>	350 <sup>c</sup>	300
Metabolic water	250	350	300	Faeces	100	300	200 <sup>c</sup>
Total	2250	2850	2550	Total	2000	3100	2550

<sup>a</sup>It is normally assumed that the contribution of food to total dietary water intake is 20–30%, whereas 70–80% are provided by beverages. This relationship is not fixed and depends on the type of beverages and on the choice of foods.

<sup>b</sup>Foods with a wide range of water content (<40 to >80%).

<sup>c</sup>(EFSA, 2008).

<sup>d</sup>Average total water intakes in sedentary women (EFSA, 2008).

<sup>e</sup>Average total water intakes in sedentary men (EFSA, 2008).

# Il Fabbisogno di Acqua

• E' stato stabilito che l'apporto adeguato quotidiano di acqua è pari a **3.7 L per gli uomini** e **2.7 litri per le donne**. Tuttavia, **l'assunzione giornaliera di acqua varia notevolmente per singoli e tra gruppi**. Ad esempio, **per un individuo sedentario va da circa 1,2 litri fino a 2,5 litri**, un valore che aumenta a 3,2 litri se svolge un'attività fisica moderata. Chi svolge attività fisica e vive in un ambiente caldo deve quotidianamente bere circa 6 litri di liquidi, quantità che cresce se svolge un'attività intensa.

**Table 3** Dietary reference intake values for total water in the United States (Institute of Medicine of the National Academies, Washington DC)

Life stage group	Criterion	AI for males in l/day <sup>a</sup>			AI for females in l/day <sup>a</sup>		
		From foods	From beverages	Total water <sup>b</sup>	From foods	From beverages	Total water <sup>b</sup>
0–6 months	Average consumption of water from human milk	0	0.7	0.7	0	0.7	0.7
7–12 months	Average consumption of water from human milk and complementary foods	0.2	0.6	0.8	0.2	0.6	0.8
1–3 years	Median total water intake from NHANES III	0.4	0.9	1.3	0.4	0.9	1.3
4–8 years	Median total water intake from NHANES III	0.5	1.2	1.7	0.5	1.2	1.7
9–13 years	Median total water intake from NHANES III	0.6	1.8	2.4	0.5	1.6	2.1
14–18 years	Median total water intake from NHANES III	0.7	2.6	3.3	0.5	1.8	2.3
>19 years	Median total water intake from NHANES III	0.7	3.0	3.7	0.5	2.2	2.7
Pregnancy 14–50 years	Median total water intake from NHANES III				0.7	2.3	3.0
Lactation 14–50 years	Median total water intake from NHANES III				0.7	3.1	3.8

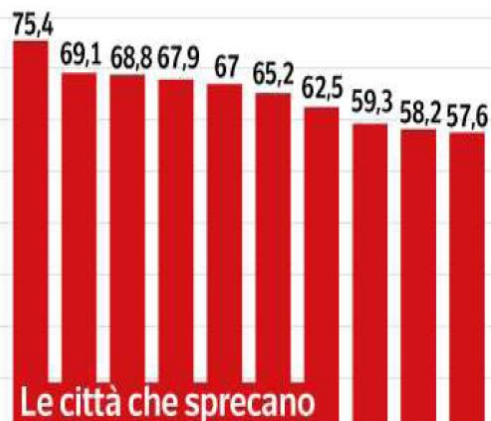
Jèquier E e Costant F, Water as an essential nutrient: the physiological basis of hydration. European Journal of Clinical Nutrition 64: 115–23, 2010

# Acqua potabile, una rete colabrodo: si perdono 6, 5 milioni di litri al minuto

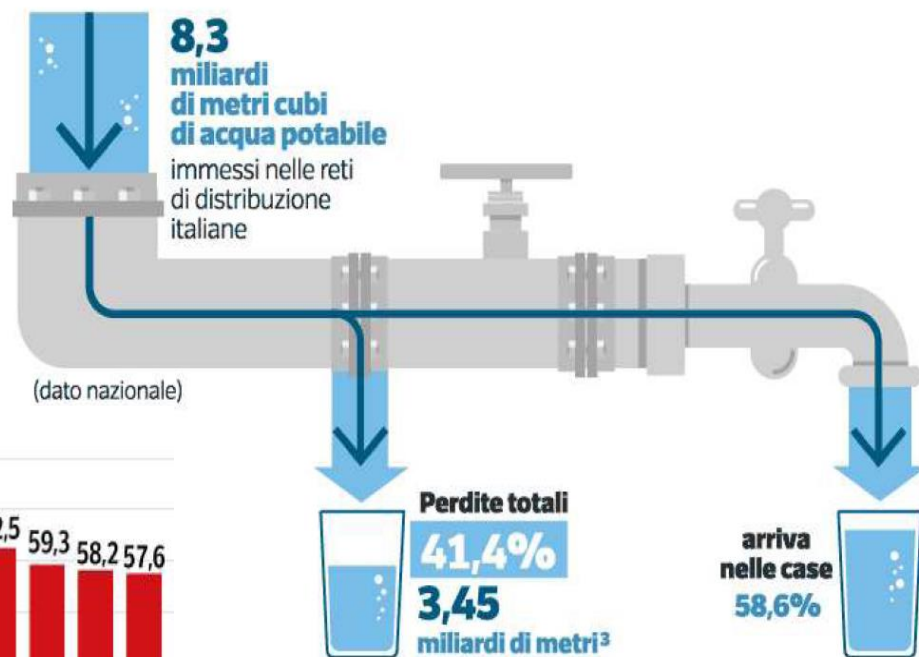
MILENA GABANELLI

## Le città virtuose

Valori percentuali sul volume immesso in rete nei comuni capoluogo di provincia



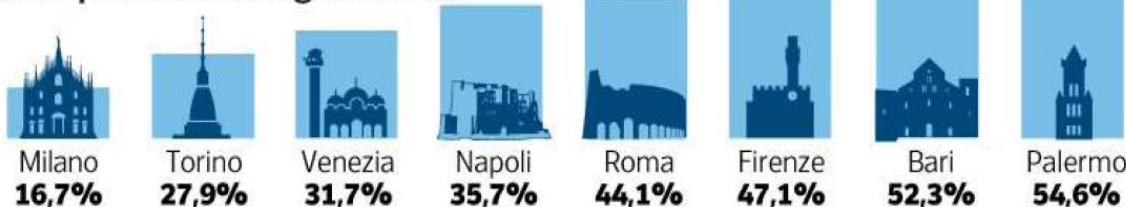
**Le città che sprecano**



## TUBATURE VECCHIE SENZA MANUTENZIONE

questo gigantesco spreco è dovuto alle pessime condizioni delle tubature, specialmente nel tratto di rete finale, quello che porta il servizio ai consumatori. Sono gli acciacchi dell'età: **fra il 60/70% della rete idrica ha più di 30 anni, il 25% supera i 50.**

## La dispersione nelle grandi città



# LA QUALITA' DELL'ACQUA: ACQUA MINERALE NATURALE E ACQUA POTABILE

Aspetto significativo	Acqua Minerale Naturale	Acqua Potabile
Provenienza	Origine profonda, protetta, incontaminata	Diversa: pozzi, laghi, falde superficiali
Caratteristiche originarie	<ul style="list-style-type: none"> <li>- Batteriologicamente pura all'origine</li> <li>- Composizione chimica costante</li> </ul>	Subisce trattamenti di potabilizzazione e disinfezione con derivati del Cloro
Criteri di accettabilità	Parametri specifici. Il superamento dei limiti ne fa revocare il riconoscimento	Parametri specifici per le acqua destinate al consumo umano. Il superamento dei limiti è accettato con Deroga del Ministero della Salute
Confezionamento	Imbottigliata all'origine in contenitori sicuri approvati dalle Autorità Sanitarie	È trasportata tramite rete di distribuzione (condutture) con una dispersione media del 34%
Aspetti favorevoli per la salute	Proprietà favorevoli indicate in etichetta approvate dal Ministero della Salute	No
Etichettatura	Tipologia, denominazione e luogo di origine; caratteristiche chimiche salienti...	Non specifica, peraltro impossibile per le caratteristiche chimiche soggette a variazioni continue
Contaminanti ed inquinanti	Non possono e non sono rintracciabili contaminanti di origine antropica	Sono presenti tracce di contaminanti antropici (i più diffusi sono tetracloroetilene e tricloroetilene), nonché derivati della clorazione: gli alometani (cloroformio e bromoformio) tutti possibili cancerogeni

# LA QUALITA' DELL'ACQUA

## ACQUA MINERALE NATURALE E ACQUA POTABILE

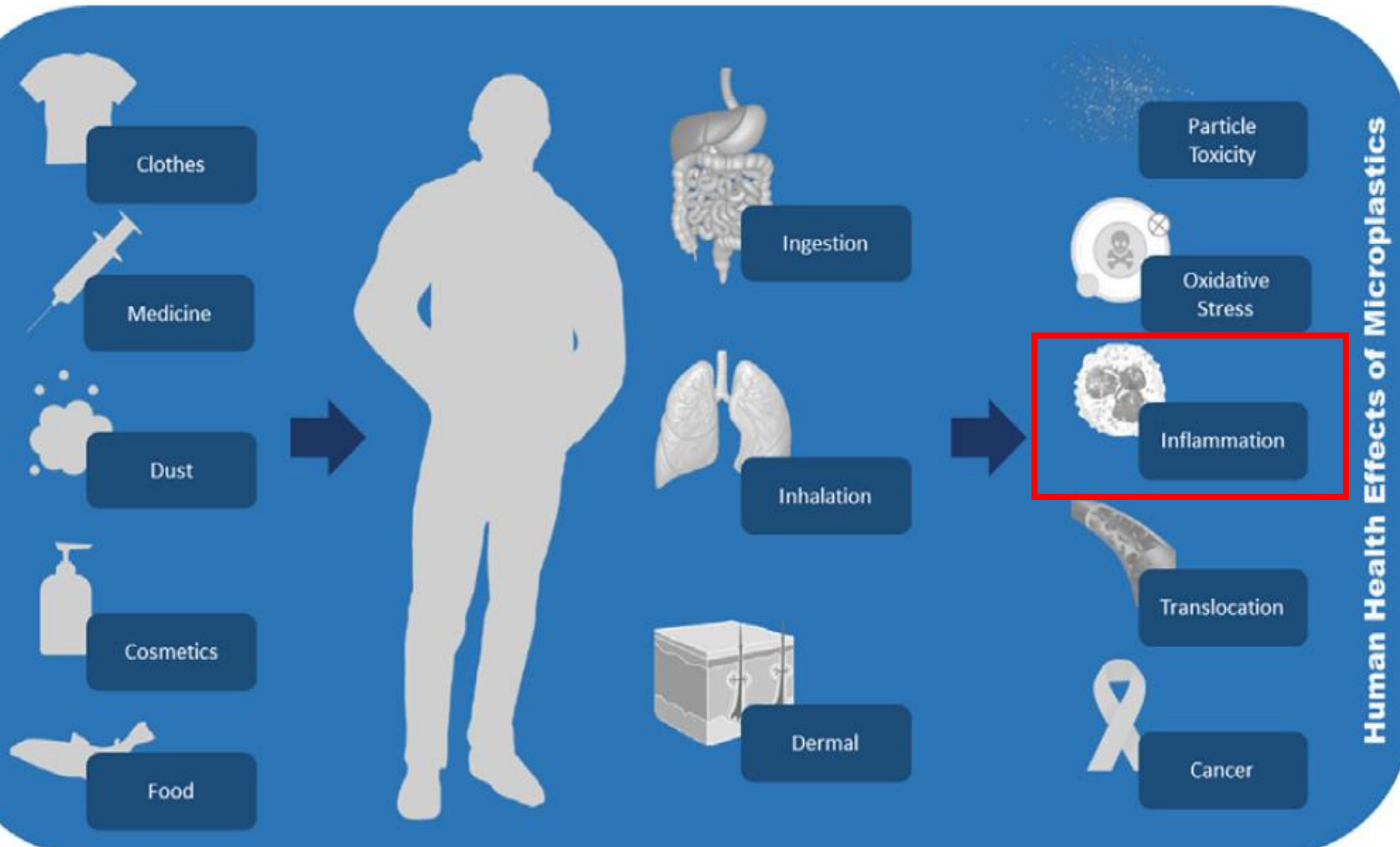
- Le proprietà "benefiche" che un'acqua minerale naturale può vantare sono, quindi, da attribuire da un lato alla quantità e al rapporto fra i sali in essa disciolti, dall'altro all'assenza di sostanze inquinanti o indesiderabili.
- L'impiego dell'acqua (di quella minerale in particolare), oltre a contribuire ad una corretta idratazione, può svolgere un'azione salutistica, un ruolo preventivo o **esercitare un'azione coadiuvante il trattamento farmacologico**.
- Quando si beve non solo ci si disseta, ma si assumono elementi importanti (oligoelementi come calcio, sodio, ferro, magnesio, zolfo, bicarbonato, fluoro etc.) che a seconda della tipologia e della concentrazione possono soddisfare le diverse esigenze di benessere psico-fisico.

# Environmental exposure to microplastics: An overview on possible human health effects

Science of the Total Environment 702 (2020) 134455

Joana Correia Prata<sup>a,\*</sup>, João P. da Costa<sup>a</sup>, Isabel Lopes<sup>b</sup>, Armando C. Duarte<sup>a</sup>, Teresa Rocha-Santos<sup>a</sup>

**Microplastics range from 0.1 to 5000  $\mu\text{M}$  – Nanoplastics range from 0.001 to 0.1  $\mu\text{M}$**



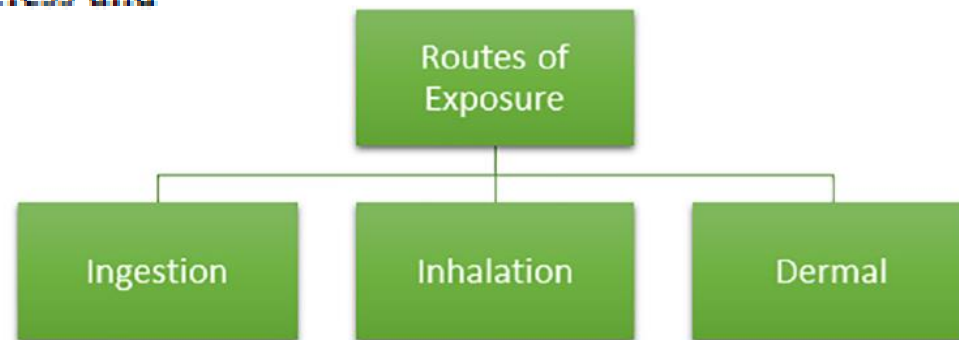
# Environmental exposure to microplastics: An overview on possible human health effects

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Joana Correia Prata<sup>a,\*</sup>, João P. da Costa<sup>a</sup>, Isabel Lopes<sup>b</sup>, Armando C. Duarte<sup>a</sup>, Teresa Rocha-Santos<sup>a</sup>

- Human are environmentally exposed to microplastics.
- Routes of exposure include ingestion, inhalation and dermal contact.
- Toxicity may result from particle toxicity, oxidative stress and inflammation.

- Inflammation may lead to neoplasia and increased translocation of particles.
- Microplastic may be involved in the disruption of immune function and neurotoxicity.



- The smallest size fraction (<1.5  $\mu\text{m}$ ) being more likely to penetrate deeply into organs - EFSA 2016



Oxidative stress and cytotoxicity

Energy and metabolism disruption

Translocation

Disruption of immune function

Neurotoxicity and neurodegenerative diseases

Vector for organisms and chemicals

# ENDOCRINE DISRUPTING CHEMICALS (EDC)

## → groups

synthetic chemicals from industry, agriculture, consumer products

synthetic chemicals in cosmetics and pharmaceuticals

natural plant products („phytoestrogens“, isoflavones, goitrogens)

## → characteristics

stability in the environment

accumulation in the food chain, body fat

interference with hormone system & reproduction



# Acqua potabile, contaminanti antropici e interferenti endocrini

- Un interferente endocrino (EDC) è una sostanza o un misto di sostanze esogene che altera la/e funzione/i del sistema endocrino e come conseguenza altera la salute di un organismo intatto, o della sua progenie, o di una determinata popolazione.
- I principali bersagli degli interferenti endocrini sono: l'omeostasi degli ormoni sessuali steroidei, la tiroide (ad es. il perclorato) e la salute riproduttiva
- E' probabile che non vi siano "dosi sicure" degli EDC e che vi possano essere effetti di combinazione

## Endocrine-disrupting chemicals in human follicular fluid impair *in vitro* oocyte developmental competence

Human Reproduction, Vol.27, No.4 pp. 1025–1033, 2012

**RESULTS:** Chlorinated biphenyl 153 ( $72 \pm 44$  and  $201 \pm 106$  pg/ml) and *p,p'*-DDE ( $392 \pm 348$  and  $622 \pm 406$  pg/ml) were the compounds found in the highest concentrations in follicular fluid and serum samples, respectively. A new variable principal component 1, repre-

**CONCLUSIONS:** An overall higher EDC contamination in the follicular micro-environment was associated with a decreased fertilization rate and consequently with a lower chance of an oocyte to develop into a high-quality embryo. In addition, EDC concentrations in serum were reliable predictors of the contamination status of the follicular micro-environment.

## Hormones and Endocrine-Disrupting Chemicals: Low-Dose Effects and Nonmonotonic Dose Responses

Laura N. Vandenberg, Theo Colborn, Tyrone B. Hayes, Jerrold J. Heindel, David R. Jacobs, Jr., Duk-Hee Lee, Toshi Shioda, Ana M. Soto, Frederick S. vom Saal, Wade V. Welshons, R. Thomas Zoeller, and John Peterson Myers

Endocrine Reviews, June 2012, 33(3):378–455

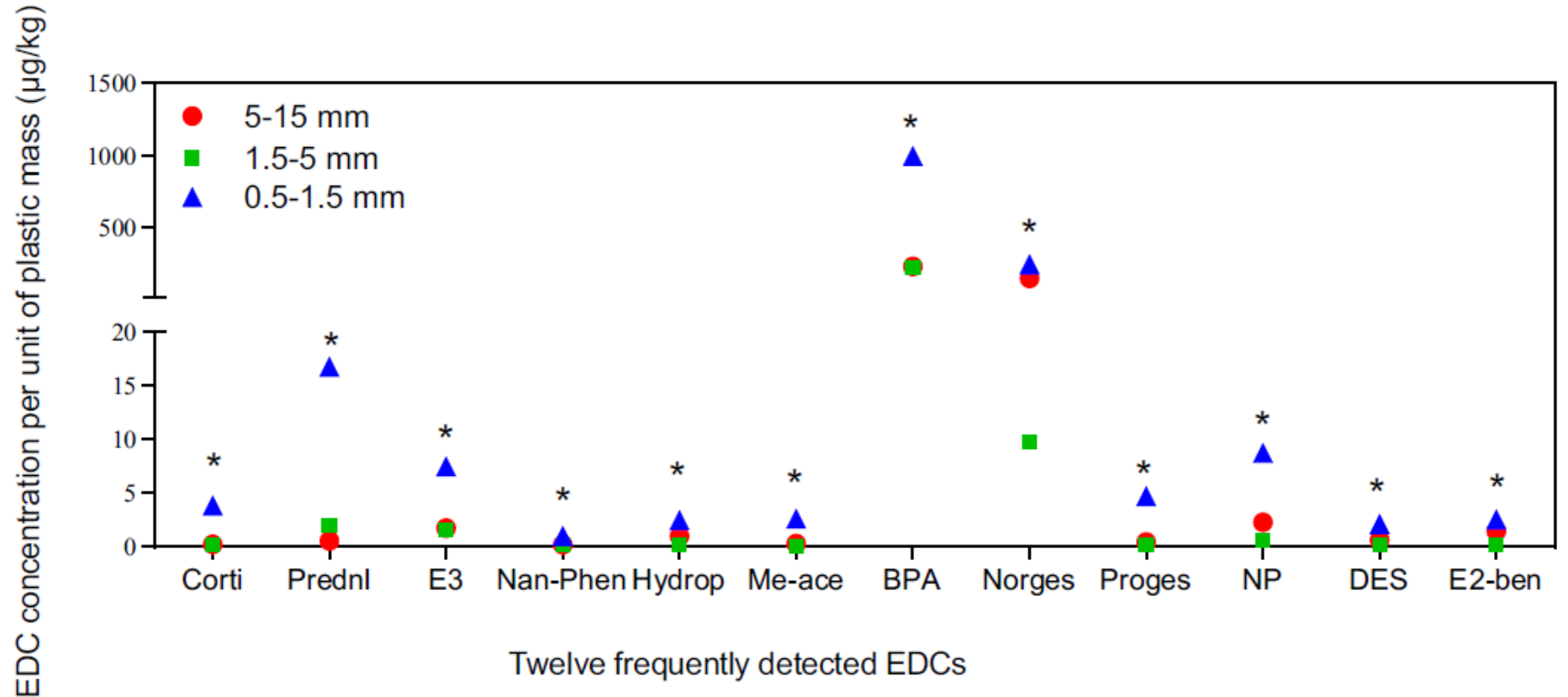
# **Microplastics**

## **Possible endocrine disruptors**

# Leaching of endocrine disrupting chemicals from marine microplastics and mesoplastics under common life stress conditions

Environment International 130 (2019) 104938

Qiqing Chen<sup>a, D, \*</sup>, Annika Allgeier<sup>D</sup>, Daqiang Yin<sup>C</sup>, Henner Hollert<sup>D, C</sup>



In conclusion, with evidence from the present study, we found a size effect: the smaller the particle size is, the greater the resulting EDC concentrations are. Marine MPs had higher concentrations of estrogens than mesoplastics, but estrogenic effects mediated by both MPs and mesoplastics may be negligible. Uptake of EDCs through MP- and mesoplastic-bearing seafood cooking may not raise a safety concern.

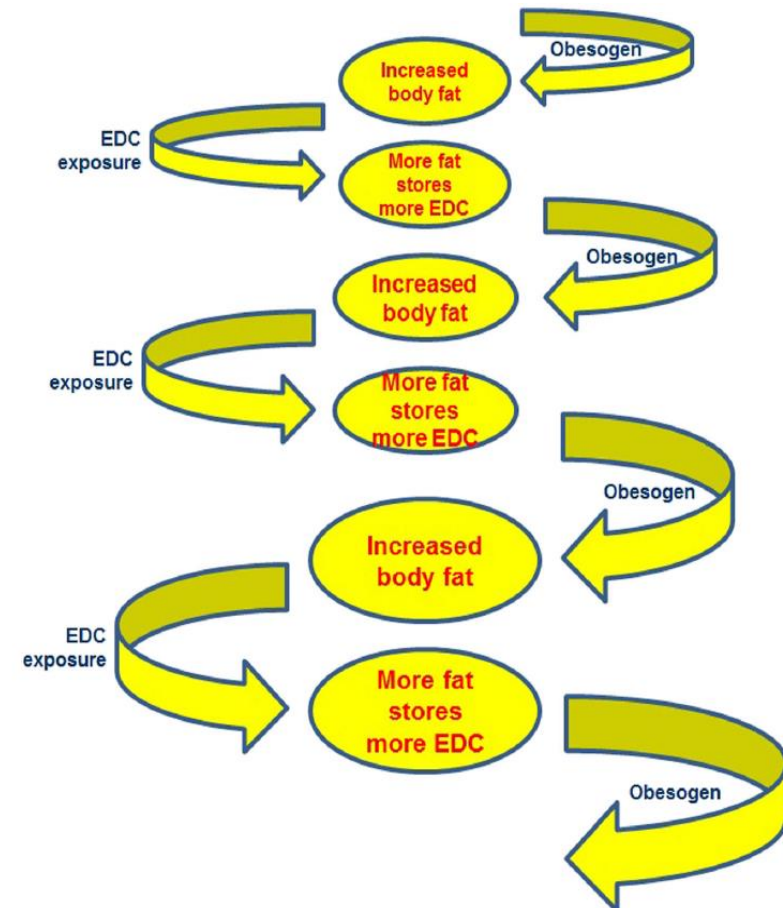
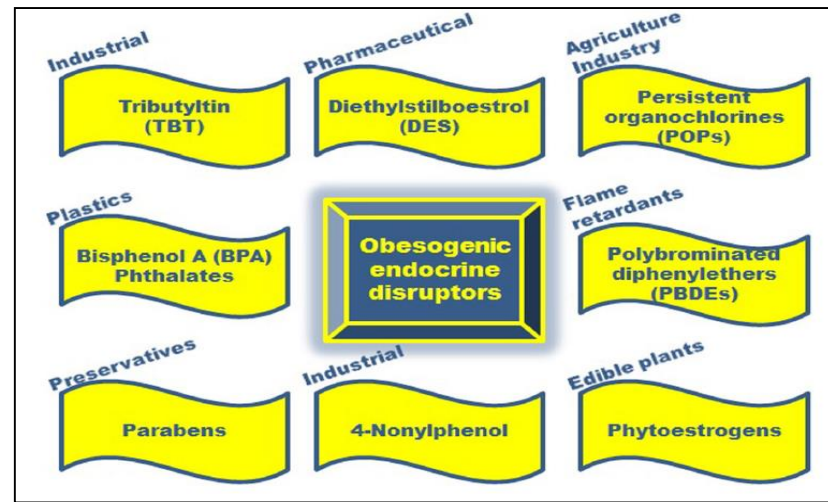
However, if plastic particles become even smaller, estrogenic effects could probably no longer be ignored, and EDCs on nanoplastics need to be explored in future studies. Moreover, even though no obvious risks are indicated at present, monitoring of seafood that contains MPs and mesoplastics remains important because the concentrations of these particles may change in the future.

# Endocrine Disruptors and Obesity

Philippa D. Darbre<sup>1</sup> Curr Obes Rep  
Published online: 15 February 2017

## Mechanism of action of obesogenic ED

- Increase number of fat cells
- Increase size of fat cells
- Alter endocrine regulation of adipose tissue development
- Alter hormones regulating appetite, satiety, food preference
- Alter basic metabolic rate
- Alter energy balance in favour of storing calories
- Alter insulin sensitivity & lipid metabolism in endocrine tissues



# Screening of endocrine-disrupting phenols, herbicides, steroid estrogens, and estrogenicity in drinking water from the waterworks of 35 Italian cities and from PET-bottled mineral water

Silvia Maggioni • Patrick Balaguer •  
Claudia Chiozzotto • Emilio Benfenati

Istituto di Ricerche Farmacologiche "Mario Negri"  
INSERM U896, IRCM-UM1-CRLC,

Compounds <sup>a</sup> Samples	Nonylphenols ng/L	Bisphenol A ng/L	Tot ng/L
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Ferrara	<7.70	102.00	143.42
Lecce	84.00	0.82	91.36
Padova	<7.70	<0.73	78.21
Torino	<7.70	<0.73	47.36
Verona	<7.70	1.84	31.32
Cagliari	29.60	<0.73	29.85
Venezia	<7.70	<0.73	23.29
Arezzo	19.50	<0.73	21.10
Bolzano	15.60	1.59	19.82
Trento	14.20	<0.73	16.26
Brescia	<7.70	<0.73	14.20
Savona	12.00	1.33	13.41
Milano	<7.70	<0.73	12.99
Catanzaro	11.60	<0.73	11.60
Bari	10.30	<0.73	11.15
Trieste	<7.70	<0.73	10.48
Firenze	<7.70	<0.73	7.34
Aosta	<7.70	1.54	3.98
Bologna	<7.70	1.39	3.81
Napoli	<7.70	<0.73	3.59
Latina	<7.70	2.68	2.88
Genova	<7.70	1.53	2.10
Cremona	<7.70	1.98	1.98
Reggio Calabria	<7.70	<0.73	1.74
Roma	<7.70	<0.73	1.15

## Conclusions

1. No steroid estrogens were detected in any of the samples, while BPA and nonylphenols were detected in the ranges 0.8-102.0 ng/ml and 10.3-84.0 ng/ml
2. The exposure to BPA from water would be 3.4  $\mu\text{g}$  BPA/BW/day (considering 2L water/day, 60 kg, highest [ ] BPA 102 ng/ml) much lower than the TDI = 50  $\mu\text{g}/\text{kg}$  day

	Nonylphenols ng/L	Bisphenol A ng/L	Tot ng/L
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BMW brand 5	<7.70	1.13	6.83
BMW brand 1	<7.70	0.83	2.06
BMW brand 2	<7.70	<0.73	–
BMW brand 3	<7.70	<0.73	–
BMW brand 4	<7.70	<0.73	–

# Microplastics in freshwaters and drinking water: Critical review and assessment of data quality

Albert A. Koelmans<sup>a,\*</sup>, Nur Hazimah Mohamed Nor<sup>a</sup>, Enya Hermsen<sup>a</sup>, Merel Kooi<sup>a</sup>  
Svenja M. Mintenig<sup>b,c</sup>, Jennifer De France<sup>d,\*\*</sup>

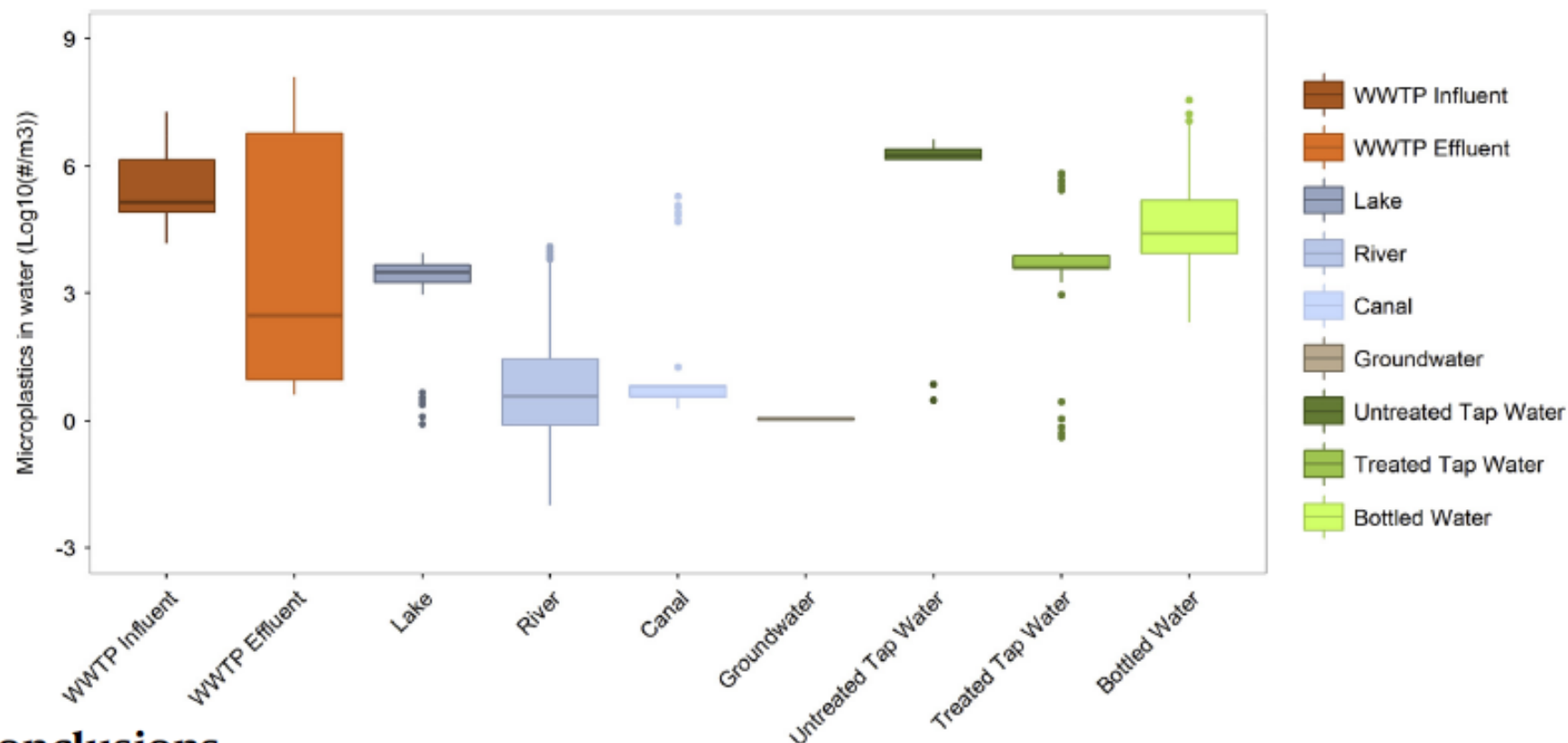
<sup>a</sup> Aquatic Ecology and Water Quality Management Group, Wageningen University, the Netherlands

<sup>b</sup> Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands

<sup>c</sup> KWR Watercycle Research Institute, Nieuwegein, the Netherlands

<sup>d</sup> World Health Organisation (WHO), Avenue Appia 20, 1211, Geneva, Switzerland

Water Research 155 (2019) 410–422



## Conclusions

We conclude that based on the limited number of high quality studies identified, standardization of microplastic analysis in water is needed. Quality assurance criteria that require the most improvements are sample treatment, polymer identification, laboratory preparation, clean air conditions and positive controls.

Among water types, reported microplastic concentrations differed widely, but the fact that studies target different size classes contributes to this variability. Despite the quality limitations, our analysis confirmed that microplastic is frequently present in freshwaters and drinking water. There is a high need to improve the analysis of very small microplastics, and to identify them in different water samples.

IDRATAZIONE DI QUALITA' E  
LONGEVITA' SANA

# Understanding the Association between Environmental Factors and Longevity in Hechi, China: A Drinking Water and Soil Quality Perspective



International Journal of  
*Environmental Research  
and Public Health*

Deng Q et al 2018

Proportion of centenarians × 100,000 inhabitants

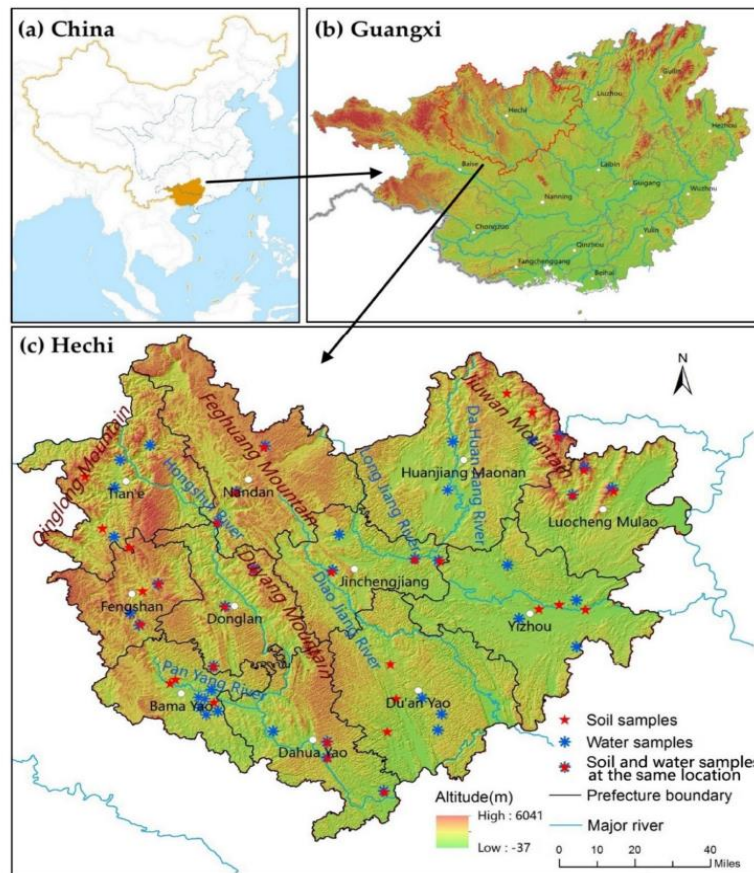
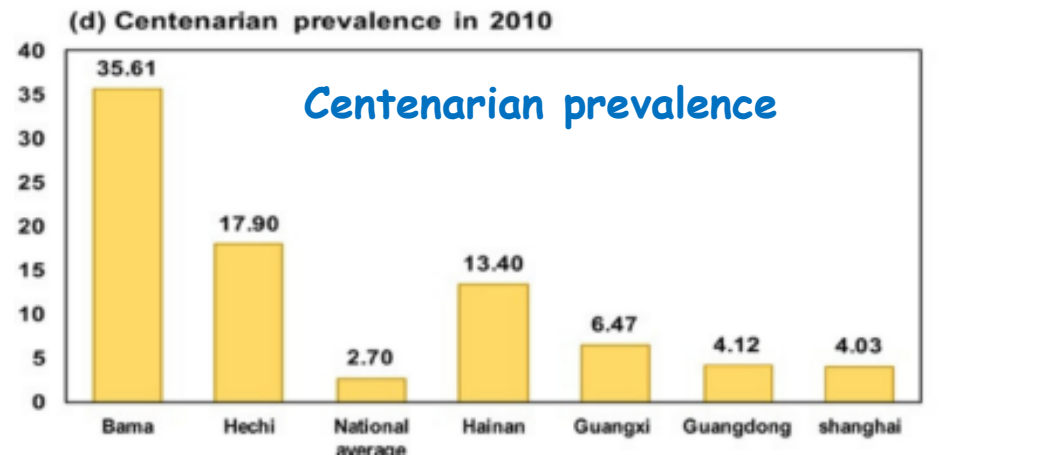
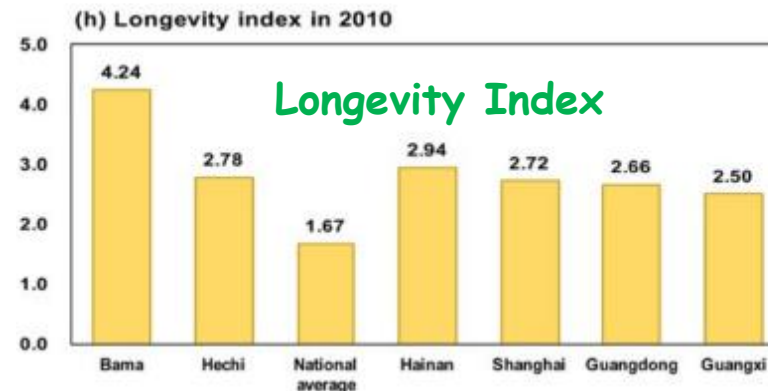


Figure 1. Location of Hechi and its sampling sites(c) in Guangxi (b), China (a).



Over 90yrs/over 65yrs

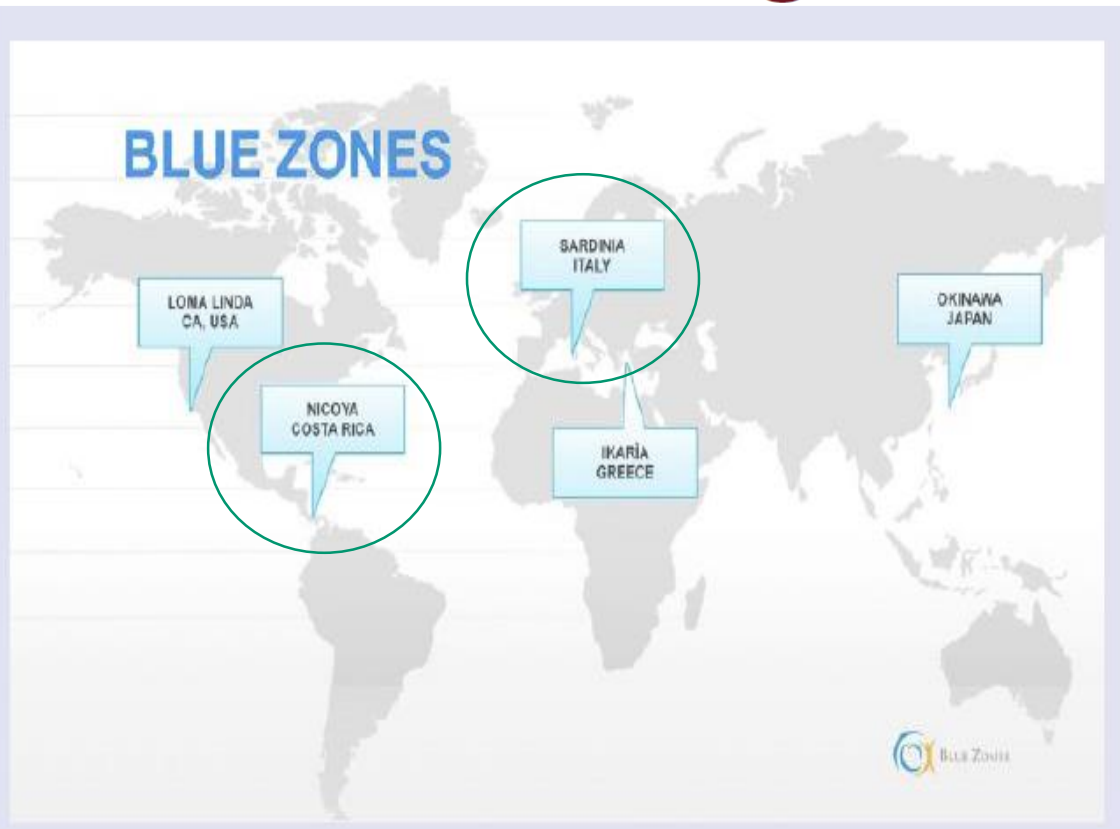


**CONCLUSIONS** – Alkalinity and trace elements in water, i.e.  $\text{H}_2\text{SiO}_3$ ,  $\text{Ca}^+$  and  $\text{Mg}^+$  were closely related to the regional longevity

STATE OF THE ART  
REVIEWS

Dan Buettner, BA, and Sam Skemp, BA

# Blue Zones: Lessons From the World's Longest Lived






## Nicoya

Nicoyans spend just 15% of what America does on health care and are more than twice as likely than Americans to reach a healthy age of 90 years.

Nicoyans eat little to no processed foods but plenty of antioxidant-rich tropical fruit. But they also have 1 unique secret: calcium- and magnesium-rich water, which wards off heart disease and promotes strong bones.

**Twin studies established that only about 20% of how long the average individual lives is dictated by our genes, whereas the other 80% is dictated by our lifestyle**

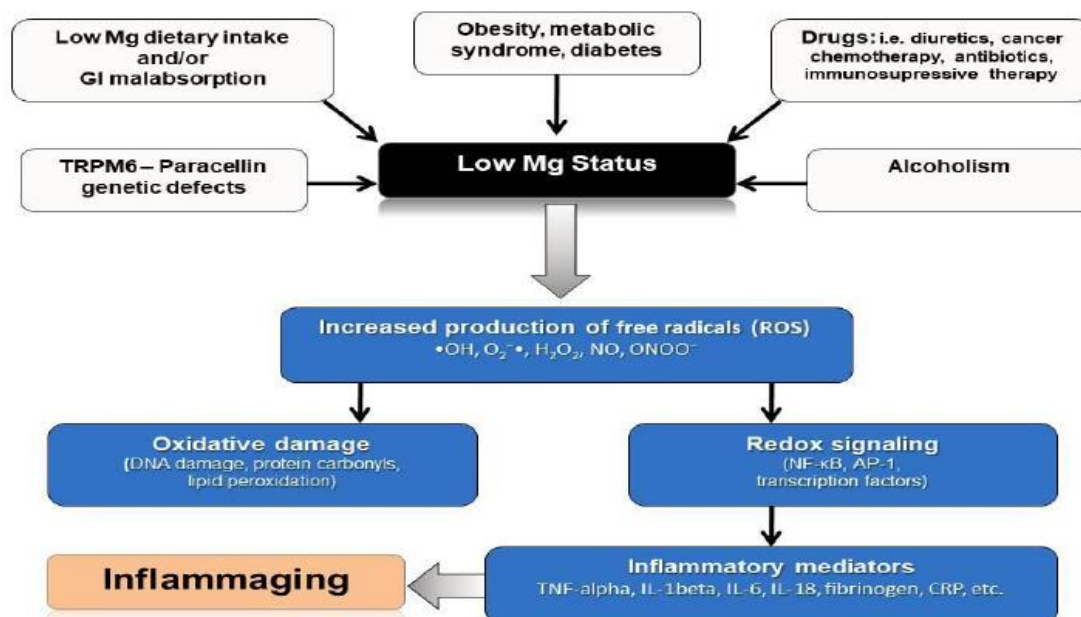
# Water Quality and Mortality from Coronary Artery Disease in Sardinia: A Geospatial Analysis

Maria Pina Dore <sup>1,2</sup> , Guido Parodi <sup>1</sup> , Michele Portoghese <sup>3</sup>, Alessandra Errigo <sup>4</sup> and Giovanni Mario Pes <sup>1,5,\*</sup> 

was, respectively,  $121.4 \pm 59.1$  vs.  $104.7 \pm 38.2$  ( $p = 0.025$ ). More specifically, an inverse association was found between elevated calcium content in spring water and cardiovascular mortality (AMI:  $r = -0.123$ ,  $p = 0.032$ ; IHD:  $r = -0.146$ ,  $p = 0.009$ ) and borderline significance for magnesium (AMI:  $r = -0.131$ ,  $p = 0.054$ ; IHD:  $r = -0.138$ ,  $p = 0.074$ ) and bicarbonate (IHD:  $r = -0.126$ ,  $p = 0.058$ ),



Figure 1. An example of a typical public fountain in a Sardinian village (Mores).



Mg deficit, inflammation, oxidative stress, and aging.

Barbagallo et al, Nutrients 2021

**The importance of quality hydration for a health longevity**

# Contribution of mineral waters to dietary calcium and magnesium intake in a French adult population

P Galan <sup>1</sup>, M J Arnaud, S Czernichow, A M Delabroise, P Preziosi, S Bertrais, C Franchisseur, M Maurel, A Favier, S Hercberg

**Subjects:** Subjects were water consumers-240 men and 424 women-divided into the following 4 groups (n=166 per group): regular drinkers of a calcium-rich and magnesium-rich mineral water (calcium, 486 mg/L; magnesium, 84 mg/ L), drinkers of a water classified as a moderately mineralized content (calcium, 202 mg/L; magnesium, 36 mg/L), drinkers of 2 low-mineralized waters (calcium, 9.9 to 67.6 mg/L and magnesium, 1.6 to 2 mg/L, respectively), and drinkers of tap waters.

## RESULTS

Depending on the magnesium concentration of the mineral water, it contributed 6% to 17% of total daily magnesium intake. Drinkers of magnesium-rich mineral water and water with a moderate mineral content had magnesium intakes significantly ( $P < 10^{-3}$ ) higher than those of drinkers on low-mineralized or tap water.

**Applications:** Mineral-rich water may provide an important supplementary contribution to total calcium and magnesium intake. For dietetics professionals, it may provide-in place of the usual recommendations concerning the consumption of dairy products-a good way to improve calcium and magnesium intakes, particularly in subjects who don't like dairy products.

La formazione e il mantenimento dell'osso richiede una adeguata quantità di vitamina D e calcio; il calcio viene assunto con gli alimenti.

*Quantità di calcio raccomandate dalla Società Italiana di Nutrizione Umana  
raccomanda di assumere:*

> dai 7 ai 17 anni di età, periodo in cui si forma la maggior parte dello scheletro di calcio/die	> 1.000-1.200 mg
> dai 18 anni in su	> 800-1.000 mg/die

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*In particolare:*

> durante la gravidanza e l'allattamento	> 1.200 mg/die
> nella fase perimenopausale e nei 10 anni post-menopausali	> tra 1.200 e 1.500 mg/die

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- **La maggior parte del calcio alimentare è presente nel latte e nei suoi derivati,** prodotti che spesso non vengono consumati adeguatamente vuoi per motivi di "linea", visto il loro contenuto di grassi mediamente elevato, vuoi per fenomeni di intolleranza al lattosio, lo zucchero presente nel latte, che di ipercolesterolemia.
- A parte i supplementi specifici che però devono seguire precise indicazioni mediche, **un ruolo importante è rivestito dall'assunzione di acque ricche di calcio (>150 mg/L).** *L'assorbimento frazionale del calcio contenuto nelle cosiddette acque calciche è sovrapponibile a quello dei latticini.*

# Calcium Bioavailability From a Calcium-Rich Mineral Water, With Some Observations on Method

*J Clin Gastroenterol* • Volume 38, Number 9, October 2004

Lucia Bacciottini, PhD,\* Annalisa Tanini, PhD,\* Alberto Falchetti, MD,\* Laura Masi, MD, PhD,\*  
Francesco Franceschelli, PhD,\* Barbara Pampaloni, PhD,\* Gianluca Giorgi, PhD,† and  
**Acqua minerale calcica** Maria Luisa Brandi, MD, PhD\* **Latte**

TABLE 5. Analytic Data of Uliveto Water Bioavailability Postmenopausal Women

ID*	WT†	pCa‡	% abs§
A19	56.00	2.25	21.37
A20	76.00	2.25	15.93
A21	74.00	2.40	19.83
A22	72.00	2.47	16.46
A23	65.00	2.42	21.21
A24	68.00	2.47	26.46
A25	75.00	2.42	19.92
A26	70.00	2.37	26.20
A27	60.00	2.47	10.97
Mean ± SD <sup>  </sup>	68.44 ± 6.93	2.39 ± 0.09	19.82 ± 4.92

TABLE 6. Analytic Data of Milk Bioavailability

ID*	WT†	PCa‡	% abs§
A2	60.00	2.37	30.13
A6	65.00	2.47	25.70
A7	72.00	2.43	21.15
A15	83.00	2.15	14.45
A11	62.00	2.43	26.88
A14	78.00	2.25	10.27
A24	69.00	2.15	15.99
A26	69.00	2.40	18.48
Mean ± SD <sup>  </sup>	69.75 ± 7.81	2.33 ± 0.13	20.38 ± 6.83

L'NIH statement dice: "l'assorbimento di supplementi di calcio è migliore a dosi individuali di 500 mg di calcio o meno e quando assunti tra i pasti".

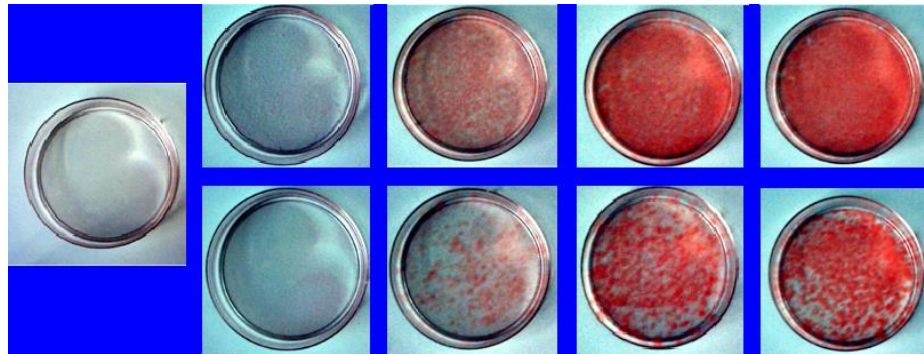
Quindi: è raccomandato bere acqua minerale naturale calcica molte volte al giorno per la migliore idratazione e supplementazione di calcio giornaliero.

# **IDRATAZIONE DI QUALITA' E INDICATORI DI INFIAMMAZIONE**

# 3T3-L1 cells adipogenesis: inflammatory protocols

*Oil red staining*

A Fabbri, GM Besser et al Mol Cell Endoc 2003

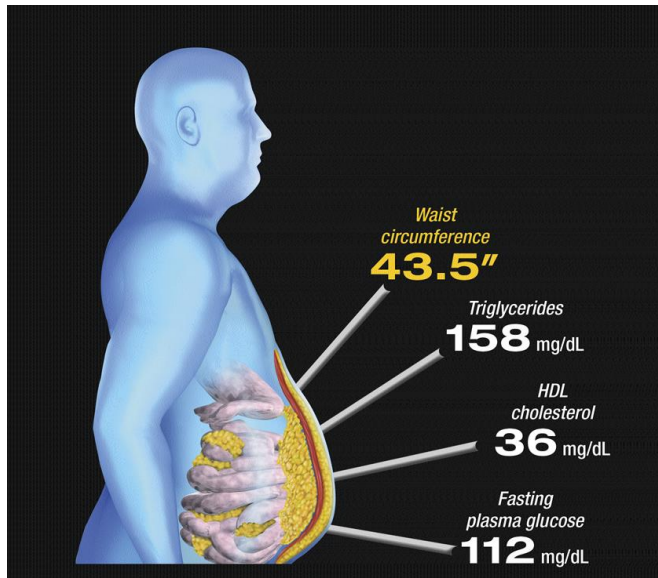


0 2 6 10 14  
Days of culture

IDM: Insulin/Dexamethasone

II: Insulin/Indomethacoin

**Insulin + Cortisol**  
potent adipogenetic and  
inflammatory substances



>102 cm  
Male  
>88 cm  
Female

While the pathogenesis of the metabolic syndrome and each of its components is complex and not well understood, **central obesity** and **insulin resistance** are acknowledged as important causative factors.<sup>1-5</sup>

# The importance of vitamin D and omega-3 PUFA supplementation: a nonpharmacologic immunomodulation strategy to halt autoimmunity

2022; 26: 6787-6795

European Review for Medical and Pharmacological Sciences

M. INFANTE<sup>1,2,3,4</sup>, A. FABBRI<sup>2</sup>, D. DELLA-MORTE<sup>2,5,6</sup>, C. RICORDI<sup>1</sup>

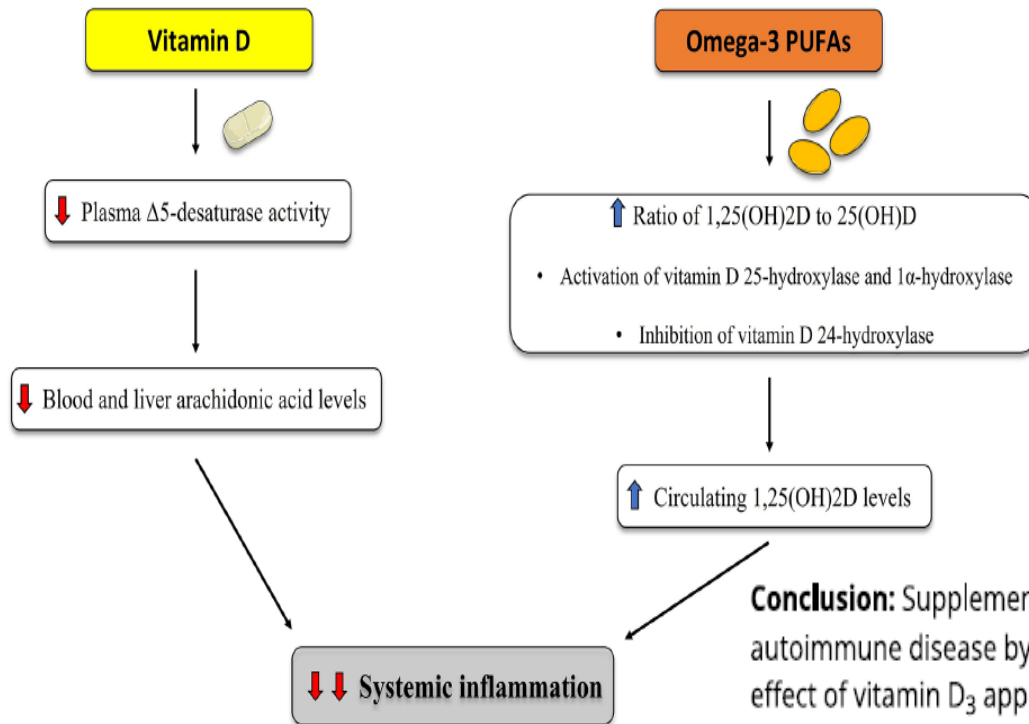
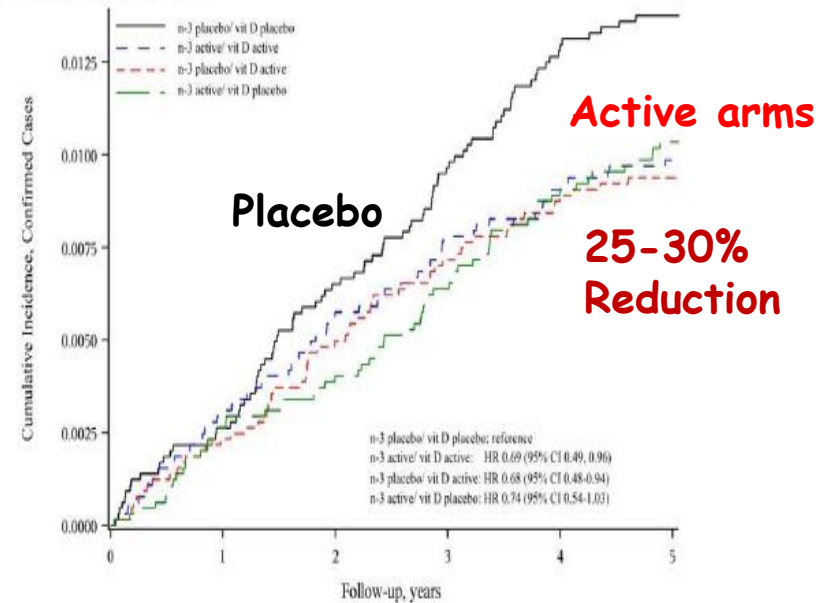


Figure 1. Incident Autoimmune Disease in the Four Arms of VITAL, over 5.3 years Mean Follow-up, including Confirmed Cases



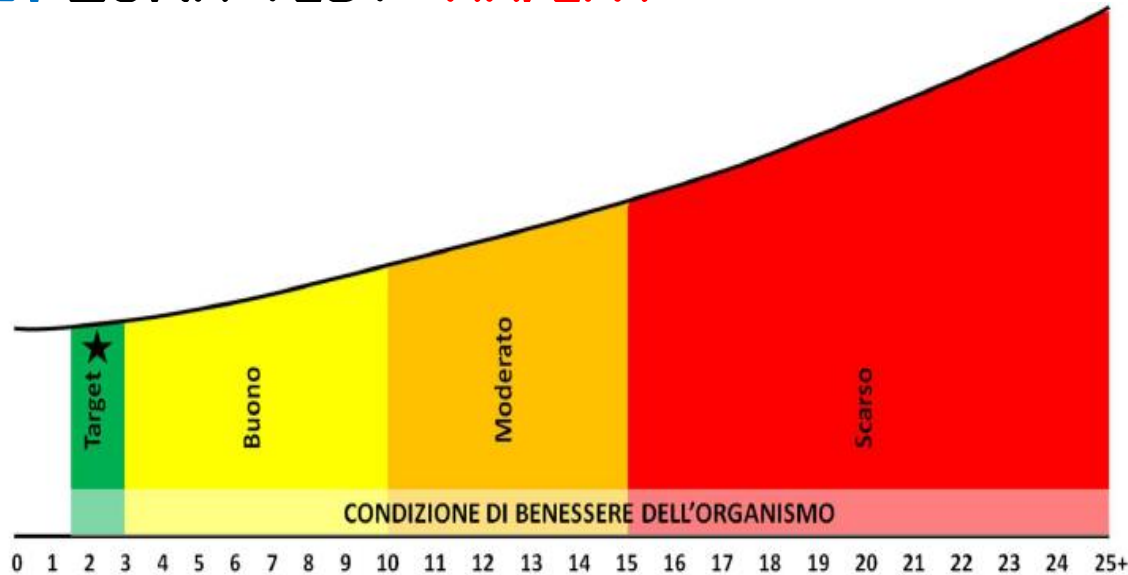
**Conclusion:** Supplementation for 5 years with vitamin D<sub>3</sub> and/or n-3 fatty acids reduced incident autoimmune disease by 25-30% in older adults vs. those who received neither supplement. The effect of vitamin D<sub>3</sub> appeared stronger after 2 years of supplementation.

Hahn J et al., BMJ 2022

**Vitamin D + Omega-3 PUFAs**  
potent antiinflammatory substances

# SENSITIVE INFLAMMATORY INDEXES

## 1. ZONA TEST: AA/EPA



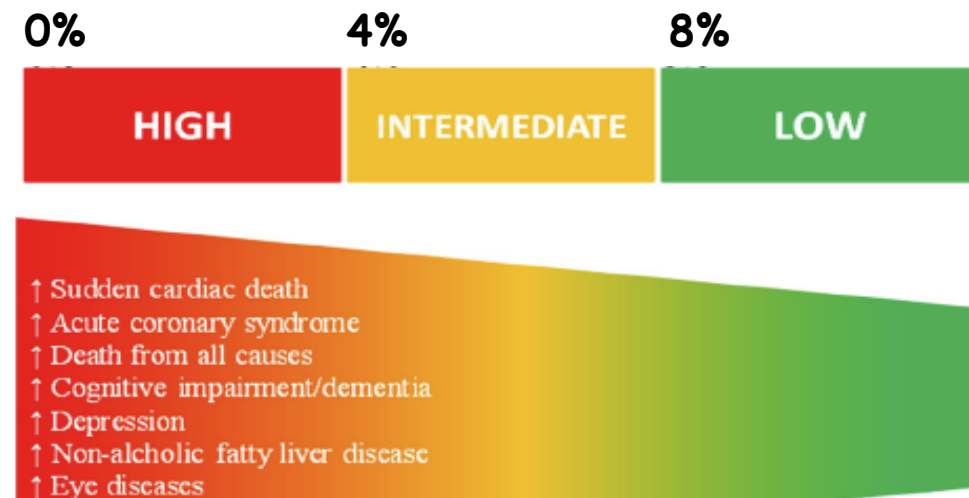
A rapid method for determining arachidonic: eicosapentaenoic acid ratios in whole blood lipids: correlation with erythrocyte membrane ratios and validation in a large Italian population of various ages and pathologies

Rizzo *et al.* *Lipids in Health and Disease* 2010, 9:7

LIPIDS IN HEALTH AND DISEASE

Target EPA: 4.0% - 6.0%	Target AA: 7.0% - 9.0%
Valore Target: 1.5 – 3.0	

## 2. N-3 INDEX: EPA+DHA/TOTAL FATTY ACIDS



Metabolic indices of polyunsaturated fatty acids: current evidence, research controversies, and clinical utility

CRITICAL REVIEWS IN FOOD SCIENCE AND NUTRITION

Scapagnini G *et al.* 2021

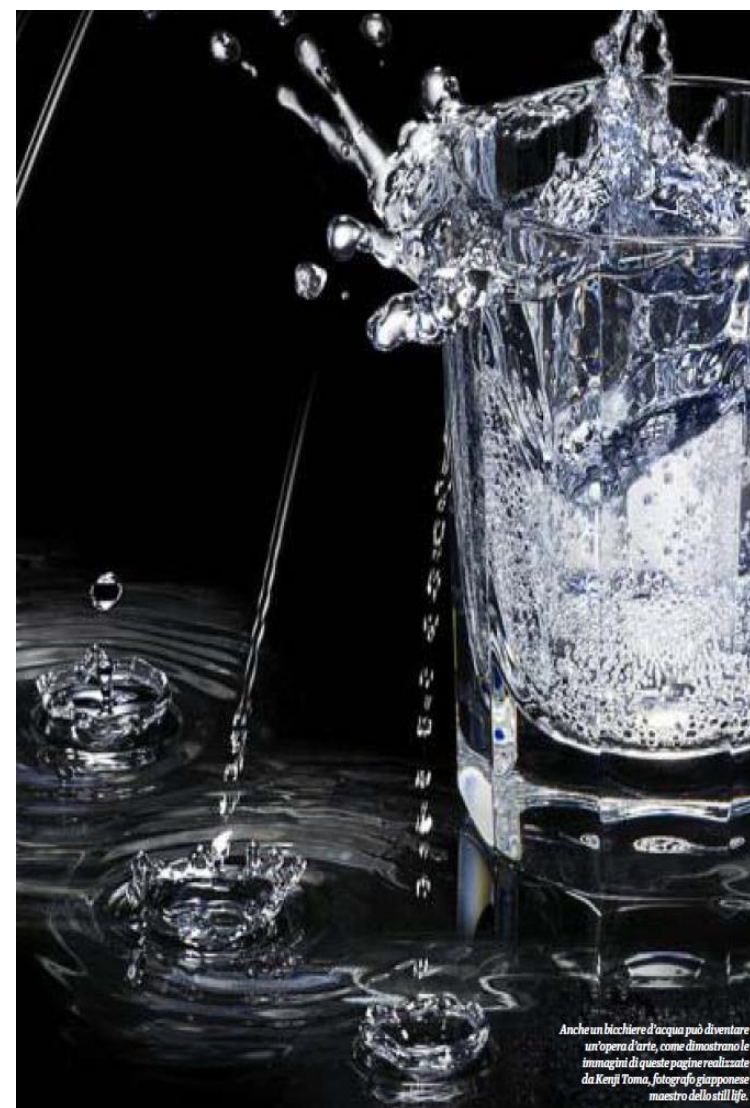
## Conclusioni

L'acqua è un **nutriente vitale**.

Le acque minerali naturali, non hanno effetti terapeutici in senso stretto, ma essendo dotate di caratteristiche organolettiche ed igieniche particolari sono in grado di svolgere azioni favorevoli la salute, di mantenere il benessere nelle varie fasi della vita e di essere un vero e proprio **"functional food"** che come tale va conosciuto e usato nel modo migliore.

Ci sono evidenze di effetti benefici sulla salute dell'uomo, su una longevità sana ed è plausibile una **azione antiinfiammaging**.

**Le acque minerali naturali ricche in bicarbonato, calcio e magnesio sembrano essere le più promettenti.**



Anche un bicchiere d'acqua può diventare un'opera d'arte, come dimostrano le immagini di queste pagine realizzate da Kenji Toma, fotografo giapponese maestro dello still life.