



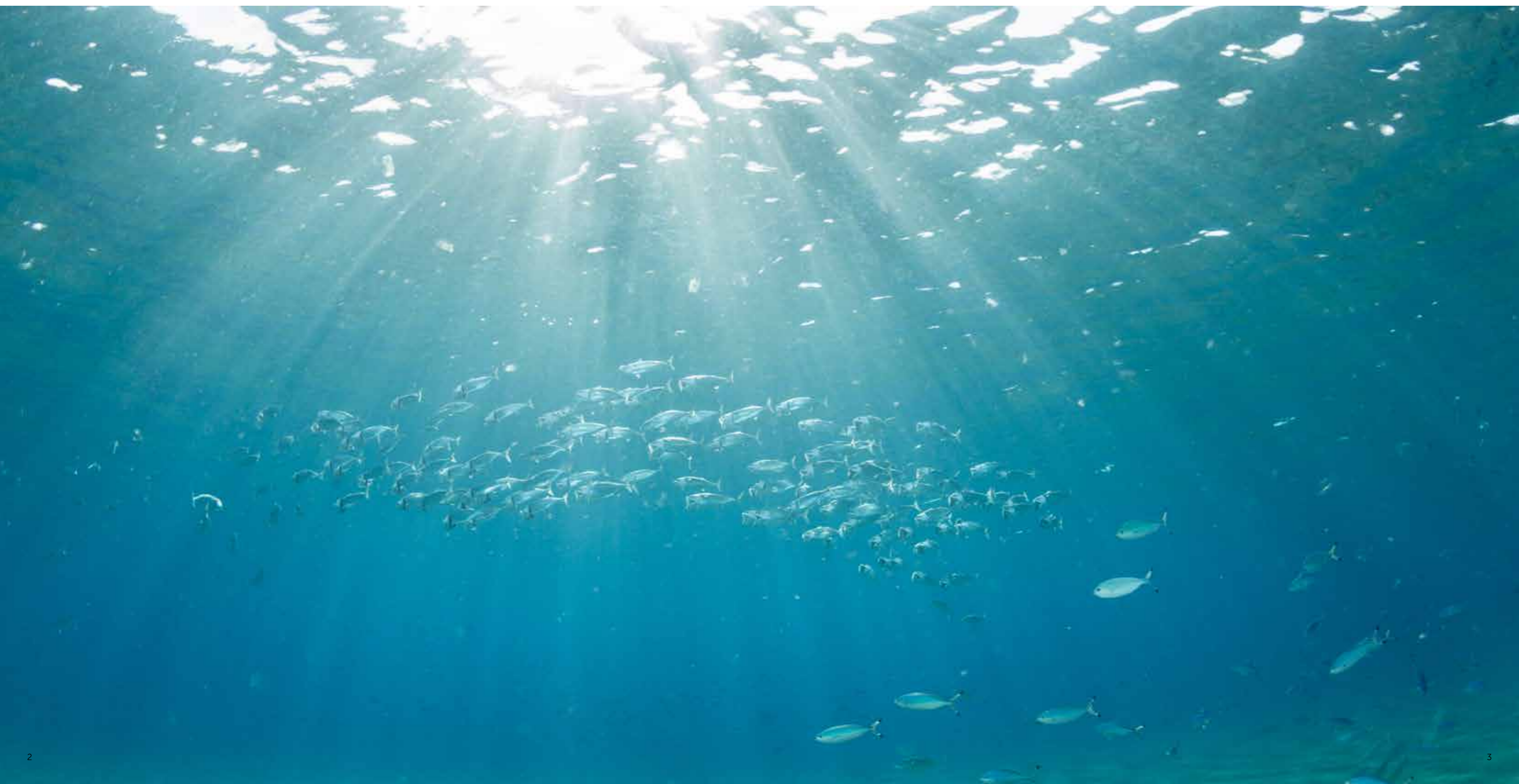
THE GLOBAL PLASTIC CALAMITY

How much should we worry
about plastics impacting our health?

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New studies show micro-plastics are found in the fish we eat, the air we breathe, and the water we drink from our taps and bottles



IMAGINING THE UNIMAGINABLE IS NEVER PLEASANT

Many of us live lives of luxury in which we've never had to grapple with disaster, conflict, famine or epidemic. Yet a global health epidemic is slowly unfolding around the planet under the weight of single-use plastics that are breaking into microparticles in our oceans, rivers, and lakes and entering our water and food systems.

One of the world's top medical experts on human hormones warns how human hormones are being disrupted by the thousands of chemicals found in plastic and believes humankind faces possible extinction within 200 years unless steps are taken to reduce the use of plastics in our lives.

Dr. Ivone Mirpuri has dedicated her life to practicing medicine in her home country Portugal for over 35 years, where she operates one of Europe's leading clinics specializing in hormonal modulation.

The medical clinics' anti-aging studies – which have nothing to do with aesthetics – are directed towards maintaining general health and improving quality of life through a better understanding of nutrition, physical exercise, supplementary diet, hormonal modulation and changes in lifestyle. Hormonal modulation embraces studying changes in the functionality of neural, sensor and motor systems driven by changes in hormonal levels.

Troubled by seeing growing numbers of fertility-related and abnormal development cases, Dr. Mirpuri's research has left her firmly convinced that the causes are related to exposure to chemical contaminants. A frequent speaker at international medical conferences, Dr. Mirpuri draws a direct connection between the suspected impacts of plasticizers in humans'

bloodstreams and rising infertility, early menses and menopause, obesity and sexual dysfunction.

The long-term consequences are potentially dire. Mess with hormones, and you mess with the health and wellbeing of all living creatures on the planet. Hormones control every function in the human body. From blood pressure and heartbeat to fertility, immune function, mood and emotions, and even quality of sleep.

In this White Paper, we look at the way an estimated 85,000 so-called Endocrine Disrupting Chemicals, or EDC's, block the way hormones function naturally, triggering abnormal development and illnesses ranging from stunted fertility and male/female sex malformations to obesity, diabetes, cancer and heart attacks.

The No1 threat to humankind

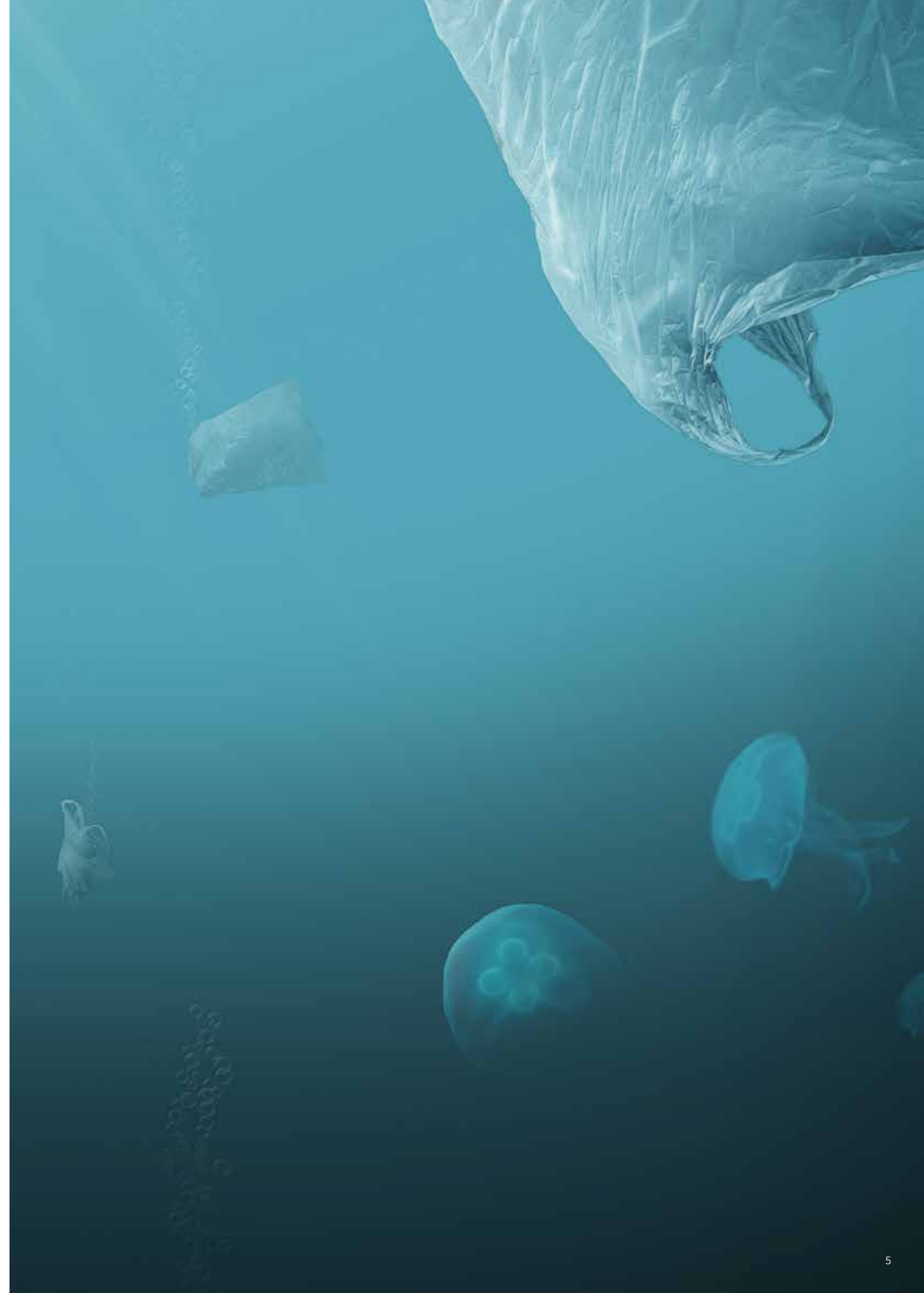
Found in non-stick cookware to the packed food we eat, and now also found in the tap and bottled water we drink, EDC's have been dubbed by Dr. Mirpuri as the 'No1 threat' to humankind.

The world's environment and waterways are in peril. Growing population numbers, plastic pollution on the rise and governments rolling back environmental regulations only exacerbate this bubbling crisis. This trend was notably seen in December 2018 when the Trump administration lifted significant protections for thousands of waterways and wetlands nationwide. The move eliminated key landmark Clean Water Act of 1972 policies and is a clear signal to all they must take personal ownership for their safety.

In support of how Dr. Mirpuri and others are challenging the unmitigated use of plastic, United Nations environment chief Erik Solheim says the planet 'is on the edge of a global plastic calamity.' He insists consumers, businesses and governments must cut consumption of single-use, throwaway plastics – or face the worst of outcomes.



Dr. Ivone Mirpuri is one of Europe's leading specialists in hormonal modulation – how hormones play a central role in regulating the body's systems.



IN FOOD, WATER AND AIR, AND NOW OUR BODIES, PLASTIC IS EVERYWHERE

Dr. Ivone Mirpuri does not mince her words. Humankind, she states with absolute conviction in a video interview with Bluewater, 'faces extinction within 200 years unless steps are urgently taken to reduce the use of synthetic plastics and the chemicals in them'.

The doctor is one of the world's top medical experts on human hormones and how they are being disrupted by toxic chemicals. Her fear was sparked by seeing at first hand in her medical practice an ongoing rise in fertility problems, male/female sexual organ malformations and hormonal disorders ranging from obesity to diabetes and physical ailments such as cancer and heart attacks

What do hormonal problems have to do with a water company like Bluewater, you may ask?

The answer is simple. Plastic pollution is rife. Microplastic particles are everywhere, even in our drinking water, and so are the chemicals used in the plastic.

Planet Earth, its soils, rivers, and oceans that supply the food and water our survival as humans depend upon, is already fouled by vast amounts of plastic trash, which is in the food we eat, the air we breathe, and the water we drink from our taps and bottles. Bluewater has made sustainability and removing single-use plastics from our planet a cornerstone of the company's mission to help create a healthier, cleaner world for all living on it. Armed with a high performance Bluewater water

purifier, individual human beings and professional businesses can achieve peace of mind and safeguard against water contamination posed by the plastic threat.

Solid scientific evidence

There is no shortage of substantial scientific evidence about the extent of plastic pollution and the potential dangers to human health carried by chemical contamination.

The United Nations estimates that over 13 million tonnes of plastic litter yearly ends up in our oceans. In the UK alone, just 45% of the country's recyclable plastic waste is actually being recycled. Currently, the rest ends up in landfill or the ocean. Research reveals Britons used over 13 billion plastic bottles in 2016 (that's 36 million a day), yet only 7.5 billion was collected for recycling.

But the plastic waste problem is not confined to what is being thrown into the sea. The United Nations warns that while the plastic in the world's oceans has garnered massive media attention, plastic pollution 'arguably poses a bigger threat to the plants and animals – including humans – who are based on land.'

Underlining that little of the plastic discarded every day is recycled or incinerated in waste-to-energy facilities, the UN states unambiguously that much is ending up in landfills, taking up to 1,000 years to decompose, and continually leaching potentially toxic substances into the soil and water.

WHAT ARE MICROPLASTICS?

The term 'microplastics' is widely used to describe plastic particles with the size ranging from 1 nanometer to 5 millimeters, according to the United Nations Environment Programme.

The UN says 'these small plastic pieces, between the size of a virus and an ant, now can be found worldwide: in the water of lakes and seas, in the sediments of rivers and deltas, and in the stomachs of various organisms ranging from zooplankton to whales. Microplastics have been detected in environments as remote as a Mongolian mountain lake, and deep-sea sediments deposited five kilometers below sea level.

The world organization also states that chemical additives are often included during plastic manufacturing to generate or enhance specific properties. These properties often make the material more durable by introducing anti-microbial, flame retardant, UV resistance, rigidity, malleability, or waterproofing characteristics. Such enhanced plastic products include packaging materials, containers and bins, fishing nets, bottles, pipes, and furniture.

After the product becomes waste, the chemical additives can potentially leach into marine organisms when they ingest the plastic, and their systems attempt to digest. Potential adverse effects, at high enough concentrations, may include immunotoxicological responses, reproductive disruption, abnormal embryonic development, endocrine disruption, and altered gene expression.

"Humankind faces extinction within 200 years unless steps are urgently taken to reduce the use of synthetic plastics and the chemicals in them"

– Dr Ivone Mirpuri

NANOPLASTICS HAVE A BEHAVIOR- CHANGING EFFECT

MICRO- AND NANOPLASTIC COMES FROM:

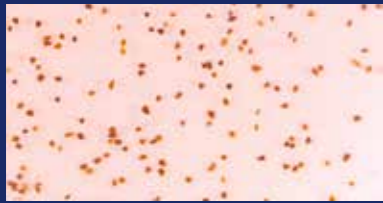
Plastic waste that degrades

Microplastics come from many different sources, large and small, that continuously degrades into ever smaller pieces.



Fibers used in clothing

Sportswear and fleece clothing release large amounts of fiber when washed, which ends up being flushed out.



Microbeads

Microbeads are tiny pieces of manufactured polyethylene plastic added to health and beauty products, such as some cleansers and toothpaste.



Nurdles

Nurdles are pre-production plastic pellets, used as the building blocks for the likes of drinking straws, plastic bags, and plastic bottles, for example.

The nanoparticle threat

German researchers from the Leibniz -Institute of Freshwater Ecology and Inland Fisheries (IGB) estimate terrestrial microplastic pollution is 4 – 23 times higher than marine microplastic pollution.

Saying around one-third of all plastic waste ends up in soils or freshwater, the German study warns this pollution could have a long-term adverse effect on terrestrial ecosystems throughout the world, especially as it breaks down further into nanoparticles (less than 0.1 micrometers in size), that can enter internal organs and the bloodstream.¹

The UN also writes that when plastic particles break down, 'they gain new physical and chemical properties, increasing the risk that they will have a toxic effect on organisms.' The Leibniz Institute concurs. It adds that while the long-term effects of such changes have not yet been sufficiently explored, studies on fish have revealed 'that when passing the blood-brain barrier nanoparticles have a behavior-changing effect.'

Alarm bells

The alarm bells on plastic have been jangling for a while. Already back in 2011, the UN warned plastic trash in oceans posed a threat to human health, stating vast amounts of marine litter posed multiple risks, including 'loading the human food chain with potentially cancer-causing toxins.'

The Baltic Sea provides solidly researched proof of how toxic chemicals can upset reproduction and lead to reduced fertility. A 2017 report, Endocrine Disrupting Chemicals in the Marine Environment, by researchers from the ACES Institute at Stockholm University, studied chemical pollution's impact on marine life. The scientists concluded that Endocrine Disrupting Chemicals have indeed negatively impacted the ability of live creatures to reproduce.²

ACES researcher Marlene Ågerstrand stated: 'In toxicity studies, EDCs have been linked to effects on the immune system and metabolism, and also with cancer.'

The ACES report added that although most "classical" substances are regulated and banned, at the same time, the production and use of other and, in many cases, similar chemicals have increased sharply, and as a result the marine environment is burdened with thousands of new substances, about which science knows little or nothing.

The founders of Earth Day, the largest civic-focused day of action in the world with over 1 billion people in 192 countries taking part, has addressed chemicals impact on humans. It believes:

- Bisphenol A also known as BPA, used to make billions of plastic beverage containers, dinnerware, protective linings of food cans and toys, is considered an endocrine disruptor, meaning it can both decrease or increase endocrine activity in humans and cause adverse health effects.

- Based on the weight of existing evidence, it is likely that elevated urinary BPA levels are associated with prostate cancer in humans and may be an independent diagnostic marker in prostate cancer patients.

- Growing literature links many Phthalates, which are a group of chemicals used to make plastics more flexible and harder to break, with a variety of adverse outcomes including weight gain and insulin resistance, decreased levels of sex hormones, and other consequences for the human reproductive system both for females and males.

Sources:
¹ <https://www.igb-berlin.de/en/news/underestimated-threat-land-based-pollution-microplastics>

² <https://balticeye.org/globalassets/fokusomraden/farliga-amnen/edcs-in-the-marine-environment-report.pdf>



Dr. Mirpuri dubs EDCs the #1 threat to human health due to how the chemicals enter our bodies, from the packaged or fresh food we eat, the air we breathe and the water we drink or wash in.

THE RISE (AND GROWING FALL) OF PLASTIC

- Plastic is a name for polymers, such as cellulose, that are long chains of molecules. But over the past 150 years or so humans have evolved how to make synthetic polymers, using petroleum and other fossil fuels.
- The first synthetic polymer was invented in 1869 by New Yorker John Wesley Hyatt, who discovered a plastic that could imitate natural substances like tortoiseshell, horn, linen, and ivory.
- The first fully synthetic plastic called Bakelite was invented in 1907 by Leo Baekeland to meet the needs of the rapidly electrifying United States. Bakelite was not only a good insulator; it was also durable, heat resistant, and ideal for mechanical mass production.
- Plastics came of age during World War II which sparked an enormous expansion of the plastics industry due to the need to replace scarce natural resources with a synthetic alternative. After the war ended, plastics offered a utopian view of the future, prompting author Susan Freinkel to write, "In product after product, market after market, plastics challenged traditional materials and won, taking the place of steel in cars, paper and glass in packaging, and wood in furniture."
- Plastics image began becoming tarnished already in the 1960s as the world started awakening to pollution, spurred by Rachel Carson's 1962 book, *Silent Spring*. Plastic also gradually began to be seen as something cheap and flimsy. Plastic's reputation fell further in the 1970s and 1980s as anxiety about waste increased. The status of plastics has also suffered thanks to a growing concern about the potential threat they pose to human health.

Source: <https://www.sciencehistory.org/the-history-and-future-of-plastics>

THE DANGER PLASTIC POSES TO HUMAN HORMONES

Chemicals in the environment are affecting human hormones and subsequently health and wellbeing. Dr. Ivone Mirpuri of Portugal's Mirpuri Foundation notes how hormones control every function in our body. This includes blood pressure, heartbeat, blood sugar, fertility, immune function, our mood and emotions, our quality of sleep, our water content, our calcium level, the water we drink, the urine we excrete.

Noting that research reveals 9 out of 10 Americans have BPA in their blood, and 99% of pregnant women tested were found to have PFC (Perfluorinated chemicals used in non-stick-cookware) and PBDE (Polybrominated difenyleters, used in fire retardants) in their blood, Dr. Mirpuri has compiled a long list of the harmful effects of EDCs:

- Reduced fertility (which has decreased by 50% over the last 50 years, owing to low sperm quality as well as higher endometriosis, poliquistic ovaries syndrome and miscarriages)
- Skewed male/female sex ratio changes in hormonal levels, which leave men with more feminine bodies and women with more masculine traits
- Increased rates of obesity, diabetes and heart problems
- More heart attacks
- Early puberty (our grandmothers had their first period around the age of 16, now it is occurring at 8-9 years)
- Higher levers of breast, prostate and testicular cancer (which has found fourfold since 1943)
- Rising rates of breathing problems like asthma
- Cognitive, behavioral and other brain development problems
- Attention Deficit Hyperactivity Disorder - ADHD



"THE PLANET IS ON THE EDGE OF A GLOBAL PLASTIC CALAMITY"

BPA in a plastic bottle

In Europe, the Guardian newspaper described how EU authorities in June 2017 stated the bisphenol A (BPA) chemical found in water bottles and kettles poses a threat to human health because of its effects on hormones. The European chemicals agency (Echa) voted unanimously that BPA was an 'endocrine disruptor' and linked it to a range of hormone-twisting health effects including cancer, autism, and diabetes.

In North America, the *livestrong.com* website also notes a plastic bottle may leak chemicals into the water when reused, especially if they have been washed using hot water. The site wrote: 'Most plastic water bottles are ... made from polyethylene terephthalate, which Harvard University says may contain antimony, a chemical that may cause cancer. More rigid bottles, like the type which contain water or fruit juice, are... made from polyvinyl chloride. Such bottles contain phthalates, which may be linked to reproductive health problems.'

85,000 toxic chemicals

There are over 85,000 chemicals according to some research that can mimic and disrupt human hormones. EDC's, are everywhere. In dry cleaning chemicals, non-stick cookware, herbicides, and everyday plastics.

Plastic is useful, but at what cost?

Plastic has proven a useful material over the past 70 years. It is used in electronic equipment from cell phones to computers medical equipment, and flooring, insulation materials and clothing (acrylic, nylon, spandex, and polyester), to name just a few examples. But, as Greenpeace says, 'is it essential to have shrink-wrapped broccoli sitting side-by-side with an unwrapped version on supermarket shelves?'

The plastic itself is often of less concern than the chemical additives found in it. In many plastic products, added fillers and chemicals comprise more than 80 percent of the overall weight and can include flame retardants (power cords, for example). The problems associated with plastic as it breaks down into micro- and nano plastic particles stretch far beyond eyesore pollution such as the large islands of waste like the Great Pacific Garbage Patch, the most extensive collection of floating plastic in the world covering 1.6 million square kilometers.

Microplastics are pervasive. Tiny pieces of plastic resulting from the disposal and breakdown of consumer products and industrial waste, microplastics swirl about in every sea around the planet. Microplastics are also in the fish and shellfish we eat, in sea salt, in the food-growing soil, and in both tap water and bottled water. A study by a research team at US lobbying group Orb Media found 'a single bottle can hold dozens or possibly even thousands of microscopic plastic particles.' Tests by Orb Media on more than 250 bottles from 11 brands reveal contamination by plastics such as polypropylene, nylon, and polyethylene terephthalate (PET).

The extent of the plastics problem has been summed up by the UN. The world body's environment chief Erik Solheim says the planet 'is on the edge of a global plastic calamity.' He calls on consumers, business and governments to cut consumption of single-use, throwaway plastics or face the worst of outcomes.



ABOUT MIRPURI FOUNDATION

The Mirpuri Foundation was established by its President Paulo Mirpuri with the commitment to make the world a better place for future generations. The non-profit organization partners with governments, businesses, communities, and individuals to address a range of projects in Marine Conservation, Wildlife Preservation, Aerospace, Medical Research, Performing Arts and Social Responsibility. Earth and ocean sustainability have been granted special attention and Mirpuri Foundation has put into practice several campaigns to raise awareness towards current challenges and emerging threats. For more information, please visit www.mirpurifoundation.org

ABOUT BLUEWATER

Bluewater harnesses patented technology to deliver enhanced water quality in a world where tap water taste and safety can no longer be taken for granted. Our technology delivers water for homes, commercial operations and public dispensers that is free of bacteria, toxic metals, pharmaceutical and chemical residues, micro-plastics and limescale.



Bluewater has been certified with a Gold Seal Trademark from the US Water Quality Association (WQA), a body that tests and certifies water treatment products to ensure they meet industry standards.

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