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GUEST EDITORIAL

Una cuchara de plástico en tu cerebro: The calamity of a plastic spoon in your brain

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A Picture That Refuses to Soften

The image on our cover was not chosen for effect. It is neither abstract nor poetic. It is not "inspired by" anything. It is an unflinching report: a human brain, stippled with bright fragments of microplastics, not imagined but real, caught at the precise intersection of scientific fact and biological intrusion. That the visual is disturbing is not a matter of aesthetics. It is a reflection of an epistemic break. The blood-brain barrier, long treated as a sacred anatomical defense line, has been crossed. We now have polymers where cognition happens.

This moment reframes more than a risk profile. It shatters a framework. For years, whispers within environmental science anticipated the encroachment. That plastics would enter our biology was inevitable, they said. But even the most pessimistic among them did not expect this: particles in the hippocampus, polymers tangled with neurons, synthetic debris within the very tissues that govern memory, identity, and mood (see Fig. 1). What was theory has been replaced by evidence. And the consequences are no longer theoretical.

Between Disciplines, Beyond Containment

This issue presents a series of papers that do not comfortably belong to a single field. Their home lies between disciplines. Toxicology, neurology, public health, and molecular biology all converge here uneasily. The work we have chosen to feature does not form a collection, not in the traditional sense. It is, instead, a confrontation. These papers reveal that materials once celebrated for their durability and convenience now reside inside our most vital organ, the brain, not metaphorically but physically.

One Spoon, One Era

Fabiano, Luu, and Puder, the authors of the featured commentary, do not begin with declarations (1). They begin with data. Their focused review looks at and expands on the findings of Nihart et al. (2), and what they uncover is not just quantitative; it is cognitively disturbing. An average of one spoonful (yes, a spoon's worth!) of microplastic particles has been identified in human brain tissue (see Fig. 1). That this number is real is difficult enough. That it is three to five times higher in individuals with dementia is something else entirely.

Levels climbed by approximately 50 percent between 2016 and 2024. That is not background noise. That is velocity.

Beyond quantification lies causation. In their broader Viewpoint on microplastics, ultra-processed foods, and mental health, Fabiano, Luu, Puder, and Marx connect the alarming rise in brain microplastics with our changing food systems (3). Ultra-processed foods—now comprising over 50% of energy intake in countries like the United States—contain exponentially more microplastics than whole foods. Chicken nuggets, they note, harbor 30 times more microplastics per gram than chicken breasts. The microwave heating of plastics releases millions of particles within minutes. Their work establishes a critical bridge between diet, environmental contamination, and potentially, our rising rates of depression and cognitive decline.

Fragility in Acceleration

But beyond the shock of the numbers is something subtler, and more troubling: temporal acceleration. An increase of that magnitude across just eight years implies not only spread but speed, a momentum that traditional public health models are not built to accommodate—a reality equally apparent in the rapid global shift toward ultra-processed food consumption documented by Fabiano and colleagues. The fact that higher concentrations were observed in dementia patients prompts a question we are not yet equipped to answer: are microplastics contributing to neurodegeneration, or does a degenerating brain become more permeable, more absorbent?

The authors do propose a path that is narrow but navigable. Their recommendations, rooted in empirical pragmatism, focus on behavioral modifications: choose tap over bottled water, refrain from heating food in plastic, and question the safety of ultra-processed foods. These are not revolutionary acts, perhaps, but they are not irrelevant either.

The Tea Bag and the Apheresis Machine

Their analysis goes further down to the specific, sometimes mundane, entry points of contamination. Tea bags release billions of submicron plastic particles during brewing. It sounds absurd, but it is not. So, we move from concept to detail, from macroecology to domestic ritual.

Then we come to removal. In an exciting Brevia, also in this issue, Bornstein et al. offer what may be the first true shift in the paradigm, from detection to extraction (4). Their work, cautious but ambitious, explores extracorporeal therapeutic apheresis to remove microplastic-like particles from the bloodstream.

The method is not new. The intention is.

Peripheral Disorders, Central Signals

Their subjects, patients with myalgic encephalomyelitis/chronic fatigue syndrome, were not arbitrarily chosen. These individuals often live at the edge of biomedical consensus. Yet it is precisely at those edges that new truths surface. Bornstein's team detected 14 distinct microplastic-like compounds in apheresis eluates. Preliminary? Yes. Disregardable? Absolutely not.

The mechanisms posited, such as inflammation, oxidative stress, and endocrine disruption, are well-known. But it is their entanglement that matters. These are not isolated insults. They are mutually reinforcing.

Profiles in Translation

Dr. Fabiano, profiled in this issue in our Innovators & Ideas section as a "Rising Star," understands disruption from within (5). His journey, from orthopedic trauma and psychiatric insight to research synthesis, reflects what this moment requires. His work on exercise as antidepressant treatment mirrors the same systems logic that microplastic pathology demands.

Highlighted in our Innovators & Ideas: Research Leaders section, Professor Bornstein's work on the HPA axis is a map of cascading failure (6).

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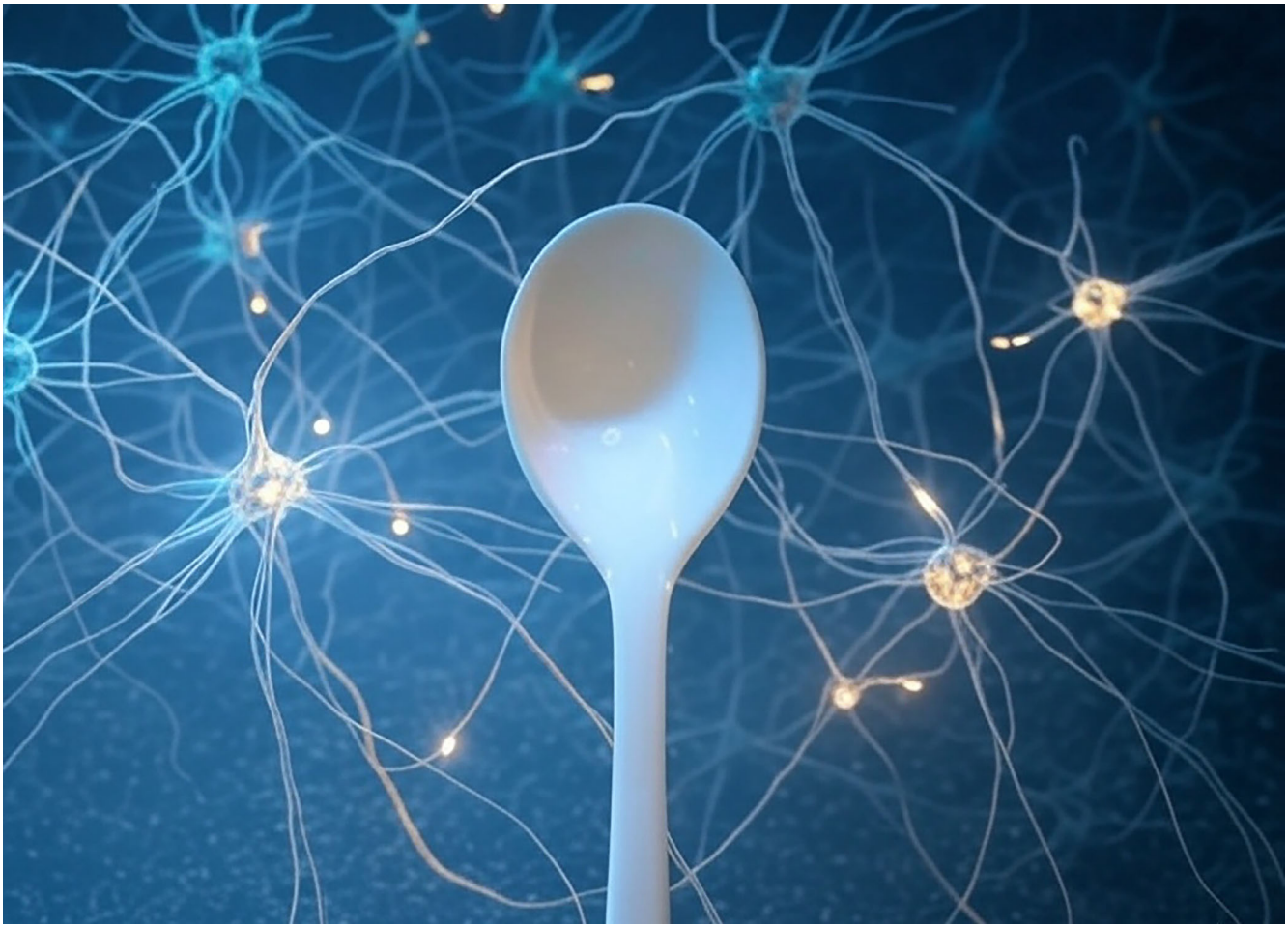

Figure 1. The plastic spoon in neural context. This visual metaphor represents the alarming findings reported by Nihart et al. (2) and further analyzed by Fabiano, Luu, and Puder (1): approximately a spoon's worth of microplastic particles has been detected in human brain tissue. A mundane object from daily life, the plastic spoon is juxtaposed against a neural network background, highlighting how synthetic materials now infiltrate our most complex organ. The glowing neurons surrounding the spoon illustrate potential sites of microplastic deposition within cerebrovascular walls and immune cells, particularly concerning given their concentration is 3–5 times higher in individuals with dementia. Image generated by Grok (xAI, 2025), with active author input.

When stress, inflammation, and metabolism collapse, the result is not just dysfunction but disintegration.

We also showcase Dr. Charlotte Steenblock as a "Rising Star" (7). Her models of stem and progenitor cells under stress show that exposure may not just harm It may reroute. Alter cell fate. Rewire development.

When Contamination Becomes Occupation of the Brain

At this point, we must stop pretending that these papers are about "risk." That language is too weak. What they document is not potential harm. It is present infiltration. The brain is not threatened. It is occupied.

What emerges from this work is not a warning. It is a reckoning. The boundary between internal and external has failed. If microplastics cross the blood-brain barrier, what else do we think remains sacred?

The Viral Spoon

And then, quickly and globally, came the response. Fabiano, Luu, and Puder's paper was not merely read. It was echoed. In twenty languages. In headlines. In memes. "Una cuchara de plástico en tu cerebro." A plastic spoon in YOUR brain. A metaphor that became too real.

Spain. South Korea. Argentina. Germany. United Kingdom. New Zealand. Canada. USA. Hong Kong SAR and China—The highest viewed Spanish-language website in the world, having surpassed 100 million unique visitors per month: *El País*. Four of the top five newspapers in Germany: *Frankfurter Allgemeine Zeitung* (FAZ), *Süddeutsche Zeitung* (SZ), *Die Welt*, *Die Zeit*. The most circulated newspapers in their countries: *Daily Mail* and *New Zealand Herald*. *National Post*. *Washington Post*. *Newsweek*. Associated Press. *Miami Herald*. *South China Morning Post*. 163.com. A million impressions within days (8).

It was not science communication. It was cultural cognition. People understood this. Deeply. Instinctively. While this viral response applies primarily to the first cited commentary on human microplastic removal, the Viewpoint by Fabiano, Luu, Puder, and Marx on microplastics, ultra-processed foods, and mental health and the Brevia on microplastic elimination by apheresis are just being published; their global outreach is rapidly building momentum.

Brain Medicine in the Present Tense

It is not incidental that *Brain Medicine* became the conduit for this message. This journal is not simply a publisher. It is a translator from data to dialogue, from research to relevance.

The brain on the cover is not symbolic. It is diagnostic. It demands we admit: the environment is inside us now.

Looking Ahead

The path forward will not be linear. We need particle detection and epidemiology, longitudinal studies, and legislative reckoning. A robust

scientific debate is currently underway among analytical experts regarding the validity of microplastic detection methodologies in human samples. From recent advancements in blood sampling techniques (9) to improved multivariate quantification using non-targeted pyrolysis GC-MS (10) and innovative biosensing approaches (11), the field is rapidly evolving. These ongoing refinements are essential as we work toward developing standardized methods that yield valid, reproducible, and reliable data, ultimately enabling evidence-based preventive strategies and medical interventions in the future.

We need to ask whether removal is possible, not in theory but in practice.

We also need to tolerate uncertainty, act before every causal arrow is known, and discard the illusion that caution means waiting.

What these papers offer is not the conclusion. It is the ignition.

They ask us to think differently.

To respond differently.

And perhaps, finally, to feel differently.

From Laboratory to Leadership

As I conclude this editorial, a striking convergence surfaces. US Health and Human Services (HHS) Secretary Kennedy's recent declaration that "Microplastics are everywhere—in our water, our soil, our food, even our organs" elevates what began as scientific observation into governmental recognition (12). RFK Jr's framing of the crisis not as "pollution" but as "market failure" echoes precisely what our researchers have documented: systems-level collapse requiring systems-level intervention. The Secretary's commitment to "fix the incentives and stop this toxic cycle" represents the policy response our findings demand. Whether through rewarding companies developing sustainable packaging or regulating chemicals near food sources, we are witnessing the rare moment when scientific alarm translates to governance action.

The plastic spoon is no longer just in our brains. It is now on policymakers' desks. What these papers initiated in laboratories may now find completion in legislation. This is how science should work: not as isolated knowledge, but as catalyst for correction. The environment inside us has finally become visible to those with the power to protect it.

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