

It's a matter of size

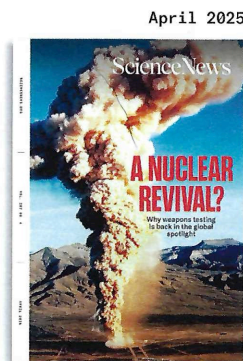
● A January executive order by President Donald Trump designates people as female if they make the “large” reproductive cell (the egg) and male if they make the “small” one (the sperm). But the human sexes don’t fit neatly into a male–female binary due to factors such as genetics and hormones, senior molecular biology writer Tina Hesman Saey reported in “The real biology of sex.”

Reader Root Gorelick, a biologist at Carleton University in Ottawa, appreciated the feature and wrote in to add some nuanced points.

Reproductive cells change throughout development, so a sex definition based on size is tricky. For instance, in developing embryos, the progenitors of eggs and sperm, known as primordial germ cells, typically form before ovaries and testes do. PGCs migrate to the gonads later in development. These cells are huge, and they start off roughly the same size, regardless of the type of gonad an embryo forms, Gorelick notes.

After gonads form, meiosis, the process of cell division that produces sperm and eggs, further complicates things. In human females, meiosis

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produces one large egg cell and two small infertile cells called polar bodies. “Things are weirder in males,” Gorelick continues. Before meiosis in males, a PGC replicates its genome several times without splitting up into product cells. So one huge cell with multiple nuclei is produced, Gorelick says. That huge cell then jettisons multiple tiny sperm cells, and the remaining cytoplasm is left as a large “residual body” cell without nuclei.

Roughly speaking

● A study of nearly 100 human brain samples shows that micro- and nanoplastics, or MNPs, in the brain have increased substantially over time, senior neuroscience writer Laura Sanders reported in “Plastic shards permeate human brains.”

The story stated: “From 2016 to 2024, the median concentration of MNPs increased by about 50 percent, from 3,345 micrograms per gram to 4,917 micrograms per gram — roughly three bottle caps worth of plastic.”

A couple of readers were confused about what the bottle cap comparison referred to.

The “roughly three bottle caps worth of

plastic” refers to the total amount of plastic estimated to be present in an entire human brain. That’s about 4,917 micrograms multiplied by the average weight of a brain in grams, Sanders says.

But this comparison comes with caveats. Brains vary in weight, as do bottle caps. Also, the study measured MNPs in samples from the brain’s frontal cortex, Sanders says. It’s not clear whether plastic loads differ depending on brain region.

Tip of the hat

● Reader Diana Lutz greatly enjoyed the April issue’s three features, which covered the debate around the revival of nuclear weapon testing, the complexity of biological sex and the uncertain promises of the carbon credit market. “All three articles are on important topics that are rarely examined at such depth,” Lutz wrote. “In each case, I had lingering questions the articles resolved. Kudos!”

Correction

✱ April’s “Spooky lights could be earthquake farts” mistakenly described radon as a flammable gas. Indeed, it is an inert gas.

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