What’s Inside: Tap Water

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- Photo: Kenji Aoki

- **Dihydrogen Monoxide**
The International Union of Pure and Applied Chemistry calls it oxidane. You probably know it as H₂O. Essential for all life, it’s the universal solvent as well as a biological lubricant and coolant. But when it comes out of your tap, this simple combination of hydrogen and oxygen atoms is often mixed with stuff that you might be less happy to swallow.

- **Sulfate**
A naturally occurring chemical that leaches into groundwater. Some people drink high-sulfate mineral water at spas for its “cleansing” (laxative) effects. In public supplies, the EPA recommends keeping it to 250 parts per million to minimize the sulfurous smell and taste.

- **Radio-Nuclides**
Millions of years ago, volcanic ash rich in uranium blanketed what is now the Gulf coast of Texas. Since then, the U-238 has made its way into aquifers, where it decays into radioactive isotopes like radium, thorium, and radon. In Houston, radiation levels in water have been measured as high as 16.9 picocuries per liter, well above the EPA maximum. (Yes, that unit of measure for radioactivity is named after Marie Curie—a fine tribute to a glowing career.)

- **Trihalomethanes**
Like fluorine and bromine, chlorine belongs to the group of intensely reactive “halogen” elements—the home wreckers of the periodic table, capable of breaking up many molecules (like ozone in the stratosphere). That makes chlorine great for killing microorganisms in water, but it can also combine with organic matter to form trihalomethanes, which damage your DNA and liver and may cause cancer.

- **N-Nitrosodimethylamine**
Labs have actually used this stuff to induce cancer in rats—with as little as one injection. But relax: It’s not a conspiracy to taint our precious bodily fluids. NDMA can be formed as a byproduct of water purification with chlorine or chloramine. You might also drink it if you live near a Cold War-era military base. Riverside County, California, has measured levels of this stuff as high as 12 parts per trillion—four times the state’s target limit.

- **Lead**
New York City boasts about the quality of its drinking water, but that upstate freshness means nothing if the water travels through ancient pipes. (Even new “lead-free” pipes can be 8 percent lead.) New York’s soft water readily absorbs Pb, which can cause developmental disabilities and neurological problems. City authorities are required to take steps when levels hit 15 ppb, and they’ve had rates as high as 19 ppb.

- **Chloramines**
You know how ammonia labels say, **DO NOT MIX WITH BLEACH**—and bleach labels say, **DO NOT MIX WITH AMMONIA**? Municipal water utilities, in their zeal to kill microorganisms, have been ignoring that advice for most of the past hundred years. The result is cleaner water, plus a few ppm of this stuff—a compound that can damage red blood cells in mice and some humans.

- **Bromate**
No, it’s not some chill dude that you share your Old Spice with. This potential carcinogen is another water-purification practice gone awry. When water containing bromine ions from natural mineral deposits is purified with ozone (O₃), bromate (BrO₃⁻) is born.