Imagine a 2030 Headline:

"Fentanyl Overdose Deaths Reach New Low for Fifth Consecutive Year"
By Tom Schumacher, Housing and Safety Signals Team member

Based on recent advances in drug detection, this headline could be reality in seven years!

Scientists have developed a quick test to detect trace amounts of fentanyl, heroin and cocaine, even when mixed with other drugs or cutting agents and adulterants. These new tests are easier, faster and more accurate than current lab-based methods – and up to 1,000 times more sensitive. The new technology is built on the identification and replication of aptamers, short single strands of DNA or RNA that bind with a specific molecule. Once pairings of substance and aptamer are found from a pool of hundreds of trillions of randomized DNA sequences, they are further tested to isolate only the ones that uniquely match the target substance.

"The aptamers can be mass produced, have a long shelf life and are easily chemically modified, which means they can be utilized for any type of sensor you develop," says Yi Xiao, associate professor of chemistry at North Carolina State University, who authored two studies describing the work. "So they could be incorporated into testing strips for officers in the field, for use at home, or for human patients in a physician's office."

The potential applications are exciting. A single drop of blood could immediately inform emergency medical technicians to help them initiate proper treatment for drug overdoses. Field measurement of intoxicants could help law enforcement quickly assess DUI situations. The aptamer tests could also lead to truth in labeling or quick testing of street drugs, enabling users to avoid dangerous fentanyl-laced substances.

Want to learn more? Here are some great sources for you:
- [NC State University](#)
- [*High-Affinity Aptamers for In Vitro and In Vivo Cocaine Sensing*](#) (Journal of the American Chemical Society)
- [*Developing Aptamer-Based Colorimetric Opioid Tests*](#) (Journal of the American Chemical Society)