The 10 Most Incredible Medical Breakthroughs of 2018

From medical drones to the first FDA-approved cannabis drug, innovative research continues to transform the future of health care.

By Meghan Rabbitt  Dec 6, 2018

In a tech-obsessed world, it’s only natural to ponder all the ways technology might actually be damaging your health. Is social media a trigger for depression? Could your cell phone start a fire while you sleep? Can reading a computer screen all day ruin your vision? It’s easy to get caught up in that downward spiral of thinking.

However, nestled in between all the negatives is an incredible world of positives. Technology only continues to advance in ways that can completely transform the future of health care. Just last year, scientists made progress in learning how to regenerate body parts, detect pancreatic cancer earlier, and relieve pain via virtual reality, Prevention reported.
This past year has proven to be an equally exciting time for innovative research. Here, some of the most striking medical breakthroughs of 2018 that have the potential to change your life.

1

Medical drones

You’ve heard about the possibility of drone drop-offs of your Amazon Prime packages. But soon drones might be door-dropping things like medication, shuttling blood to hospitals, and even delivering blood and biopsies to labs for speedier test results.
In May, the Federal Aviation Association approved 10 new drone projects—many of which will be used for health care. One San Francisco-based company called Zipline plans on expanding the drone blood deliveries it’s been doing in Rwanda to the U.S.; another company, Flirtey, will soon start dropping heart-jolting defibrillators in response to 911 calls in Reno, NV, which could let bystanders perform effective first aid.

2

Engineered bacteria

“Microbiome” has become a buzzword in medicine, and for good reason: Scientists have made big strides in the past few years when it comes to learning about the crucial role gut bacteria play in both causing and warding off disease. Now biologists have engineered
synthetic bacteria patients can ingest that break down a naturally occurring amino acid in the blood.

Most of us have gut bacteria that can do this on their own, but for people with a rare disease called PKU, it doesn’t happen, and the resulting toxic buildup in the blood can damage neurons, leading to developmental delays, mental disabilities, and psychiatric disorders. Clinical trials of the synthetic biology-based medical treatment on humans have so far been successful, and it may be the first of its kind to be approved by the FDA. Microbiome experts say this could lead to more engineered-bacteria treatments for issues from infections to inflammation.

3

Medical contact lenses
Goodbye, annoying eye drops; hello, smart contacts. Researchers at Boston Children’s Hospital and Massachusetts Eye & Ear (Harvard Medical School affiliates) have developed a contact lens designed to release medication slowly into the eye. These lenses could help treat glaucoma, diabetic retinopathy, inflammation, vein occlusion, and a number of other eye conditions that currently require intensive use of eye drops or in-office injections. The contacts, which don’t affect vision, can release medication for days to weeks at a time. They’re being extensively tested before going through a clinical trial.

Imagine this: Instead of giving you a shot, your doctor uses a device with a tiny nozzle at its tip to inject a high-pressure stream of medication or a vaccine. The stream, as thin as a strand of hair, exits the device at the cruising speed of a commercial jet and enters your skin, causing little or no pain. An app tracks your dose and any side effects and uploads the info to the cloud for you and your doc. This might sound too good to be true (particularly if you’re needle-phobic), but an MIT startup has created exactly that device, called Prime. The developers are looking for partnerships and hope to roll it out in the next couple of years.
Sensors that you swallow

This year, researchers from Australia developed an ingestible sensor that can measure and track gases in the intestines, allowing doctors and scientists previously impossible insight into the digestive system. The sensor is a pill with electronic components that detect, process, and transmit info, as well as a battery that runs on stomach acid (amazing!). Research shows that it could help diagnose stomach bleeds, identify the microbes in your gut (which could help docs get a better sense of your immune response), and even sense cancerous DNA way before you start having symptoms.

It’s building on technology another company created last year: a pill with a sensor that’s part of an FDA-approved treatment for certain mental illnesses to help patients (and their doctors or caregivers) track if and when they’ve taken their meds. Ingestible sensors are still in the very early stages of development, but the medical community is pretty sure this is an area that’s going to explode. One research report found that the market for them was expected to grow from $198 million in 2015 to $678 million by 2022.

The first FDA-approved cannabis drug

Medical marijuana is having a moment (hello, CBD oil!). Over the last few years, 30 states (and counting) have legalized the medical and recreational use of the plant. This year the FDA approved the first drug that contains cannabis (an active ingredient derived from marijuana), which will be used to treat seizures associated with two rare and severe forms
of epilepsy. With multiple cannabis-based drugs in development for serious diseases like cystic fibrosis, this approval is the first of what will likely be many.

New ways to monitor your blood pressure, blood sugar, and body fat and mass index

Blood pressure: Docs typically recommend that those with high blood pressure check it at home to help prevent heart attacks and strokes, but personal blood pressure machines haven’t been easy to use. Now there’s the Omron HeartGuide, the first wearable blood pressure monitor, which looks like a smart watch. “It provides a log, which gives your doctor a better sense of your blood pressure over time than if she’s just taking a reading at your appointment,” says Susan Elizabeth Spratt, MD, associate professor of medicine at Duke University.

Blood sugar: Millions of Americans with diabetes have to prick their fingers up to 10 times a day to monitor their glucose levels—which studies have shown may lead them to avoid checking their levels as often as they should. Continuous glucose monitors (CGMs) let people with diabetes monitor glucose in real time, day or night, without a finger stick.

Late last year, a new CGM, called the FreeStyle Libre, was released: Worn on the back of the upper arm, it’s smaller (the size of two stacked quarters) and significantly cheaper than others on the market. Real-time glucose monitoring can help diabetic patients make better lifestyle choices: “It’s one thing for your doctor to tell you to avoid ice cream and another to
see that number climb after you indulge,” says Elena Toschi, MD, a staff physician for adult diabetes at Joslin Diabetes Center in Boston.

**Body fat and mass index:** FitBit’s new Aria 2 is a scale that tracks body mass index (BMI), lean mass, and body-fat percentage. Dr. Spratt explains that BMI is a better measurement than weight because it takes into account a patient’s height. “Being able to monitor BMI at home helps patients stay on track,” she says.

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**8**

**A system to prevent hair loss from chemotherapy**

For many cancer patients undergoing chemotherapy, losing their hair adds another layer of pain to an already difficult experience. But a new helmet-style hat filled with a gel coolant (chilled to about 25°F) has been shown to narrow the blood vessels beneath the skin of the scalp, reducing the amount of chemo medicine that reaches the hair follicles and making hair less likely to fall out. Patients wear the cap before, during, and after treatment. The FDA first approved a scalp-cooling system in 2015 for patients with certain cancers and last year expanded clearance to some others.

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**9**

**Comfier mammograms**

Mammograms can reduce a woman’s chance of dying from breast cancer. Yet research shows that one in four women avoids them, in part because of the physical discomfort.
Enter GE Healthcare’s new mammogram machine, called the Senographe Pristina. It makes that uncomfortable breast “smooshing” more bearable with a wireless remote control that enables patients to adjust the compression with a technologist’s guidance. It also has a thinner image detector that requires less hard, cold material to touch patients as well as armrests instead of handgrips so women can relax their muscles during the exam. These new mammo machines are found at only 310 facilities in the U.S. right now, but GE Healthcare estimates that hundreds more will be available globally in 2019.

Smart-imaging computers for cancer prediction

Researchers at Case Western Reserve University have discovered how to train computers to quickly and accurately predict which lung cancer patients will benefit from chemotherapy and which may be able to avoid the intense treatment. By looking at the “spatial architecture” of immune cells in biopsy tissue—essentially, their shapes and patterns—these computers can determine which cancers are aggressive (and would respond well to chemotherapy) and which ones are less aggressive.

“Clinicians don’t have a good way of deciphering this right now, and it’s an easy way to look at biopsies that have already been collected to give patients more accurate diagnoses and treatment plans,” says Anant Madabhushi, a professor of biomedical engineering at the Case School of Engineering and the lead researcher on this technology. “We’ve shown
that this works the same way in early-stage breast cancers as well as head and neck cancers,” he says.