

Wearable Tech

Why carry when you can now wear digital accessories?

Most people know how much biotech has changed the world, leaving the laboratory to give us home DNA-testing kits, genetically modified vegetables and (soon) meat grown in petri dishes. And it's easy to see how computers have changed daily life, when they left our desks behind and melded with all our tools—from phones and cars to refrigerators and vacuum cleaners. Now comes the next big stage: a converging of both the digital and biological revolutions, which are showing up, of all places, in clothes and accessories.

Indeed, the line is blurring between tools that track our health and productivity and garments we wear to express who we are. In the future, both those kinds of items will be fashionable, electronic and biological all at once.

Already in stores are designer clothes and accessories whose “leather” is made by converting specially cultivated mats of mushroom roots, or by genetically modifying yeast to produce the same protein fibers that form animal skin. One gadget monitors your sleep and wakes you up at the right moment with a zap of electricity, while another tracks your health by analyzing your sweat then beaming the results in real time to your smartphone.

And, as some of the bolder experiments in wearable tech show, this is only the beginning.



FROM TOP

STELLA MCCARTNEY FALABELLA BAG This purse's sturdy “leather” is made of mushroom roots, which normally form tangled underground mats. Biofabric start-up Bolt Threads grows the cells, then compresses, tans and dyes the sheets into a leather substitute.

PAVLOK The wrist-worn Pavlok device interacts with your biology in the most direct way possible: It zaps you with a jolt of 50 to 450 volts. It's designed to help you break bad habits.

ZOA BY MODERN MEADOW Leather accents in this T-shirt were made by yeast, which start-up Modern Meadow genetically engineers to make collagen. That's the protein that gives animal skin its structure and feel.



CHECKUP ON A CHIP

It's amazing what our bodies can reveal to a computer. This is why we're seeing a rush of products that meld software, hardware and sensors to glean detailed personal data about the people who wear them. In three years, researchers say, such wearable sensors will be a \$68 million business in the United States alone.



Aren't aware of them yet? One particularly clever example is the Spire (right), which analyzes your breathing. If it isn't calm, the device vibrates to tell you to take a deep breath. A connected smartphone app focuses on the longer term, with reports like: "Yesterday, Spire sensed 47 minutes of focus, 1.3 hours of calm and 10,156 steps. Nice work!"

Then there's sweat, which contains electrolytes, metabolites, small molecules and proteins, all of which reveal a lot. Several start-ups offer wearable sweat-monitoring patches, which alert you if your glucose level is too high or low, if you're dehydrated, if stress hormones are running high or even if you're reacting badly to medication. ●