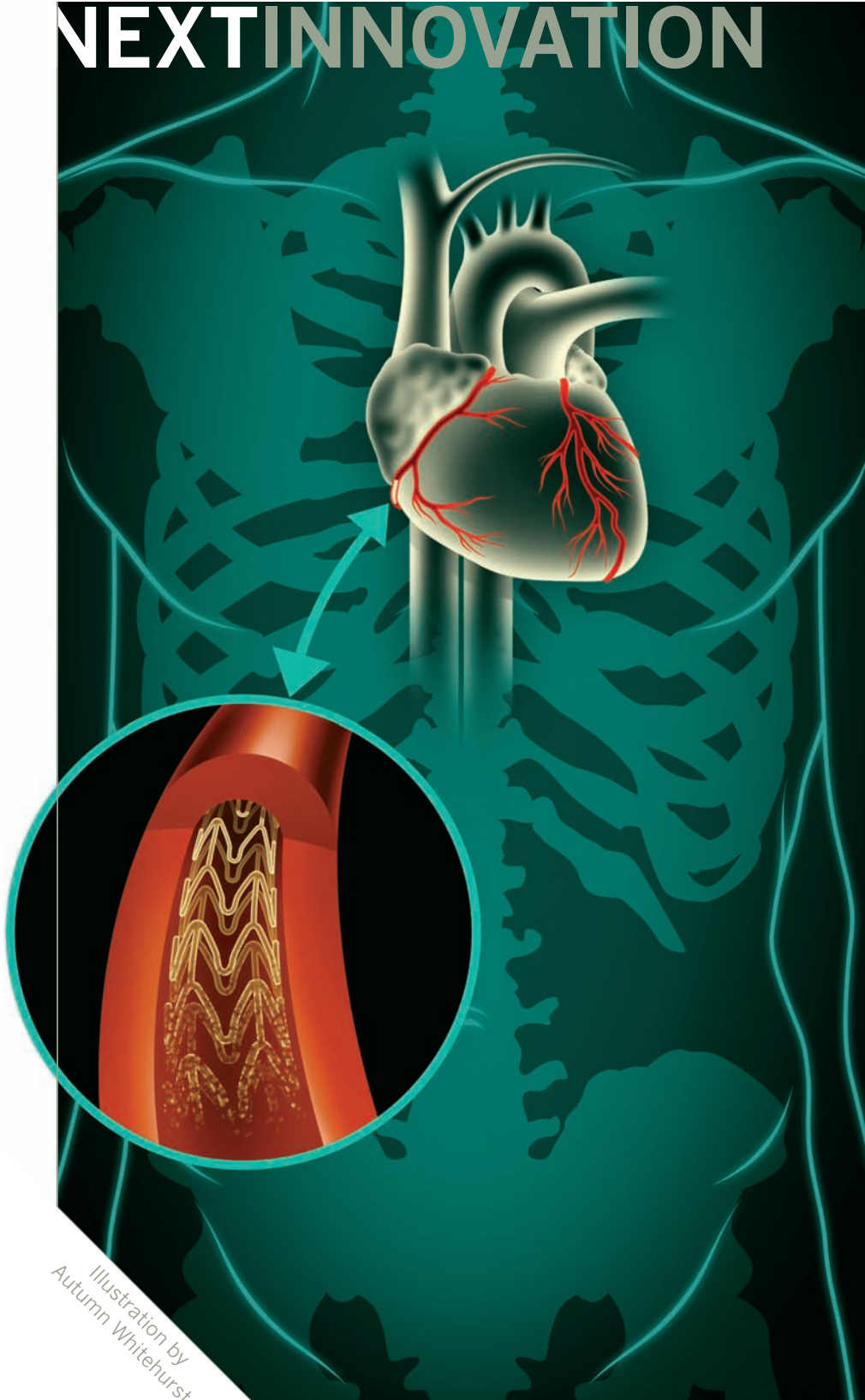


FAST COMPANY

FEBRUARY
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NEXT INNOVATION



ARTERY, HEAL THYSELF

Abbott's new absorbable stent could change heart surgery and revive a \$5 billion business.

By Amy Feldman

IT SOUNDS LIKE SCIENCE FICTION: A stent made of bioabsorbable plastic simply dissolves back into the bloodstream within a year or two after its work opening an artery is done—similar to the way sutures or bone screws are ultimately absorbed.

Stent designers have spent decades pursuing this goal, with little success. But drug and medical-devices company Abbott Laboratories—the leader in old-style, bare-metal stents, with \$24 billion in revenues—is finally showing progress. Abbott's new stent, called Absorb, is made of polylactic acid and coated with a drug called Everolimus; the water in the artery wall eventually breaks down the polylactic acid into lactic acid, a naturally produced substance. That lactic acid is then absorbed into the body as carbon dioxide and water, leaving nothing behind.

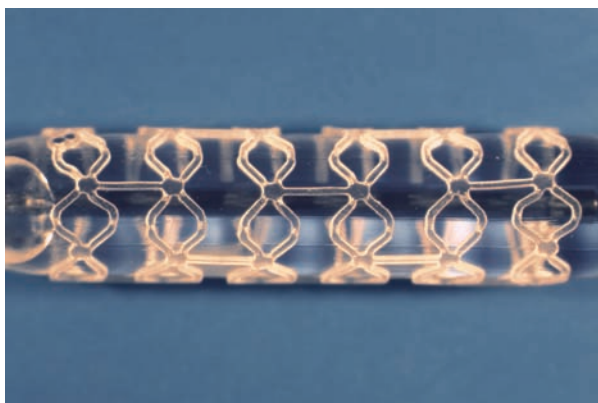
Absorb's human trials in 30 patients showed positive results at the nine-month mark, with a low rate of major cardiovascular events and no stent thrombosis, a rare but often fatal clotting within the stent itself years after insertion. This makes the goal seem increasingly possible. "If I could provide a fully bioabsorbable, drug-coated stent that works as well as a metallic one, it's a no-brainer," says John M. Capek, Abbott's executive VP for medical products, who announced the initial results last fall. "Why wouldn't you pick the one that returns

Illustration by
Autumn Whitehurst

NEXT INNOVATION

the vessel to a more natural state? If you define the question that way, it could be the only stent we're using in the future." Abbott is still tweaking its design, but hopes to receive FDA approval for release in the United States in 2012; it could begin marketing in Europe even earlier.

This development comes at a welcome time for an industry that has hit a speed bump. Medical concerns about late-stent thrombosis reversed the medical device's sales momentum. Stent revenues in 2007 are expected to dip to \$5.2 billion, from a high of \$6.3 billion in 2006. While there are some indications the concerns were overstated, all of the major manufacturers—Johnson & Johnson, Boston Scientific, Medtronic, and Abbott—are working on a second generation of drug-coated stents to address the thrombosis problem. Abbott's Absorb would not only negate



THIS IS NOT A CATERPILLAR MOLTING
Rather, it's an actual bioabsorbable coronary stent system to be used in a human patient in Abbott's trials for Absorb.

the body within a year or two be as good at holding an artery open as a traditional metal one? The new iterative process, which allowed the stent researchers to try many options, was critical because polymers have a lot more variables than metals—the thickness of the stent, the processing of the polymer, and so forth. Polymers are not as strong as metals, and when you try to make them stronger, they

become brittle. Researchers discovered that by making the polymer stents slightly thicker than Abbott's traditional ones, they gained durability without triggering additional adverse reactions.

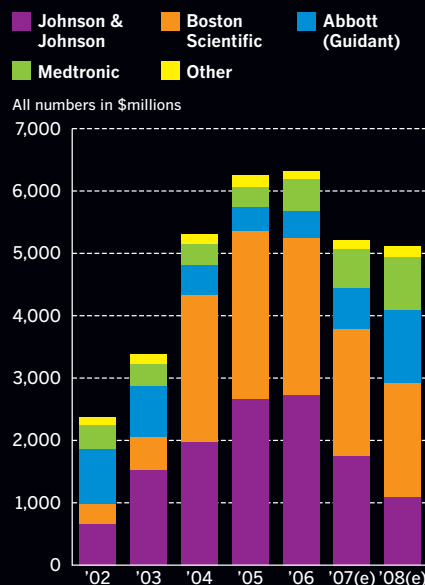
The challenge now is to get the absorption time right: If the stent dissolves too quickly, the artery may not remain open long enough and the patient would then be at risk for a heart attack. But if it goes too slowly, then there's less advantage over a traditional stent. And the faster you want the stent to dissipate, the harder it is to make it durable. Abbott's current lab studies show absorption rates of two-and-a-half years, says Richard Rapoza, Abbott's divisional VP in charge of Absorb. Researchers hope to cut that to one and a half. "A shorter absorption time may be achievable and better for marketing," he says, "but we don't want to push it down too far."

Finally, and perhaps most intriguing, researchers hope that by opening the artery and returning it to a natural state, an absorbable stent could help the body to heal itself. This remains the biggest open question for Absorb, one that will be resolved through additional human trials. "If you hold the vessel [with the stent] and enable it to grow as it receives signals from the body, then we can reestablish the healing curve and get rid of the problems that we see with metallic stents," explains Rapoza. "That's the really big promise of the technology." **FC**

By playing around with the design, they solved the conundrum they'd had with performance. Could a polymer stent that's meant to be absorbed into

STENTED GROWTH

The worldwide stent market peaked in 2006. Since then, new evidence of problems with drug-coated stents has hammered sales. Abbott, though, with its plain stents, has increased its share. Now, the company is betting that bioabsorbable stents could be the next big thing in unclogging arteries—and growth.



Graphic: David Foster. Photograph: Courtesy of Abbott Labs