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HEALTH CARE
Innovation

Hot Technology that Could Change Health Care

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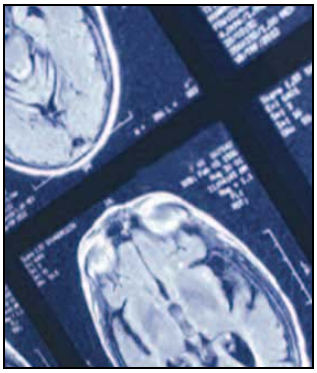

(Forbes.com/HX Technologies)

Advances in health care run the gamut from mind-boggling medicines to simple Web solutions that, if adopted, could slice huge slabs of fat from a bloated system. Whatever form innovation takes in the coming years, much of it will spring from start-ups, not pharma and tech giants.

"Little companies can work on something that's not proven and that has a higher risk," says Brenda Gavin, founding partner of Quaker BioVentures in Philadelphia and former director of GlaxoSmithKlein's venture fund. If they can find enough funding, entrepreneurs "basically can go for the gold."

But it's not just the risk of failure that hampers big companies' search for game-changing breakthroughs. It's the constant demand to generate revenue in the here and now to cover all the overhead and hit aggressive growth targets.

"Small companies are much more nimble, so they can react quickly," says Jack Lasersohn, a partner in the Vertical Group, a Summit, N.J., venture capital fund that specializes in medical technology and biotechnology. "You take an idea, and a few months later you can have a company."

Another structural issue: Health care is an extremely splintered industry. Many new areas of research — such as personalized medicine and digital document retrieval — don't fit neatly into established divisions within big companies, ultimately thwarting capital investment.

"Too many investors have failed to understand what health care is as an industry," says Ralph Sabin, a managing director at Pacific Venture Group in San Diego. "[It] isn't like financial services or manufacturing. It's an area dominated by nurses, physicians, hospitals and insurance companies and all kinds of different constituencies."

All of that spells huge opportunities for tech-savvy start-ups — and new hope for sick patients in need of better, less expensive care.

Philadelphia-based Hx Technologies wants to unlock the power of computer networks (a very '90s concept) and suck costs out of the system by making it easier to transport diagnostic images like CT scans. Amazingly, shuttling these images to doctors for second and third opinions is still done the old-fashioned way — by hand. That can lead to duplicative and

potentially dangerous testing. (Hence President George Bush's mandate that a majority of Americans have electronic health records by 2014.)

Launched in 2000, Hx Technologies estimates that it can eliminate extra tests — and save the U.S. medical system $5 billion (US) to $6 billion a year — by storing medical images so they can be accessed in encrypted form over the Internet. Hx collects setup fees and monthly rent from insurance companies to use the system; doctors and hospitals use it for free. Tommy Thompson, former secretary of the U.S. Department of Health and Human Services, sits on the board.

The challenge: For this technology to truly take off, Hx will have to blanket the entire hospital system — and that may take a bit more than the $5 million it's managed to raise thus far from investors including the National Institutes of Health, RK Ventures and Next Stage Capital.

Robotic helping hand

Nurses don't need to schlep bandages and food — robots can do it better and cheaper, figures Aethon, a Pittsburgh-based developer of mobile robots that use radio frequency identification technology to track and fetch medical supplies. Founded in 2002, the company has raised about $22 million from the likes of Draper Triangle Ventures and Pacific Venture Group.

Aethon's robots, which it leases for between $1,500 and $2,000 a month, now zip throughout the hallways and supply closets of 100 hospitals in the U.S. Among them: "Tug," a self-navigating, battery-powered bot the size of a small suitcase that attaches directly to hospital carts and can carry up to 800 pounds. Tug can pick up, sort and deliver medical supplies and meals and run blood samples to labs; he can even ride elevators and open doors.

Vaccines are typically made in high volumes in heavy-duty 5,300-gallon stainless steel tanks that can take weeks to sterilize at high heat. XCellerex, launched in 2002, aims to slash manufacturing costs using so-called FlexFactories, a series of tanks one-tenth the size with disposable inserts that can be cleaned and reused more efficiently. (Forbes.com/XCellerex)

If you think that stuff is straight out of Star Trek, how about "growing" new organs from the very patients that need them? Launched in 2004, Tengion, based in East Norriton, Pa., aims to do just that.

The process: A doctor takes a tissue sample from a diseased organ and sends it to Tengion's facility. There, the cells responsible for growth of new tissue are reproduced in a biodegradable "scaffold" made in the shape of the diseased portion of the organ. Several weeks later, surgeons implant the new organ/scaffold structure, leaving the patient's body to absorb the new organ and excrete the scaffold. Unlike those who receive organ transplants, Tengion's patients, in theory, won't need to be on a lifetime regimen of anti-rejection medicine.

So far, the company has invented a way of making a "neo-bladder" based on a patient's own tissue, and has filed for 70 patents covering the entire process. It plans to eventually move into manufacturing other organs and tissues, including kidneys, blood vessels, hearts, livers and nerves.

Tengion has already raised $150 million in total financing from the likes of Bain Capital, Johnson & Johnson Development Corporation (the consumer giant's VC arm), Oak Investment Partners and Quaker BioVentures. Not that success is right around the corner — the FDA won't approve the process until early next decade, says Gary Sender, Tengion's chief financial officer.

Personalized medicine

Then there's the whole push toward truly personalized medicine, which could fundamentally alter the way diseases are diagnosed and treated. Until now, doctors have relied on the law of averages: Clinical drug trials yield data on how many people are helped by a particular treatment; if the success rate is high enough, that treatment gets the nod.

But as the human genome is better understood, it's becoming apparent that diseases like cancer can be treated in specific ways, based on a patient's individual genetic code.

"Nothing should cause us to expect that one person's cancer or arthritis or heart disease is like other patients," says Brook Byers, partner at the Menlo Park, Calif. venture giant Kleiner Perkins Caulfield & Byers. "Standardized treatments will shift to personalized and tailored ones with better outcomes and lower costs." Personalized medicine has been Kleiner Perkins' primary area of investment for its life sciences division.

Take its bet on fellow Menlo Park resident Pacific Biosciences. The company is working on a machine that doesn't just identify DNA strands, but can understand, based on a few drops of blood, how the strands are manufactured, so that they can be sequenced (copied) faster — dramatically speeding up the race for a host of powerful cures. Sequencing a person's entire DNA now takes about about three years; Pacific Biosciences thinks it can cut the time to three hours.

"If you could sequence people's DNA thousands of times faster, you could make disease research a software problem," says chief executive Hugh Martin.

Perfecting that process may take a while. Pacific doesn't expect its $300,000 to $500,000 machines to hit the market before 2013 — but white-shoe investors, including Kleiner Perkins, MDV-Mohr Davidow Venture, and, more recently, Intel, have ponied up $178 million to make it happen.