

Medicine's latest big ideas

13 scientific breakthroughs that could change everything

By Dennis McCafferty

With new medical research reported every day from all kinds of sources, it would take a full-time job and a medical degree to make sense of the findings. The American Medical Association -- via its weekly "JAMA" ("Journal of the American Medical Association") and its sister publications -- publishes the results of well over 1,000 major medical studies a year. In 2005, the Food and Drug Administration approved more than 560 applications for either new drugs, generics or new/expanded uses of drugs already greenlighted. And there are more than 40,000 health-related research projects ongoing, most of them in the United States, thanks to grants from the National Institutes of Health. Now that's what we call information overload.

We here at USA WEEKEND Magazine consulted with top medical associations, government agencies, medical institutions, drug companies and health care industry leaders to find 13 of the most exciting health breakthroughs out there today. Some of the innovative drugs and technologies have recently been introduced to the public, and others are still in the trial stages. There's no guarantee, of course, that these medical advancements will be remembered as the "silver-bullet" solutions of this decade. Some may hit a snag in the approval process, for example. But read on, and you will discover that researchers are making remarkable progress when it comes to painless flu inoculations, quick and easy heart scans, non-invasive cancer screening -- and even ways to quit smoking.

Nursing kids to health -- and trimness.

After conducting a study involving more than 15,000 boys and girls ages 9 to 14, the University of South Carolina recently reported that those who were breastfed during the first year of life were less likely to become obese when they grew older -- regardless of whether their mothers were overweight. Why is that? Researchers believe that one reason is because breastfed babies stop eating when they're full, as opposed to babies who are bottle-fed and may be encouraged to finish what's in the feeding bottle.

Speeding up CT scans.

First launched this year at New York University Medical Center and the Mayo Clinic, the Somatom Definition computed tomography (CT) scanner from Siemens Medical Solutions is like an X-ray on steroids. It is able to capture cardiac images as fast as the heart beats -- a feat the traditional scan cannot achieve. Why is this so important? Because it will allow doctors to acquire essential information about the human heart in a single beat, avoiding the need for beta-blockers, which typically are used to slow down the heart to get a decent image, but can lead to insomnia, fatigue or other side effects, even with a brief exposure. The Somatom also uses less than half the radiation dose of a standard machine during cardiac scans. Added perks: The scanner can identify plaque, an early indicator of heart disease, and differentiate body fluids to evaluate internal bleeding. By 2007, the Somatom Definition is expected to be installed at 150 medical facilities worldwide.



Nursed kids stay fit

Babies that are breastfed are less likely to become obese later in life.

A lightning-fast CT scanner

The Somatom captures cardiac images more quickly -- eliminating the need for medicines that can have side effects.

Soothing inflamed arteries.

There has never been a drug to take on atherosclerosis, a condition that involves arterial inflammation and plaque build-up, which can lead to heart attack, stroke or even death. But partnering pharmaceutical companies AtheroGenics and AstraZeneca are expected to announce next year the results of a global trial for a drug now called AGI-1067, which blocks vascular inflammation in the interior walls of blood vessels, minimizing plaque buildup. The trial will determine whether AGI-1067 reduces the prevalence of heart attacks, stroke and other cardiovascular events among patients with heart disease.

Hip repair instead of replacement.

Birmingham Hip Resurfacing -- approved by the FDA this year -- involves smoothing damaged parts of the femur and using an all-metal implant to cover the end of the resurfaced bone. It's like a crown covering a tooth, with a metal cup used to line the corresponding areas of the pelvis socket. Since it has been available, the resurfacing treatment has been given to more than 500 U.S. patients for a faster and less painful recovery than a hip replacement.

Hip repair
"Resurfacing" provides a speedier and less painful recovery for hips.

Rehabbed knee rehab.

From Northeastern University, a new robotic knee brace called AKROD v.2 relies on more than neoprene and Velcro for rehab. It uses sensors and "smart fluid" to vary the resistance on a person's joints during walking. AKROD v.2 is intended not only to reduce rehab time for patients who get banged up while playing pickup hoops on the playground, but it also may help stroke victims learn how to walk again. The brace is now undergoing human trials.

Cancer screening made gentler.

A study from biotech company Exact Sciences indicates that now-available DNA testing of stool samples is as accurate when it comes to detecting colon cancer as a standard colonoscopy, which many people avoid because of its invasive and sometimes uncomfortable nature. But with more than 150,000 men and women diagnosed with colorectal cancer every year, new avenues toward early detection are critical. Prostate cancer testing also is getting an update. Current screening entails a blood test and a physical examination of the prostate, which, like the colonoscopy, many patients avoid out of fear. But Gen-Probe, a diagnostics company, has come out with a urine-based test that is an alternative way to detect prostate cancer.

Beating cancer
Working out may help save lives when it comes to beating breast cancer.

Having the brain on the brain.

Microsoft alumni and co-founder Paul Allen just wrapped up a \$41 million project to develop the "Allen Brain Atlas," a virtual 3-D road map identifying and locating the 21,000-plus genes expressed in the mouse brain (which has a surprisingly similar makeup to our own). Similar to the famous Human Genome Project, the Allen Institute for Brain Science hopes that the results will better equip researchers who are studying the human cortex and focusing on developing treatments for neurological and brain-related diseases such as epilepsy, autism, schizophrenia, Alzheimer's, addiction and more. Just how critical are these advancements? Very. The National Institute of Mental Health estimates that about one in four American adults suffers from a diagnosable mental disorder in a given year.

A childhood without flu shots?

Although children ages 5 and up can dodge the needle for flu shots, younger tots haven't been that lucky - yet. MedImmune, the company that makes intranasal FluMist, is seeking FDA approval for a new formulation that's safe for children as young as 1 year old, hopefully in time for the 2007-08 flu season. A test found that the vaccine was 55% more effective than a traditional injection.

Surviving breast cancer with exercise.

Scientists at the Fred Hutchinson Cancer Research Center interviewed more than 1,200 women diagnosed with breast cancer between the ages of 20 and 54. They found that women with a high body mass index who also were physically active at the time of their diagnosis had a 30% lower risk of death than those who had a low level of physical activity. (However, among women who maintained a normal weight, there was no link between activity and survival from the disease.)

Real-time MRIs.

With BrainLab's BrainSuite, doctors can -- for the first time -- conduct MRIs during surgery, providing quick, on-the-spot images of a tumor. BrainSuite combines traditional MRI tools with image-guided surgery and data management technology to allow surgeons to remove the tumor while better protecting the brain. Typically, MRIs are done before and after surgeries to confirm tumor removal. Between eight and 10 medical facilities are expected to have BrainSuite in 2007.

Combating cancer via gene therapy.

Can the cells in your body be transformed into tumor-seeking attack missiles? Yes, apparently so. An advance in cancer treatment recently emerged from the National Cancer Institute, which has used gene therapy to shrink and even eliminate tumors. Researchers treated patients with their own white blood cells, which had first been removed and then genetically engineered to better fight tumors. Although the therapy reduced tumors in only two of the study's 17 melanoma patients, it's still a first and is hoped to aid in the treatment of melanoma and other forms of cancer, too.

A new drug to butt out smoking.

Now on the market, Chantix is the first new prescription drug to aid smoking cessation in almost a decade. The drug's manufacturer, Pfizer, has come up with a molecule that targets the human nicotinic receptors that may reduce the usual craving and withdrawal sensations that smokers normally experience -- hopefully making the hard habit easier to break. In two clinical trials, data showed that approximately 44% of patients who took Chantix (1 mg twice a day) quit smoking by the end of the 12-week treatment period vs. the approximately 30% who quit while using other available medications and the approximately 18% who were on a placebo.

No smoking
Chantix is a new smoking cessation drug to help you kick the habit.

Slowing down Alzheimer's.

A drug company called Neurochem has developed Alzhemed to inhibit the progression of Alzheimer's. The drug targets amyloid beta, a protein that plays a central role in the disease by forming clumps in the brain. Results of the drug's next clinical trial are expected in spring 2007. If the trial is successful, the product could be available by late 2008. Results from a previous study indicate that the drug helps stabilize cognitive function, especially in patients in an early stage of the disease.

Alzheimer's reprieve
A protein that's a leading culprit in the disease gets targeted with a new treatment.

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