

HOW YOU'LL LIVE FOREVER (ALMOST)

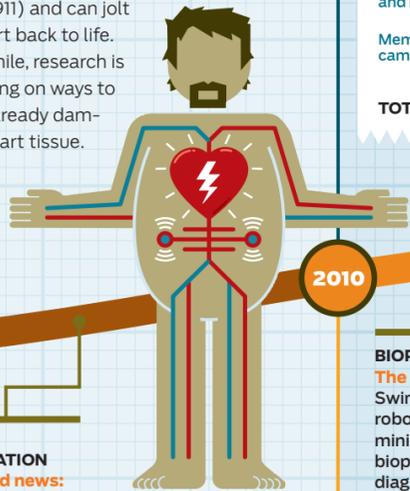
The Census Bureau says life spans will climb nearly 10 years in the next half-century. We think that's just the beginning.



By 2010, U.S. cigarette sales decline to 16.5 billion packs a year, from a peak of 31.5 billion in 1980. Smoking was at its most widespread back in 1960 (above).

2000-2010 Healthier Hearts

Heart disease, the biggest killer in America, is giving way before a technological onslaught that will reach full force in the next few years. Drug-coated stents can prevent the reblocking that occurs in up to 40 percent of coronary interventions. Implantable microsensors and defibrillators will become smaller and more sophisticated. These devices warn of cardiac events (even calling 911) and can jolt the heart back to life. Meanwhile, research is advancing on ways to repair already damaged heart tissue.



NEURO-MODULATION
The good news: Planted into the central nervous system, electrodes send out localized charges to treat Parkinson's disease, epilepsy and complications from stroke and multiple sclerosis, without the side effects of drug therapies.

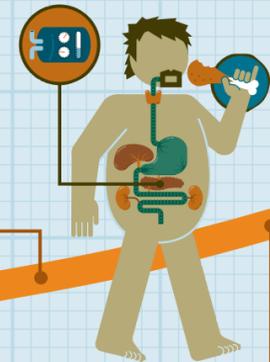
THE BAD NEWS By 2010, one in 50 Americans are afflicted with melanoma, the deadliest form of skin cancer. **How to fight back:** UV-resistant clothing and laundry detergents, already popular in ozone-deprived Australia, effectively supplement conventional sunblock lotions.

\$6 MILLION MAN BECOMES REALITY (leisure suit not included)

Two artificial retinas	\$1,300,000
Artificial pancreas	\$850,000
Custom-made liver	\$1,280,000
Prosthetic hand	\$1,160,000
Internal computer hub	\$310,000
Synthetic-bone hip and knees	\$520,000
Memory-boosting hippocampus implant	\$580,000
TOTAL	\$6,000,000

2011-2020 Hormone Fixes

Implanted chips that sense chemical imbalances and release tiny doses of insulin or other hormones promise to transform the management of many diseases—starting with diabetes. It's estimated that one in three Americans born in 2000 will develop the disease.



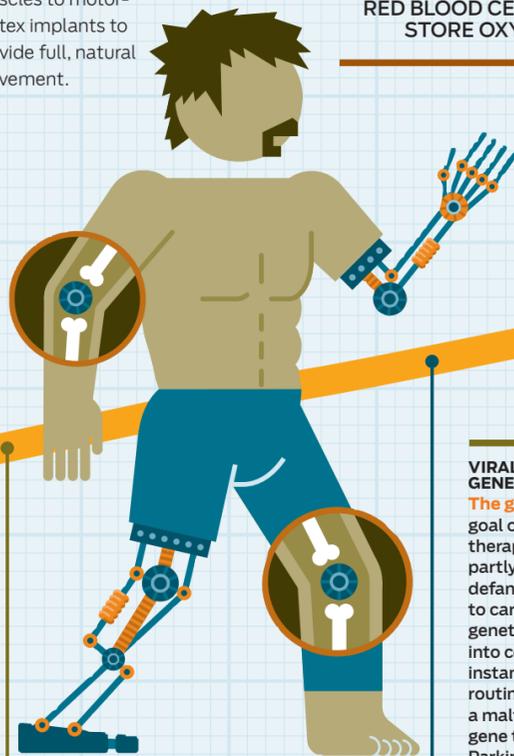
BIOPSY BOTS
The good news: Swimming micro-robots perform minimally invasive biopsies, helping diagnose cancer earlier and determine the best treatments.

STEM CELL-TESTED DRUGS
The good news: Testing pharmaceuticals on human stem cells instead of on animals leads to more effective drugs, delivered to market faster—and more humanely.

98,000 LIVES SAVED EACH YEAR BY SLASHING MEDICAL ERRORS. THE NATIONAL COMPUTERIZED MEDICAL RECORDS DATABASE ADDRESSES OVERLOOKED DRUG INTERACTIONS, SPOTTY MEDICAL HISTORIES AND—IT'S CLICHÉD BUT TRUE—DOCTORS' BAD HANDWRITING.

2021-2030 Steely Limbs

The titanium and ceramics of older artificial joints have given way to strong new materials that merge with the body's tissues. Advanced prosthetics for amputees transmit sensations and receive motor commands from the brain—truly replacing missing limbs. And bionic nerves, first developed to stimulate the muscles of paralyzed patients and prevent atrophy, now connect muscles to motor-cortex implants to provide full, natural movement.



THE BAD NEWS Drug-resistant microbes evolve faster than new antibiotics appear. From 1982 to 2002, drug-resistant staph infections jumped 1100 percent. **How to fight back:** Limit the use of antibiotics. Hard-to-cure infections boom in hospitals and on sports teams partly because of the heavy use of these medications.

TANKLESS DIVERS STAY UNDERWATER 90 MINUTES ON A SINGLE BREATH THANKS TO NANORBOTIC RED BLOOD CELLS THAT STORE OXYGEN.

VIRAL TOOLS FOR GENE THERAPY
The good news: The goal of reliable gene therapy is reached, partly by harnessing defanged viruses to carry drugs and genetic material into cells. For instance, doctors routinely shut down a malfunctioning gene that leads to Parkinson's disease.

MALARIA AND AIDS CONQUERED
The good news: After decades of effort, scientists perfect vaccines for these worldwide scourges. At the turn of the century, AIDS killed more than 3 million people annually, while malaria killed 1.3 million—70 percent of them children.

The neural code is cracked by IBM and the French École Polytechnique, letting scientists convert data from brain waves to computer code. Think "hello" to mental e-mail.

2031-2040 Cancer-Killing Bots

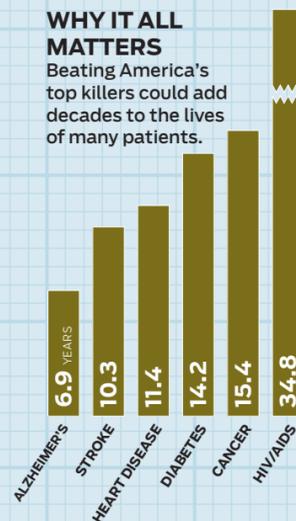
By the fourth decade of the century, nanotechnology breakthroughs have made the lymphatic system navigable for tiny robots that course through our bodies on search-and-destroy missions. Tumors, bacteria and viruses are on the hit list. The bots also deliver drugs and diagnose incipient diseases—wirelessly transmitting data to our health-care coordinators. Power may come from chemical batteries, but many bots run off the same ATP molecules the body uses to power its own cells.



ORGAN PRINTING
The good news: Pioneers began building machines derived from inkjet printers to "print" blood vessels decades ago. In the 2030s, advanced technology allows the generation of replacement organs—eliminating long waiting lists for transplants.

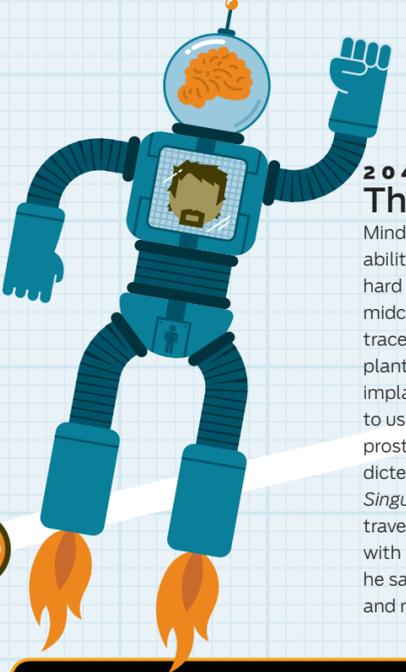
NANOBOTS IN SPACE
The good news: Astronauts on the months-long journey to Mars are monitored for radiation poisoning by nanobots that reside in the capillaries.

WHY IT ALL MATTERS
Beating America's top killers could add decades to the lives of many patients.



AUTO ACCIDENTS KILLED 42,636 AMERICANS IN 2004. NOW-STANDARD FEATURES SUCH AS ADAPTIVE CRUISE CONTROL AND DROWSY-DRIVER WAKE-UP MAKE 2035 CARS NEARLY CRASHPROOF.

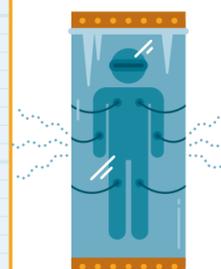
20.4 PERCENTAGE OF AMERICANS WHO ARE 65-PLUS YEARS YOUNG IN 2040. (65 IS THE NEW 25.) IT WAS 12 PERCENT IN 2006.



2041-2050 The Superbrain

Mind-controlled machines and the ability to upload memories to a hard drive have become reality by midcentury. The technology can be traced back to early cochlear implants to restore hearing, and to brain implants that allowed quadriplegics to use PCs and amputees to control prostheses. Now, in a scenario predicted by futurist Ray Kurzweil in *The Singularity is Near*, wireless nanobots travel the brain's capillaries, coupling with neurons. "Human intelligence," he said, "will be a hybrid of biological and nonbiological intelligence."

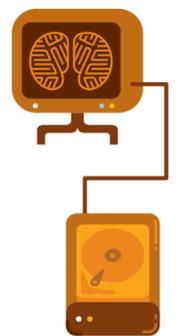
NEVER SAY DIE Life spans will gradually lengthen until around 2050. That, some say, is when new tech really gives death the boot. (Note: Results not guaranteed by PM.)



Deep Freeze
Cryonics finally works (too late for Ted Williams) with new cryoprotectants. These brain-saving chemicals are akin to those found in some frogs that freeze in winter, then thaw unharmed.

Body Transplant First done in the 1970s on monkeys, full-body transplants—really, head swaps—are perfected. Unlike the monkeys, today's patients: 1) aren't paralyzed; 2) don't bite at the surgeon's fingers; and 3) don't die within days.

Brain Backup The exponential growth in information technology allows a person to preserve his memories and personality by uploading brain content to a computer. (The subject eventually dies, but he leaves behind a complete record of his mind—in case his children ever decide to visit.) Back in 2005, Ray Kurzweil guesstimated that the data in the average adult brain would fill 114,000 terabytes of disk space. By 2050, a hard drive that big costs about 1000 bucks (in 2006 dollars).



Cure for Aging The dream of biogerontologist Aubrey de Grey is realized as doctors fix the underlying causes of aging. These include such nasties as cell loss and, conversely, the tendency of some cells to become immortal. Ironically, that's a bad thing, involved in cancer. Antiaging tools include stem cells, drugs and some tricky rejiggering of basic biology. (Details were unavailable for decades after press time.)

SPECIAL FOLD-OUT SECTION. OPEN HERE FOR THE INCREDIBLE, BIONIC, UNSTOPPABLE MAN (HINT: HE'S YOU)