there is hope that the 20% of grants SU2C is setting aside for outside-the-box research will yield something semimiraculous.

The strategy is often compared to that of the Manhattan Project, which produced the first atom bomb, or the Apollo program, which put astronauts on the moon. Some worry that it oversimplifies things. "This isn't an engineering problem," says the NIH's Harris. "It's a problem in which we know only parts of the solution."

But more communication among scientists is always better than less, and besides, there may be more engineering to beating cancer than people realize. MIT, which knows a thing or two about designing things, is building a $100 million research center that will put together biologists and chemists with engineers skilled in such arts as nanofabrication. "We are going to breed a group of people who are totally aware of the cancer problem and totally aware of the modern tools and computational powers of engineers," says Sharp.

MIT plans to make dream-team proposals, which Sharp views as a chance to loose the forces of science on the particularly diabolical forms of cancer. One of MIT's strategies is to build nanomolecules that, when injected into the body, can hunt for cancer cells, bind to them and deliver therapies directly to the bad cells; or to build nanomolecules that could locate abnormal genes and silence them. "It's MIT," says Sharp. "We shake and bake."

None of this absolves the rest of us from our own behavior. Think of all those fools standing in front of office buildings and restaurants grabbing a cigarette. Think of our national epidemic of obesity, which researchers believe has many links to cancer.

Cancer has become a little too familiar to us, too much a part of our social fabric. We embrace it with runs and walks and swims and bike rides that bring people together to raise funds and hopes and share their grief. "It's tough. We are a very optimistic organization, and all of our materials are about living every day to the fullest and living strong and fighting cancer. But at the end of the day, if you look at what's happened, some would argue that we haven't been that successful," says LAF's Ulman.

At a Livestrong ride, run and walk in the Philadelphia area, some 5,000 people took part on a beautiful summer day to raise $3 million for the LAF. "These aren't fun runs," says Armstrong. "They are very emotional, tearful times." Some participants had cancer; some were survivors. And most of those who rode by bore on their backs the names of dead relatives, a rolling graveyard passing through the placid Pennsylvania countryside. ■

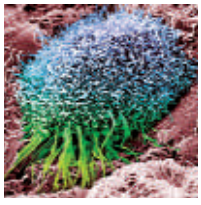
A Foe With Many Faces

Cancer is not one disease but dozens, all with different therapies and prognoses. Still, scientists are finding common roots that may link them all, which could lead to more powerful treatments

BY ALICE PARK

Solid Cancers

SKIN



Diagnosis

The old-fashioned way is best for detecting melanoma, the most serious skin cancer—by looking for and keeping track of irregular moles.

62,480 new melanoma cases in the U.S. expected in 2008; 91% five-year survival rate

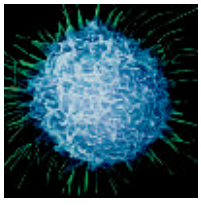
TREATMENT

Surgery can often remove early tumors, but if the melanoma has penetrated more deeply and widely into the body, doctors may also choose to take out some lymph nodes and add radiation or chemotherapy. Efforts to create a vaccine to corral cancer cells are under way.

Outlook

About 80% of melanomas are detected early, before they have spread, and can be cured. Screening programs and self-exams are key to keeping down the cancer's rates.

PROSTATE



Diagnosis

A blood test for the prostate-specific antigen (PSA) is the most common screen. A physical exam can also pick up changes in the gland's size or shape.

186,320 new cases in the U.S. expected in 2008; 99% five-year survival rate

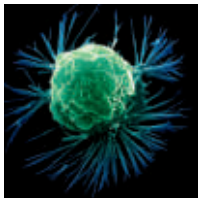
TREATMENT

Doctors can cut out contained growths, while radioactive seeds implanted in the tumor can destroy from within. Newer beam devices can focus radiation on the prostate from outside the body. Hormone therapies can also shrink growths and stall the cancer.

Outlook

It's one of the more curable cancers, as long as it is detected early. Cases still remain high among African-American men.

BREAST



Diagnosis

Physical exams and, past age 40, annual mammograms can detect up to 90% of cases in women.

184,450 new cases in the U.S. expected in 2008; 27% (if spread) to 95% (if localized) five-year survival rate

TREATMENT

Well-funded research efforts have brought breast-cancer therapies closest to personalized medicine. The first targeted cancer drug, Herceptin, was designed to seek and destroy breast cancers containing the HER2neu protein. The latest test, Oncotype Dx, a 21-gene screen, can predict the likelihood that a woman's cancer will recur and even whether she will respond to chemotherapy.

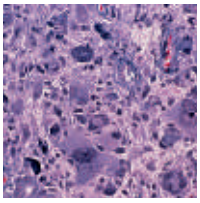
Outlook

No other cancer comes with so many treatment options, which means more women than ever before can—and will continue to—survive the disease.

ALL PHOTOS FROM PHOTO RESEARCHERS, FROM LEFT: STEVE GSCHMEISSNER; STEM JEMS; SCIENCE SOURCE; CNRI; STEVE GSCHMEISSNER; SPL; DR. ANDREJS LIEPINS; DR. E. WALKER; JAMES CAVALLINI

Liquid Cancers

BRAIN



Diagnosis

There is no screening test for brain cancer, and symptoms such as headache, blurred vision and seizure are often the first signs.

21,810 new cases in the U.S. expected in 2008; 32% five-year survival rate

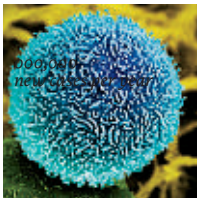
TREATMENT

Surgery, radiation and chemotherapy are the standard anticancer measures. But because growths in the brain are difficult to reach with these methods, researchers are testing a number of potentially more effective ones, including harnessing immune cells via vaccination, heating up the tumors and cutting off the cancer's blood supply using targeted drug therapies.

Outlook

New treatment options have only recently started to emerge, but a better understanding of the molecular mechanisms behind brain cancer could push survival from months to years.

PANCREATIC



Diagnosis

No screening exists, so only 7% of cases are detected early. The rest are spotted when pain or other symptoms occur.

37,680 new cases in the U.S. expected in 2008; 5% (if spread) to 20% (if localized) five-year survival rate

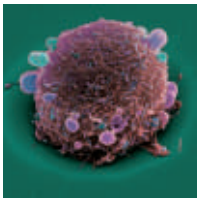
TREATMENT

Surgery can remove some of the cancer, but because it is often found late, chemotherapy and radiation are rarely enough. Doctors have a poor understanding of what drives pancreatic cancer, which means that even the latest targeted drugs are ineffective. Most research efforts are focused on finding better ways to detect the disease sooner so the tumor can be removed before it spreads.

Outlook

It may be one of the toughest cancers to treat today, but that might change as a deeper understanding of what causes pancreatic cancer is reached.

LUNG



Diagnosis

Doctors are investigating whether X-rays or spiral CT scans are better at finding lung cancers early.

215,020 new cases in the U.S. expected in 2008; 15% (if spread) to 49% (if localized) five-year survival rate

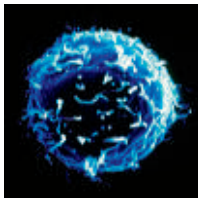
TREATMENT

Until targeted drug therapies emerged in the past decade, traditional cancer therapy could do little for lung-cancer patients. But certain forms of the disease depend on blood-vessel and growth-factor agents, all of which can now be inhibited with anticancer drugs. Other compounds that block insulin growth factor are being studied.

Outlook

Survival rates remain stubbornly low, but smarter treatments combined with better screening tests may soon raise those percentages. The best way to avoid the disease altogether? Don't smoke.

LEUKEMIA



Diagnosis

Routine blood tests can reveal the hallmark of the disease—an abnormal number of white blood cells.

44,270 new U.S. cases expected in 2008; 21%-75% five-year survival rate, depending on type

TREATMENT

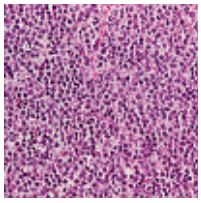
In 2001, Gleevec, the most powerful new anticancer treatment to come along in decades, was introduced. Its first target—chronic myeloid leukemia, a difficult-to-treat blood cancer. By disabling a signaling pathway inside the cancer cell, Gleevec does what chemo and radiation can't: attack the tumor from the inside out. That proved effective for other leukemias as well; some childhood versions now have an 81% five-year survival rate.

Outlook

Next-generation targeted drugs will continue to assault leukemia cells' inner workings, making them more vulnerable to destruction and the effects of chemo and radiation.

LYMPHOMA

NON-HODGKIN'S



Diagnosis

Swollen lymph nodes may be the first sign of this most common variety of lymphoma, which can occur in 30 different forms.

66,120 new cases in the U.S. expected in 2008; 63% five-year survival rate

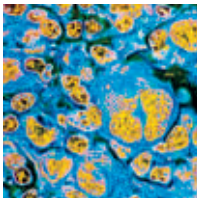
TREATMENT

Chemotherapy is an old reliable, but highly specialized antibodies that target proteins coating the cancer cell's surface are proving effective killers as well. While leukemias are destroyed from the inside out, lymphomas appear to be vulnerable to the traditional attack on the outer flanks—provided that the antibodies are designed to find the right lymphoma targets.

Outlook

New treatments provide hope that non-Hodgkin's cases can be controlled, but the incidence of the disease has climbed since the 1970s for reasons that puzzle researchers.

HODGKIN'S



Diagnosis

Swollen nodes in the neck or chest are a first sign. It may be revealed during X-rays for flulike symptoms.

8,220 new cases diagnosed in the U.S. annually; 85% five-year survival rate

TREATMENT

Alternating rounds of radiation and chemotherapy are the most effective treatment option. During the disease's early stages, radiation focused on the affected lymph nodes may prevent the lymphoma from spreading.

Outlook

Once nearly always fatal, this lymphoma is now predominantly treatable, owing to early detection and judiciously applied therapies.