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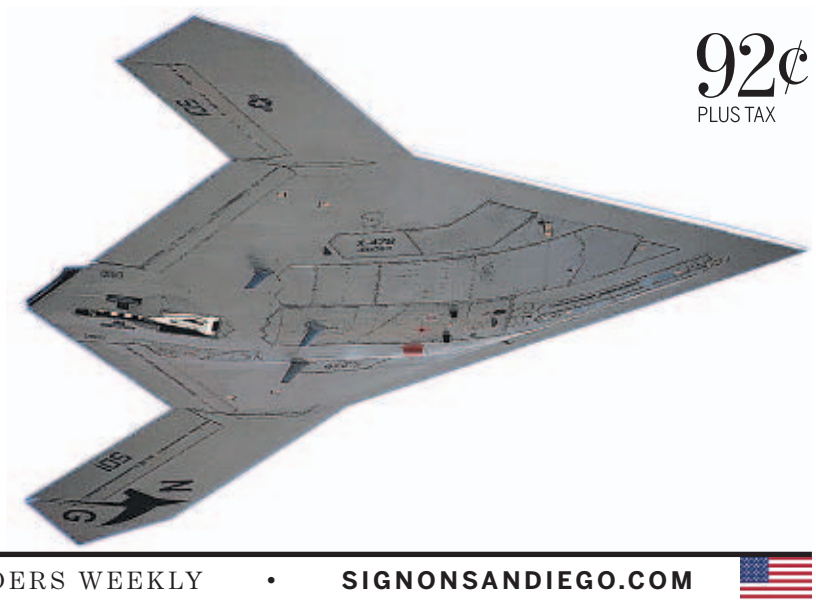

NORTHROP FLYING HIGH

C1 • The defense contractor with a big San Diego presence has emerged as a leader in the field of unmanned aerial vehicles, such as the X-47B.

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THIS WEEK

HYBRID SHIP: The Makin Island, the Navy's first hybrid drive ship (gas and electric), is schedule to leave San Diego today for its maiden deployment. About 2,200 Marines from Camp Pendleton and Miramar will be aboard for the six-month tour.

ELECTRIC CARS: North America's first all-electric car-sharing fleet will be unveiled in San Diego on Saturday. A subsidiary of Daimler North America, car2go will position a fleet of 300 "smart fortwo" electric vehicles around the city. The e-vehicles will be available for members to drive on a rental basis.

BALANCED BUDGET AMENDMENT: House GOP leaders have scheduled a vote for this week on a constitutional amendment that would require a balanced federal budget.

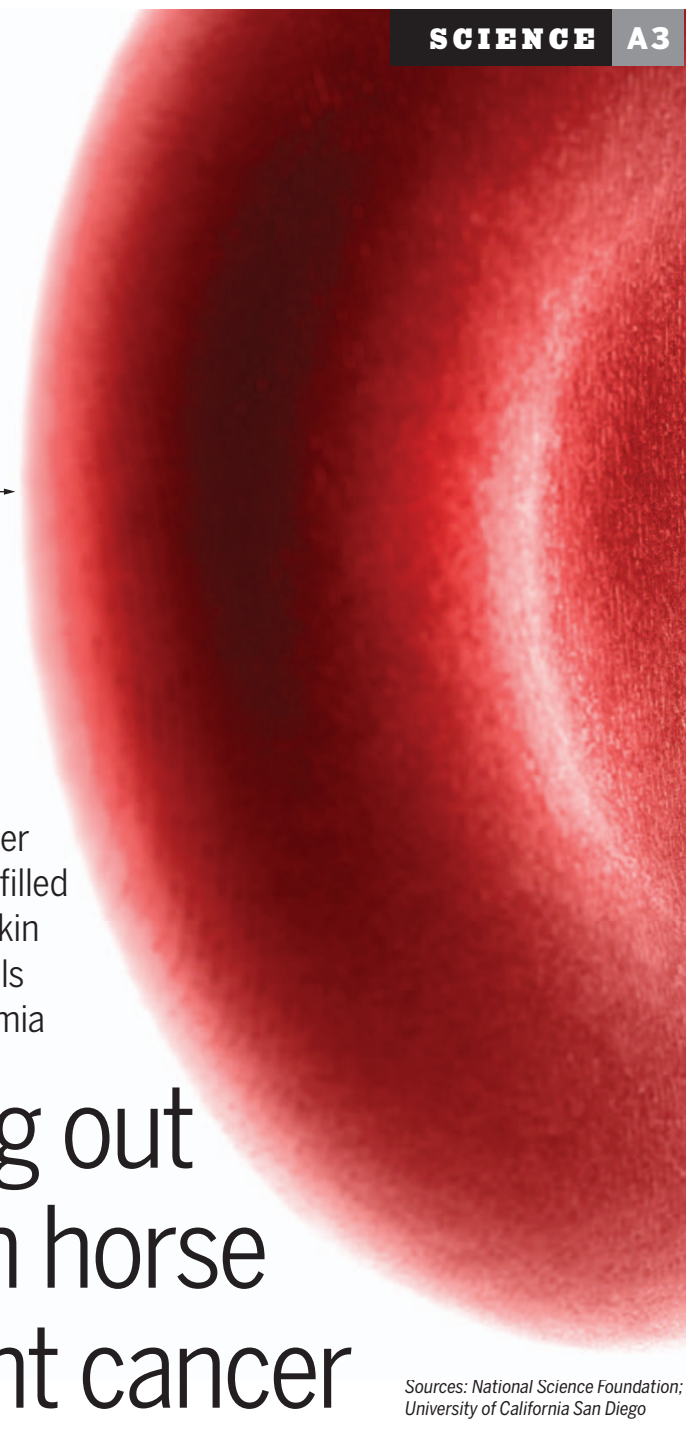
VETERANS BILL: The House will take up the jobs bill passed by the Senate last week. The bill would extend tax credits to businesses that hire unemployed veterans.

POLICEMAN ON TRIAL: The verdict in the trial of a former San Diego police officer accused of soliciting sexual favors from women during traffic stops could come any day now. The jury, which received the case last week, has 21 felony counts to consider.

WATSON IN TOWN: On Wednesday, two super computers — IBM's Watson and the University of California San Diego's Gordon — will meet at the Super Data summit in Del Mar. What will the computers be doing? Mainly showing off.

FOOD FEST: The San Diego Bay Wine & Food Festival draws notable chefs, wine and beer experts, and local and out-of-town gourmands for dinners, tastings and classes. The fest will run Wednesday through Sunday. For more, go to: worldofwineevents.com.

U-T INDEX



SCIENCE A3

The size of a nanoparticle

The adult body contains trillions of red blood cells. Each of those cells may be 70 times larger than a nanoparticle. Approximate size of:

Nanoparticle →
100 nanometers

Red blood cell →
7,000 nanometers

UCSD researcher disguises drug-filled particles with skin of red blood cells to attack leukemia

Rolling out Trojan horse to fight cancer

Sources: National Science Foundation; University of California San Diego

GARY ROBBINS • U-T

Fighting will soon erupt on a battlefield so tiny you'll need a microscope to see how things turn out. The victor will either be cancer, a wily adversary, or a young scientist pressing a simple question:

Can I launch a sneak attack on leukemia by tricking the immune system into welcoming drug-filled particles that are a million times smaller than an ant?

The immune system devours gate-crashers, seeing them as a threat. But it might be possible to hoodwink the body's biological police. In a new approach to an old problem, University of California San Diego researcher Liangfang Zhang is disguising the synthetic particles with the skin of red blood cells, hoping that something natural will hide something fake.

"If this works, the drugs will circulate in the bloodstream for a longer period of

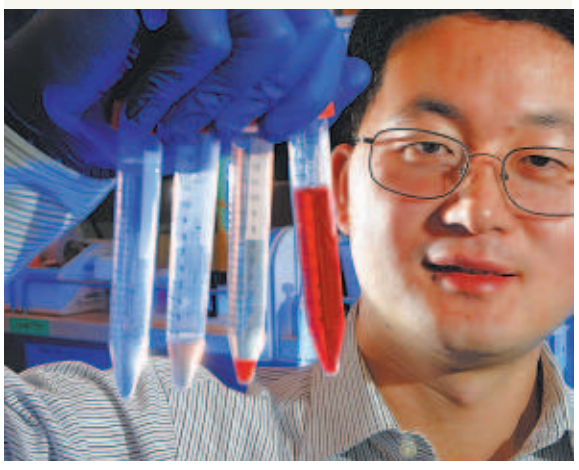
SEE **MEDICINE • A3**

Liangfang Zhang

Personal: Age 31. Born in Wuwei, China. Married to Lili Xie, an economist. One daughter. Lives in Carmel Valley.

Title: Assistant professor of nanoengineering, University of California San Diego

Education: Bachelor's degree, 2000, and master's degree, 2002, in chemical engineering, Tsinghua University; doctorate in chemical and biomolecular engineering, 2006, University of Illinois.



UCSD's Liangfang Zhang uses the skin of red blood cells to hide drug-filled particles in an effort to attack leukemia. EDUARDO CONTRERAS • U-T

COUNTY SEEKS NEW WAYS TO FUND PARKS

Possible fee increases, naming rights are among items under consideration

CHRISTOPHER CADELAGO • U-T

With public parks under siege from Sacramento to Washington, San Diego County is weighing the possibility of raising fees and exploring commercial avenues to help maintain and expand its 45,000-acre system while decreasing the amount of money it contributes.

The plan represents a shift in the way county officials traditionally approached delivering recreation services across a large and diverse parks system. It recommends jettisoning unpopular programs, leaning on volunteer groups and private donors, expanding marketing and sponsorship opportunities and increasing fees and charges.

That could mean everything from dog shows to miniature golf courses at county parks. Critics lamented possible fee increases and partial privatization and contended it's disingenuous for the county to claim it can maintain and expand services while decreasing its contribution.

The fiscal challenges brought on by the sluggish economy and state budget morass have required the county to explore innovative ways to provide programs and services to the public, Chief Administrative Officer Walt Ekard recently told the Board of Supervisors.

"The provision of parks and recreation services is something the public has consistently demanded, but one that must be balanced with all of the services the county provides to protect the health and safety of our community," Ekard said.

Public parks and recreation programs have been part of the social fabric of the county, enjoyed and primarily funded by taxpaying residents though government.

But the strain on federal and state budgets has in the past threatened Cabrillo National Monument programs and, just recently, caused the closure of Palomar Mountain State Park. Many cities have fared no better. San Diego has reduced park and rec hours while Lemon

SEE **PARKS • A14**

ECONOMIST ACCEPTS HUGE CHALLENGE OF RESCUING ITALY

Berlusconi's replacement given mandate to navigate the country out of debt crisis

RACHEL DONADIO • NYT NEWS SERVICE

ROME

Mario Monti, a former member of the European Commission, conditionally accepted a mandate on Sunday to form a new government in Italy whose main task will be to keep the country from being dragged under by Europe's debt crisis.

Mario Monti

Monti, 68, a respected economist who has promised to be a steady hand in a time of market turbulence, said he expected to move ahead as soon as he secured a parliamentary majority for the new government.

Assembling a majority usually requires days or weeks of talks, but Italy does not have the luxury of time. Skeptical investors have pushed the country's borrowing costs to dangerous heights, putting at risk the euro currency that 17 nations share. The crisis forced the resignation of Prime Minister Silvio Berlusconi on Saturday, turning Italy's most complex political shift in nearly two decades into one of its most urgent transitions.

President Giorgio Napolitano, who as the head of state

SEE **ITALY • A13**

IN TIJUANA, 1,500 PEOPLE GATHER TO MOURN MEXICO'S NO. 2 OFFICIAL

Interior minister, 7 others killed in copter crash south of Mexico City

SANDRA DIBBLE • U-T

Gloria Cossio, wife of José Francisco Blake Mora, comforts her son José Francisco during Saturday's service in Mexico City. AP

TIJUANA

Far from Mexico's presidential halls of power, the country's late interior minister was honored Sunday in his native Tijuana by those who knew him best: family, longtime friends and fellow members of the National Action Party.

Close to 1,500 people attended a memorial ceremony honoring José Francisco Blake Mora, Mexico's second-ranking official and a key player in President Felipe Calderón's drug war. Blake, 45, was killed along with seven others Friday when their helicopter crashed south of Mexico City.

On a brilliantly sunny Sunday afternoon, the lights were dimmed inside the main theater of the Tijuana Cultural Center. Drum rolls, applause and words of praise for Blake rang out. On stage, Baja California Gov. José Guadalupe Osuna Millán joined an honor guard of former colleagues standing next to a large portrait of Blake and an urn carrying his ashes.

SEE **MEMORIAL • A10**

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SCIENCE AND ENVIRONMENT

MEDICINE • UCSD cancer center researcher says early results are promising

FROM A1

time, increasing the chance of destroying the leukemia," says Zhang, who is experimenting on mice.

It's a "Trojan horse" strategy: Hide your soldiers, sneak them inside, then attack.

Zhang is trying to engineer an advance in nanomedicine, an emerging field in which scientists work at the molecular scale to do such things as create drug delivery systems.

Cancer is a chief target. It appears possible to create an assortment of couriers that not only circulate longer than conventional drugs but more directly carry medicine to diseased cells and tumors, and with fewer side effects. Zhang and many others also are trying to craft particles that release a variety of drugs that are meant to overwhelm cancer before it builds resistance to attack.

It's a Sisyphean task. Siddhartha Mukherjee, whose book about cancer earned him a Pulitzer Prize, describes cancer as a "shape-shifting disease of colossal diversity," a claim free of hyperbole. About 571,000 people will die of cancer this year in the United States.

And that's only half of the challenge.

"The human immune system is an extraordinarily intricate, many layered defense that has been refined over millions of years," said Victor Nizet, a professor of pediatrics and pharmacology at UCSD. "It capably confronts a host of threats every moment of the day, so figuring out a safe, effective way to deliver drug-containing particles that might be viewed by the immune system as foreign invaders is a daunting challenge."

But there's reason for hope. There are about two dozen federally approved nanomedicines on the market, a figure expected to rise sharply as scientists build on the success of such therapeutics as Doxil, an anti-cancer drug that's been hidden inside liposomes. Scientists are already closely watching efforts by the Massachusetts Institute of Technology to create two nanodrugs, one that locates a tumor and one that swoops in to attack it.

"It's impossible to say whether nanomedicines will come to represent 20, 30 or 40 percent of the portfolio of drugs used to treat diseases," said Stephen Libutti, a surgeon and cancer specialist at the Montefiore Einstein Center for Cancer Care in New York City.

"But this will become less science fiction than science fact."

Zhang is on the front lines of that fight, hunkered down in a generic lab on the fifth floor of UCSD's Moores Cancer Center in La Jolla, searching for simpler ways to fight the diseases that bring scores of people through the building's front doors every day for diagnosis and treatment.

At the moment, he's performing the role of field general, working to camouflage his army of drug couriers from the immune system, which is heavily made up of cells known as "natural killers."

This bit of cloak and dagger work is surprisingly easy.

Zhang puts a single milliliter of blood into a centrifuge and hits the spin button. The spinning separates the red blood cells — or the RBCs — from other serum proteins and cells in the blood.

The RBCs are then placed in a solution that causes these little red doughnuts to swell until they pop a vent or two. Hemoglobin leaks out, leaving Zhang with billions of RBC skins. They look like deflated inner tubes. Each of those skins has a biomarker that tells the immune system: "We belong here."

"It's like seeing members of your own family; you recognize something familiar," Zhang says.

Then it's time to create the drug-filled couriers, which are known as nanoparticles. The particles are biodegradable polymers, or large molecules. You mix the drugs with the polymers and come up with billions of nanoparticles.

The camouflage comes next. Zhang simply mixes the RBCs with the particles. These spheres become coated with the skin of the cells, disguising their true makeup.

He's tested the nanoparticles to see how well they circulate in the blood stream of mice, and the results are promising.

"About half the amount of the dosed nanoparticles remain circulating in blood stream after 40 hours," Zhang says. "Note that the traditional small molecule cancer drugs will stay in blood for only 5-10 minutes."

That would be an important step, if it is sustainable. The immune system flushes out invaders quickly, limiting the effectiveness of chemotherapy drugs. You can't fight if you don't stay on the battlefield.

Zhang is loading the nanoparticles with potent therapeutic payloads, preparing for trials on mice. His work has stirred interest, and a cautionary note.

"Wrapping nanoparticles in red blood cells makes sense. It might work," said Klaus Ley, head of autoimmune research at the La Jolla Institute of Allergy and Immunology. "But it's got to be tested. You never know how things are going to turn out."

> "If conventional pharmaceuticals are individual 'soldiers,' the nano drugs will be like a warship carrying thousands of soldiers, transporting them more directly to their destination."
>
> **Liangfang Zhang** • UCSD researcher

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Nanotechnology glossary

Nanometer: One-billionth of a meter, or one-millionth of a millimeter, or roughly one-millionth the thickness of an American dime.

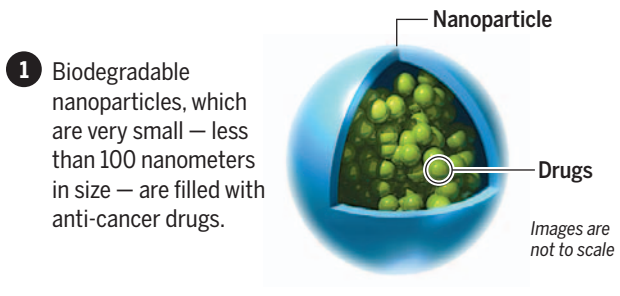
Nanoscale: The size range roughly from 1 to 100 nanometers, where many of the fundamental structures of biology are formed, and many important physical phenomena are found.

Nanoscience: The study of unique properties of matter at the nanoscale; an interdisciplinary field of science combining physics, materials science, the chemistry of complex molecules, and related disciplines.

Source: National Nanotechnology Initiative

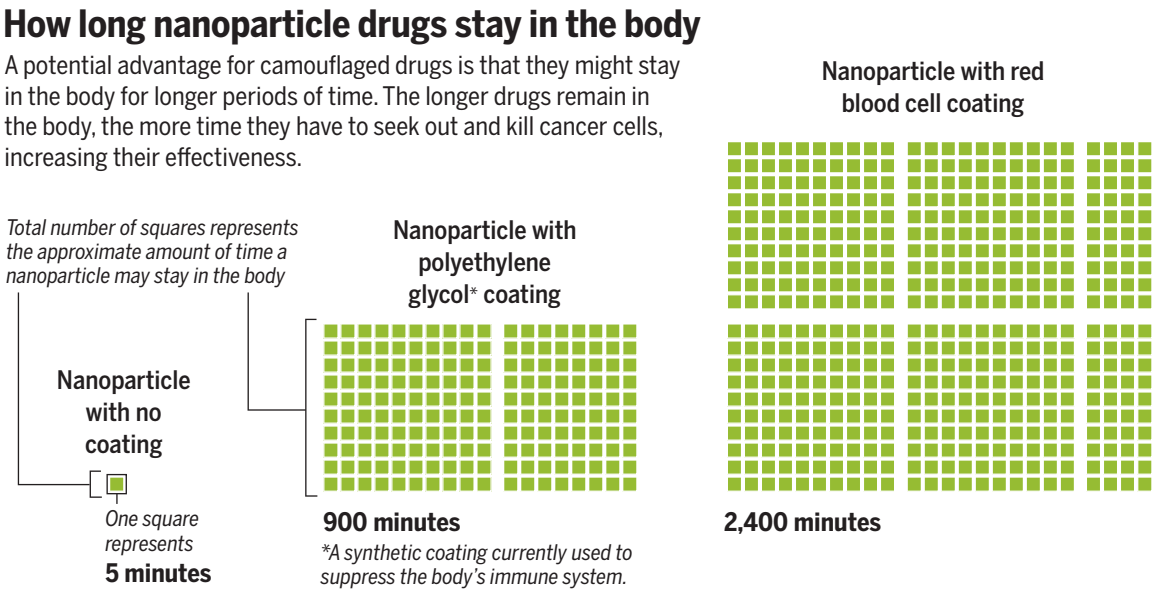
A 'Trojan horse' attack on cancer cells

Researchers at the University of California San Diego have created a novel approach to fighting cancer by coating nanoparticles that contain anti-cancer medicine with the membrane of red blood cells. How it would work:



How long nanoparticle drugs stay in the body

A potential advantage for camouflaged drugs is that they might stay in the body for longer periods of time. The longer drugs remain in the body, the more time they have to seek out and kill cancer cells, increasing their effectiveness.



Source: University of California San Diego

AARON STECKELBERG • U-T

ASTRONOMERS SHED LIGHT ON EARLY STARS IN COSMOS

Researchers discover pristine clouds of gas

MARCIA DUNN
ASSOCIATED PRESS

After decades of scouring the universe, astronomers have found two immense clouds of gas that are pristine — free of the metals fired out into the cosmos by stars.

The findings, published Thursday in the journal Science, provide the first solid detection of primitive, uncontaminated gas and support the long-standing theory as to how the chemical elements were formed in the early universe. It is these types of pure gas clouds that formed the first stars.

The research suggests that stars have not succeeded at distributing metals throughout the entire cosmos; astronomers consider metals to be heavier elements such as carbon, silicon, iron, even oxygen.

A separate study in the same issue of Science concludes the early stars were much smaller than thought — tens of times bigger than our sun, versus hundreds of times bigger.

"There's kind of been this missing link in this picture of how elements form. We haven't been able to detect what we expect to be out there, which is otherwise primordial material, stuff that would be metal-free," said co-author J. Xavier Prochaska, an astronomer at the University of California Santa Cruz.

The two pristine gas clouds were formed 2 billion years after the Big Bang.

Prochaska, along with lead author Michele Fumagalli, a graduate student at Santa Cruz, and John O'Meara, an astronomer at Saint Michael's College in Colchester, Vt., discovered the two clouds by analyzing light from quasars. They used the Keck Observatory in Hawaii.

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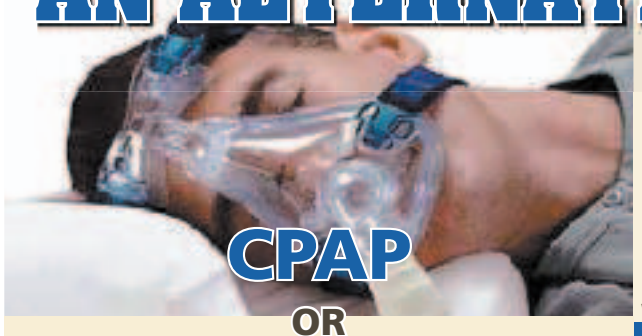
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