New research tracks the role played by genes

By Andrew Pollack
New York Times News Service

Duchenne muscular dystrophy may not seem to have much in common with heart attacks. One is a rare inherited disease that primarily strikes boys. The other is a common cause of death in both men and women. To Atul J. Butte, they are surprisingly similar.

Butte, an assistant professor of medicine at Stanford, is among a growing band of researchers trying to redefine how diseases are classified — by looking not at their symptoms or physiological measurements, but at their genetic underpinnings. It turns out that a similar set of genes is active in boys with Duchenne and adults who have heart attacks.

The research is already starting to change nosology, as the field of disease classification is known. Seemingly dissimilar diseases are being lumped together. What were thought to be single diseases are being split into separate ailments. Just as they once mapped the human genome, scientists are trying to map the "diesasome," the collection of all diseases and the genes associated with them.

"We are now in a unique position in the history of medicine to define human disease precisely, uniquely and unequivocally," three scientists wrote of the new approach last year in the journal Molecular Systems Biology. Such research aims to do more than just satisfy some basic intellectual urge to organize and categorize. It also promises to improve treatments and public health.

Scientists are finding that two tumors that arise in the same part of the body and look the same on a pathologist's slide might be
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classification is also the basis of the ICD-9 codes used for medical billing in the United States.

The first international classification, in the 1850s, had about 140 categories of disease, according to Dr. Christopher G. Chute, chairman of biomedical informatics at the Mayo Clinic.

The 10th edition, in 1993, had 12,000 categories, said Chute, chairman of the committee developing the 11th version, due in 2015.

The increase stems mainly from better knowledge and diagnostic techniques that allow diseases to be distinguished from one another. For most of human history, diseases were named and classified by symptoms, which was all anyone could observe.

Linnaeus, the 18th-century Swedish scientist known for categorizing creatures into genus and species, also developed a taxonomy of disease. He had 11 classes—painful disease, motor diseases, blennorrhages, and so on—that were further broken down into orders and species. But not knowing about viruses, for instance, he classified rabies as a mental disease, Chute said.

In the 19th century, a big shift occurred. Doctors began learning how to peer inside the body. And diseases began to be classified by their anatomic or physiological features.

The stethoscope let doctors realize that what had been thought of as 17 conditions—like coughing up blood and shortness of breath—could all be different symptoms of the same disease, tuberculosis.

"The advent of the stethoscope made it possible to unify tuberculosis," said Dr. Jacalyn Duffin, a professor of the history of medicine at Queens University in Ontario.

The shift from symptoms to anatomical measurements had big implications for patients, said Duffin, who is also a hematologist.

"Up until the 18th century, you had to feel sick to be sick," she said. But now people can be considered sick based on measurements like high blood pressure without feeling ill at all.

Duffin said people who feel sick nowadays "don't get to have a disease unless the doctor can find something" and instead might be told that it's all in their head. Doctors argue, for instance, about whether fibromyalgia or chronic fatigue syndrome, which have no obvious anatomical causes, are really diseases.

Genes might allow the study of diseases at a finer level than even physiological tests. Genes are the instructions for the production of proteins, which interact in complex ways to carry out functions in the body. Disruptions in these molecular pathways can cause disease.

Diseases are being lumped, as well as split. Researchers at Johns Hopkins reported in the April issue of Nature Genetics that two rare syndromes with different symptoms might represent a continuum of one disease. One syndrome, Meckel-Gru-ber, is tied to neural defects and death in babies. The other, Bardet-Biedl, is marked by vision loss, obesity, diabetes and extra fingers and toes.

The techniques are being applied to diseases for which the genetic cause is not as clearly known and which might be a result of multiple genes.

Butte uses data from gene chips that measure which genes are active in a cell. Amid thousands of studies using such chips, many compared the gene activity patterns in disease tissue with that of healthy tissue.

Other scientists use data on which genes appear to cause disease or contribute to the risk of contracting it.

Using such data, Marc Vidal, a biologist at Harvard, and Albert-Laszlo Barabasi, a physicist at Northeastern University, created a map of what they called the "diseasome" that was published last year in The Proceedings of the National Academy of Sciences.

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Duke tumor institute gets gift

$6 million targets child brain cancer

BY SARAH AVERY
STAFF WRITER

Duke University received a $6 million grant Wednesday from The Pediatric Brain Tumor Foundation — the second from the foundation since it created an institute at Duke in 2003 dedicated to researching brain tumors that afflict children.

"We're absolutely delighted to accept the renewal and extension of our work here," Dr. Darell Bigner, director of the Pediatric Brain Tumor Foundation Institute at Duke, said during a ceremony to accept the grant.

The foundation, based in Asheville, gave Duke an initial $6 million grant five years ago, establishing the institute and providing scientists with the research funds to develop gene-based therapies, vaccines and other treatments. Childhood brain cancer is the second-most prevalent cancer, behind leukemias, among children younger than 19, according to the National Cancer Institute. It is the leading cause of cancer death in children and adolescents; four out of 10 children with brain tumors die within five years of diagnosis.

"Science is moving very fast now, and the technology that's available today simply wasn't around even five years ago," Bigner said in a prepared statement. "We are now able to develop new therapies that not only will be effective but won't damage the nervous systems and brains of these children."

Duke's institute is part of a larger collaborative effort funded by the foundation that includes Children's Hospital Los Angeles; the Hospital for Sick Children in Toronto, Canada; and the University of California, San Francisco.

The Pediatric Brain Tumor Foundation was founded in 1991 by Mike and Dianne Traynor, who were troubled by the struggles of a colleague's stricken child. Among the organization's fundraisers is a motorcycle ride that has raised $34 million for brain tumor research.

"Children and parents are depending on you," Dianne Traynor told a gathering of scientists Wednesday. "We want to thank you for the work you do every day."

sarah.avery@newsobserver.com
or (919) 829-4882
NCSU scientist spots galaxy's youngest supernova

BY DAVID RANIL
STAFF WRITER

RALEIGH – The youngest supernova found in our galaxy to date has been discovered by a team of scientists led by an N.C. State University astrophysicist, the university announced Wednesday.

The exploding star is only 140 years old, making it 200 years younger than what had previously been the youngest supernova in the Milky Way galaxy — giving scientists a fresher specimen to study.

In this case, "you're actually getting to see the rock that made the splash, not the wave that's going out into the pond," said Robert Kirshner, a Harvard University astronomer who is not affiliated with the study.

Stephen Reynolds, the NCSU astrophysicist, led a team of researchers who compared images of a celestial object in the Milky Way — scientists call it G1.9+0.3 — taken last year with an X-ray telescope and in 1985 with a radio telescope. That confirmed Reynolds' theory that the object was the remnant of a young supernova.

The comparison also showed that it had increased in size by 16 percent during that 22-year span, enabling scientists to calculate that the initial explosion occurred, at most, 140 years ago.

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ago. If the rate of expansion slowed down over the years, it's even younger.

"My best estimate is that it's 100 years old," Reynolds said. "140 is the upper limit."

Supernovas occur when a massive star suddenly collapses at the end of its life, bursting into a vividly bright mass and then shining awhile more as its core material condenses. The explosion propels matter into space, leaving a neutron star or black hole.

The discovery is significant because the younger the supernova, the easier it is to study how the star exploded and what it was made of, Reynolds said.

"It's a little like one of those shows on TV where they investigate a death. This is a stellar death, all right, and the corpse is still warm," Kirshner said during a teleconference with reporters.

That was covered by the Associated Press.

Astronomers typically observe supernova remnants that are 10,000 or so years old, not relative infants such as this one. Getting the total picture, from the start, is important in figuring out how often supernovae explode in the Milky Way.

"This is exciting," said Michael Castelaz, director of astronomical studies and education at the Pisgah Astronomical Research Institute in Transylvania County. "This gives us a better idea of the galaxy we live in — we can better understand how stars are formed and how they go through their lives."

The elements that spew from a supernova form the basic material of new stars and planets. Many of the substances listed on the periodic table of elements, including the iron in our blood and the calcium in our bones, were forged in supernova explosions, Reynolds said.

"We are made of supernova stuff," he said. "In a sense, it is our roots."

"Supernovas are also the source of the cosmic rays that rain down on the Earth as we speak," he said. Some supernovae, including G1.9+0.3, aren't visible with optical telescopes because interstellar "murk" — gas and dust — obscures them, Reynolds said. But X-ray and radio telescopes can overcome that.

"It's the combination of the radio and X-ray, the older technique and the new one, that tells us what this object really is. So you get a lot more when you put all of these clues together," Kirshner said.


The Associated Press contributed to this report.

david.ranil@newsobserver.com
or (919) 829-4877
N&O veteran who reported on Eastern N.C. retires

BY MARTHA QUILLIN
STAFF WRITER

Jerry Allegood, who covered Eastern North Carolina for The News & Observer for 35 years, is retiring.

With his departure, the paper is closing the Greenville bureau where Allegood was based.

Allegood, 58, went into newspapers while still in college in his native South Carolina. When he walked into the offices of the Florence Morning News and heard the clattering of typewriters and printing presses and smelled the ink and piles of old newsprint, Allegood knew he was in the right place. He later worked at the paper in Anderson, S.C., then accepted a job at The N&O working in Greenville, a town he had never seen.

"I didn't know what I was getting into," Allegood said Wednesday. But, he said, the Tar and Neuse rivers looked like the rivers he had played in as a child, the tobacco farms in the wide, flat countryside looked like the tobacco farms back home, and the people he met were open, generous and talked to him in a language he understood.

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At first, Allegood said, he tried to cover Eastern North Carolina the way he had covered the small towns where he worked before. But it was too vast. Gradually, he found a different rhythm, reporting on trends and bigger stories: sensational murders, heartbreaking tragedies, unfathomable natural disasters. He covered troops leaving the port at Morehead City during the first Gulf War as thoroughly as he did the decline of the state's commercial fishing industry.

Allegood's years in journalism spanned huge transitions in the business. When he traveled in the early years, he put his manual typewriter in the car and dictated the stories he wrote on it by telephone. He knew every pay phone on every major highway from Greenville to the Outer Banks. And because film had to get back to Raleigh to make the next day's paper, he memorized the departure times of every bus that left Eastern North Carolina headed for the capital.

"I never considered myself a great writer, but I'm a pretty damn good reporter," he said.

For a man who hated hotel rooms and being away from his wife and three sons, Allegood spent a lot of time on the road.

Once, after Hurricane Dennis, he was stranded on Hatteras Island for nearly two weeks when the storm took out N.C. 12 connecting the island to the mainland. That time, he took the road home with him. The broken pieces of asphalt are in a storage building at his house.

John Drescher, executive editor of The N&O, said the bureau's closing was forced by financial conditions at the paper and in the industry. He said the paper would continue to cover the region, reporting some stories by phone and dispatching staff from Raleigh for others.

The paper kept the bureau in Greenville for as long as it did, Drescher said, "because there were so many great stories out there. Now we just have to find a way to do those great stories with fewer people."

martha.quillin@newsobserver.com or (919) 629-8909
Worker shortage predicted

Study: Colleges could train aliens

BY JANE STANCI LL
STAFF WRITER

The state community college system, embroiled in debate about illegal immigrants, will have to produce thousands of additional graduates each year to deal with North Carolina's looming worker shortage, a new report says.

And those employees may have to come from the state's growing immigrant population, according to a report by the N.C. Center for Public Policy Research to be released today. By 2016, the state's population is expected to grow by 15 percent, and a huge wave of baby boomer retirements means community colleges will need to produce 19,000 more graduates each year — a 75 percent increase over current numbers.

The nonpartisan, nonprofit think tank calls for more state money for faculty salaries, equipment, student services and academic programs in high-demand areas such as health care.

It also predicts North Carolina will need to tap into the rising number of legal and illegal immigrants. In the past decade, North Carolina's Asian population has increased 128 percent and the Latino population has jumped 394 percent, the center said.

The report comes two days after the community college system announced it would no longer ad-

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mit illegal immigrants on the advice of the state Attorney General's Office. That policy will be in place until there is further guidance on the issue from the federal government.

No matter how the issue is decided, community colleges will be a big part of the solution in churning out workers for the new economy, said Scott Ralls, the system president, who reversed policy this week on admitting students in the country illegally.

At some point, if the interpretation of federal law opens college doors to them, Ralls said, then they will need to be trained and educated to be full participants in the state's economy. If not, he added, there will be more pressure on North Carolina to solve the workforce shortage in other ways, such as by preventing high school and college dropouts.

"We're going to need everyone we can get," Ralls said.

Challenges ahead

The community colleges are a key to pushing North Carolina through a difficult economic transformation, said Ran Coble, director of the public policy research center. The state's 56 community colleges are successful, Coble said.

But he added, "You can do a lot to improve their nimbleness and ability to adjust to this fundamental change in the economy."

North Carolina's economy is undergoing a radical reinvention, away from the old manufacturing empires of tobacco, textiles and furniture to pharmaceuticals, telecommunications, biotechnology, banking and financial services.

The community college system has built-in impediments to responding, Coble said, including state funding that lags a year behind and anemic faculty salaries and equipment budgets.

Last fall, the center asked Ralls, who was then president of Craven Community College, to outline the challenges ahead.

Ralls calls them four brutal facts:

- More working adult students and the vanishing black male student.
- Low graduation rates and more students who need remediation.
- Predicted worker shortages and immigrants' emerging role.
- Rising enrollment combined with lagging faculty salaries and inadequate equipment.

Ralls said the system must reenergize technical education while also pumping up degree programs, early college high schools and costly health-care programs. The colleges have had to cut student support programs but also need to work harder to reach out to black men, more adult working students and first-year students in danger of dropping out.

"North Carolina needs us to do more," Ralls said, "when we are struggling just to keep pace."

For example, Ralls said, adult students — many with families — are now feeling the pressure of rising food bills and skyrocketing gas prices. Some have lost jobs. "During a recessionary period, that's when people need us," Ralls said.

A key to helping people into better jobs will be to grow the college's health-care programs. That costs money in faculty salaries and sophisticated equipment.

Wake Technical Community College President Steve Scott said about 500 people vie for 300 slots in the school's nursing program each year. But enlarging the program is not simple. Nursing education costs more, and it's hard to attract nursing faculty members with the salaries offered.

There's also a huge demand for automotive and heavy equipment technicians, Scott said. "That's a heavy cost on equipment," he said.

"You've got to train people on the latest equipment."

jane.stanclll@newsobserver.com
or (919) 956-2464
OUR VIEWS

A chance denied

The state's community college system, in barring admission of illegal immigrants, is fixing something that isn't broken.

The new president of the state's community college system has planted himself in the doorways of the system's 58 campuses, barring illegal immigrants from seeking degrees.

Scott Ralls' stance may be politically popular — both major-party candidates for governor favor a ban — but it's neither necessary nor humane. North Carolina should stand for something better than having one of the nation's toughest policies on educating illegal immigrants.

So let the community colleges reopen their doors to the relatively few people involved in this needless dispute. And get on with the job of upgrading our state's workforce and broadening the horizons of young people whose immigration status, in most cases, is not under their control, since they came here as children. They've gone through the public school system — as is their right — and graduated from high school. Now they wish to better themselves but find the state barring the most likely path, its excellent system of community colleges.

It's not as if some binding legal judgment requires the system to change its existing policy, which for several years has allowed admitting illegal immigrants.

After reviewing the same advisory letter from the state Attorney General's Office that Ralls acted on this week, UNC System President Erskine Bowles, to his credit, decided that university campuses will remain open to qualified applicants. (That policy may change, Bowles said, if a definitive legal opinion requires it.)

Nor is it that North Carolina community colleges are being flooded with undocumented applicants for degree programs (the colleges will continue to admit such students to non-degree courses, and students currently enrolled will be allowed to continue). There are, after all, just 112 degree-seeking students — out of the 296,540 students in the nation's third-largest community college system. No wonder: those 112 pay out-of-state tuition, about $7,500 for a full-class load, six times the in-state rate.

Not like in Texas, where community colleges admit thousands of illegal immigrants at lower in-state rates. But in North Carolina, we're tougher on degree-seeking young people than that.

Finally, it's not as if the federal government, supposedly the main reason for a crackdown, actually requires one.

Earlier this week the office of Roy Cooper, the state attorney general, issued the advisory letter saying that federal law makes non-citizens ineligible for public benefits, including "post-secondary education," unless a specific state law allows it. Yet the letter concedes that in the absence of such a law (as in North Carolina) legal precedents are "unsettled." It claims the U.S. Department of Homeland Security has the final say.

When queried last week by The N&O's news staff, that agency responded that it "does not require any school to determine a student's status." An article on today's Other Opinion page by Hans Christian Linnartz, an immigration law specialist at Duke, makes the case that the federal law doesn't apply to the community college situation here. All in all, it's hard not to conclude that this is a policy question, and that the state can choose its policy.

Governor Easley, with the good sense that has marked his stance on this issue since last fall, calls for keeping the doors open. On Tuesday he chided the community college system, saying it has been overhasty in changing course. He's right. When opportunity knocks, let it in.
Colleges ask for less 'stuff,' more money

By Mary Beth Marklein, USA TODAY

A growing number of colleges are recasting the tradition of senior-class gifts by encouraging their graduating classes to focus more on giving — preferably money the college can spend as it sees fit.

Though many colleges boast a long history of receiving fountains, benches or other tangible items each spring from their graduating classes, "the smart thinking has been, 'Let's get away from stuff,'" says Bob Burdenaki, a Chicago-based annual giving consultant who has worked with more than 100 colleges since 1994. He says more than 50% of his clients have moved in that direction in the last five years.

Some schools, including Stanford University and Skidmore College in Saratoga Springs, N.Y., have offered donation programs for more than a decade. They're becoming more common as higher education budgets tighten and competition for charitable giving intensifies, says Rae Goldsmith, spokeswoman for the non-profit Council for the Advancement and Support of Education, whose members include campus fundraisers.

EDUCATION BLOG: The rest of the senior class gifts story

Bates College in Lewiston, Maine, asked seniors this year for the first time to give to its Bates Fund, which goes toward immediate needs ranging from library books and light bulbs to faculty salaries. Southern Illinois University Edwardsville plans to roll out a program for its graduates next spring. Molloy College in Rockville Centre, N.Y., started one in 2006, and the University of Pennsylvania began one in 2005.

Tangible items "are wonderful in their own way, (but) unrestricted gifts ... are perhaps more valuable to an institution," says Rob Schur, an assistant director in the development office at Amherst College in Massachusetts, which formalized such a plan in 2003.

School administrators and philanthropists say the goal is less about dollar amounts and more about cultivating a new generation of alumni givers.

"Most schools are seeing a decrease in (alumni) participation, which is pretty scary," says Naomi Marshall of Academic Impressions, a Denver company that runs conferences on philanthropy in higher education. "The baby boomers are retiring, and there's the need to fill that donor pipeline."

The average student graduates nearly $20,000 in debt, so a request for more money isn't necessarily an easy sell.

Seniors ask, "Are you crazy asking me for money? I have student loans up the wazoo!" says Paula Nutini, director of annual giving at Michigan Technological University, which introduced a senior giving plan three years ago.

Some students balk at the unclear nature of the gift. "It would be a lot more effective for seniors to have something tangible that they can rally around," says University of Pennsylvania junior Lisa Zhu.

To address such concerns, the University of North Carolina at Chapel Hill and the University of California Los Angeles allow each senior to choose where his or her money goes from a list of options.

SPEAKING UP: Students are getting a say in commencement speakers

"This generation wants to ... see that their gifts are really making a difference," says Beth Braxton, UNC's director of annual giving.

At St. Lawrence University in Canton, N.Y., where the class of 2006 plans to leave a bicycle garage as its legacy, any gift is a good start, Vice President Michael Archibald says. "If we can instill in them the habit of giving now, even for a (specific) project," he says, "their larger, unrestricted gifts will follow down the road."