Three Americans share 2009 Nobel medicine prize

(AP) -- Americans Elizabeth H. Blackburn, Carol W. Greider and Jack W. Szostak won the 2009 Nobel Prize in medicine on Monday for discovering a key mechanism in the genetic operations of cells, an insight that has inspired new lines of research into cancer. It was the first time two women have been among the winners of the medicine prize.

The trio solved the mystery of how chromosomes, the rod-like structures that carry DNA, protect themselves from degrading when cells divide.

The Nobel citation said the laureates found the solution in the ends of the chromosomes - features called telomeres that are often compared to the plastic tips at the end of shoe laces that keep those laces from unraveling.

Blackburn and Greider discovered the enzyme that builds telomeres - telomerase - and the mechanism by which it adds DNA to the tips of chromosomes to replace genetic material that has eroded away.

The prize-winners' work, done in the late 1970s and 1980s, set the stage for research suggesting that cancer cells use telomerase to sustain their uncontrolled growth. Scientists are studying whether drugs that block the enzyme can fight the disease. In addition, scientists believe that the DNA erosion the enzyme repairs might play a role in some illnesses.

"The discoveries by Blackburn, Greider

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and Szostak have added a new dimension to our understanding of the cell, shed light on disease mechanisms, and stimulated the development of potential new therapies," the prize committee said in its citation.

Ten women have won the prestigious medicine award since the first Nobel Prizes were handed out in 1901, but it was the first time that two women were honored in the same year.

Nobel judges say women are underrepresented in Nobel statistics because the award-winning research often dates back several decades to a time when science was dominated by men. Still, critics say the judges aren't looking hard enough for deserving women candidates.

"We don't give Nobel Prizes because of gender," medicine prize committee member Goran Hansson told The Associated Press. "We give it for scientific discoveries. As more women participate in research and make scientific discoveries, more women will win Nobel Prizes."

Blackburn, who holds U.S. and Australian citizenship, is a professor of biology and physiology at the University of California, San Francisco. Greider is a professor in the department of molecular biology and genetics at Johns Hopkins University School of Medicine in Baltimore.

Greider, 48, said she was telephoned just before 5 a.m. her time with the news that she had won.

"It's really very thrilling, it's something you can't expect," she told The Associated Press by telephone.

People might make predictions of who might win, but one never expects it, she

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said, adding that "It's like the Monty Python sketch, 'Nobody expects the Spanish Inquisition!'"

Greider described the research as beginning with experiments aimed at understanding how cells work, not with the idea for certain implications for medicine.

"Funding for that kind of curiosity-driven science is really important," she said, adding that disease-oriented research isn't the only way to reach the answer, but "both together are synergistic," she said.

Blackburn, 60, said she was awakened at 2 a.m.

"Prizes are always a nice thing," she told The AP. "It doesn't change the research per se, of course, but it's lovely to have the recognition and share it with Carol Greider and Jack Szostak.

London-born Szostak, 56, has been at Harvard Medical School since 1979 and is currently professor of genetics. He is also affiliated with the Howard Hughes Medical Institute.

"There's always some small chance that something like this might happen, so when the phone rang, I thought maybe this is it, so, sure enough," Szostak told the AP.

He said winning the prize was made sweeter because it also included Blackburn and Greider.

"When we started the work, of course, we were really just interested in the very basic question about DNA replication, how the ends of chromosomes are maintained," he said. "At the time we had no idea there would be all these later implications."

He said that since then it had become apparent that "this process of maintaining the ends of DNA molecules is very important and plays an important role in cancer and in aging, which are really still being fully worked out."

Hansson said there is a lot of work yet to do to develop therapies for blood, skin and lung disease based on the winners' breakthroughs.

He said telomerase is very active in many cancer cells, "and if you turn it off or destroy the cells which have this high activity, you could be able to treat cancer," he said.

The award includes a 10 million kronor ($1.4 million) purse split three ways among the winners, a diploma and an invitation to the prize ceremonies in Stockholm on Dec. 10.

The researchers have already won a series of medical honors for their research. In 2006, they shared the Lasker prize for basic medical research, often called "America's Nobel."

Some inherited diseases are now known to be caused by telomerase defects, including certain forms of congenital aplastic anemia, in which insufficient cell divisions in the stem cells of the bone marrow lead to severe anemia. Certain inherited diseases of the skin and the lungs are also caused by telomerase defects.

The Nobel Prizes in physics, chemistry, literature and the Nobel Peace Prize will be announced later this week, while the economics award will be presented on Oct. 12.

Prize founder Alfred Nobel, a Swedish industrialist who invented dynamite, left

few instructions on how to select winners, but medicine winners are typically awarded for a specific breakthrough rather than a body of research.

Nobel established the prizes in his will in 1895. The first awards were handed out six years later.

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