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ODAC Votes For Approval Of PegIntron For Melanoma, Votrient For Renal Cancer

By Paul Goldberg

The FDA Oncologic Drugs Advisory Committee Oct. 5 recommended approval for therapies for melanoma and renal cell carcinoma.

—The committee voted 6-4 to approve a supplemental Biologic License Application for PegIntron (pegylated interferon alfa-2b) in the adjuvant treatment of stage III malignant melanoma. Sponsored by Schring-Plough, PegIntron, a longer-acting form of interferon alfa-2b, is an alternative to high-dose interferon treatment. Since the agent is administered weekly, via self-injection, patients would get a more convenient treatment option.

—In a 10-0 vote, the committee recommended approval of Votrient (pazopanib), an oral drug for advanced renal cell carcinoma. The drug is sponsored by GlaxoSmithKline. Votrient would be the sixth agent approved

(Continued to page 2)

"Personalized Medicine"

Duke University Suspends Two Clinical Trials After Journal Paper Questions Assay Validity

By Paul Goldberg

Duke University has suspended two clinical trials utilizing a controversial technology for assigning patients to treatments.

The government-run clinical trials database clinicaltrials.gov reflects that two Duke trials have been suspended and a third was stopped because of insufficient accrual. The changes were made on Oct. 6.

Duke administration officials confirmed that the action was taken after an article in a biostatistics journal alleged that the technology used for assigning patients to treatment was based on faulty calculations and other simple errors and could lead to harming patients by assigning them to treatment modalities which may not benefit them (The Cancer Letter, Oct. 2).

The technology in question was developed by Duke researchers Anil Potti and Joseph Nevins. Criticism of their work appeared in the most recent issue of the Annals of Applied Statistics. The paper is posted at www.imstat.org/aoas/next_issue.html.

The two suspended clinical trials used the technology to assign patients to Alimta (pemetrexed) or other treatments. One of the suspended trials contrasted pemetrexed with cisplatin (http://www.clinicaltrials.gov/ct2/show/NCT00509366.

The other contrasted pemetrexed with vinorelbine (http://www.

(Continued to page 7)

Regimens Not Compared With Other Active Treatments

(Continued from page 1)

to treat this disease over the past four years.

The low-dose PegIntron regimen that received a nod from ODAC would be approved based on extending relapse-free survival. Votrient, too, was recommended for approval based on its ability to delay disease progression, further confirming the agency's—and the committee's—willingness to accept this metric as a benefit in its own right.

Overall, the two applications exhibited striking similarities:

In both cases, the agents weren't shown to extend survival, but demonstrated substantial toxicities. Both were compared to observation or placebo, and in neither case a comparison was made with the previous standard of care or a competing agent.

The recommendation to approve PegIntron is also notable, because the agency has believed that the high-dose interferon regimen, which it approved in 1995, conferred a survival advantage.

PegIntron was tested in a trial led by the European Organization for the Research and Treatment of Cancer. The randomized, controlled trial enrolled 1,256 melanoma patients in Europe.

The agent was compared with observation only and had a significant and sustained impact on relapse-free survival. Median RFS was 34.8 months in the pegylated interferon alfa-2b arm vs. 25.5 months in the observational arm (p-value 0.01).

After approving high-dose interferon in 1995, FDA determined that since that regimen offered a survival advantage, it needed to be used on control arms of studies of future therapies. The approval was based on the Eastern Cooperative Oncology Group study 1684.

However, in 2002, the agency asked ODAC to consider data that questioned the survival advantage of high-dose interferon. The committee determined that high-dose interferon should no longer be required on control arms of future studies.

At the Oct. 5 ODAC meeting, Patricia Keegan, director of the Division of Biologic Oncology Products in the FDA Office of Oncology Drug Products, summarized this history:

"The basis for approval [of the high-dose regimen] was E1684. That was the sole study that was considered at the time of regular approval," Keegan said.

In that study, with five-year follow-up, survival was 46% in the high-dose interferon arm versus 37% in the observation arm. RFS was 37% in the high-dose arm, versus 26% in the observation arm. The findings were statistically significant.

"Subsequent to that, additional data did come to light, which raised concerns and resulted in another advisory committee meeting, in 2002, to consider the question of the fact that while it appeared that relapse-free survival that was demonstrated fairly consistently (although not in every study significantly) that the overall survival effect didn't appear consistent and may not have been a real finding," Keegan said.

"We did discuss this in [2002] whether [high-dose] interferon should be considered the standard of care for future trials going forward, particularly those investigating less toxic alternatives, such as vaccines. And in discussions of that committee, we didn't revisit *per se* the approval decision, but there was consideration that there was no clear evidence of the survival effect, and that other studies that didn't consider high-dose interferon could be ethically conducted."

Keegan said the committee needed to determine whether PegIntron was sufficiently efficacious and sufficiently safe to warrant approval, but didn't need to establish comparative efficacy with high-dose interferon.

"You don't have to have a comparative efficacy claim," she said. "One of the issues is when there is a survival advantage, one would not approve a new drug that did not also demonstrate a survival advantage. It's very important—and this is something the community has struggled over the years to decide—whether or not

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one believes there is a survival advantage. At the time of the original approval, we thought so.

"At this time, I think that's not the belief in the community," Keegan said.

Doubts About Survival Advantage

Doubts about the survival advantage of high-dose interferon were based on ECOG study 1690, a three-arm trial that randomized patients to high-dose interferon, low-dose interferon and observation.

E1690 found that high-dose interferon produced an advantage in relapse-free survival, but didn't confirm the survival advantage found in E1684.

"We had done a post hoc analysis, because half of that trial was conducted before and half of it was conducted after the approval of the high-dose interferon regimen by FDA," John Kirkwood, co-leader of the University of Pittsburgh Cancer Institute Melanoma Program, who had developed the high-dose interferon regimen, said in an interview.

Kirkwood was the principal investigator on both studies.

"And so 37 patients out of the group of 200 who were assigned to get observation actually turned around when they had a regional relapse and got high-dose interferon, because it had been approved," Kirkwood said. "We thought it was plausible that the lack of overall survival benefit in the E1690 trial was due to systematic asymmetrical crossover from observation assignment to high-dose after regional relapse."

Skeptics about the high-dose regimen also point to meta-analysis data that don't support the advantage in overall survival. Others say that new staging methods and modern surgical treatments—particularly sentinel node dissection, which finds microscopic disease in lymph nodes—raise questions about applicability of the findings of E1684.

In an interview, Kirkwood described the 2002 ODAC meeting with disappointment.

"The participants in that ODAC meeting were people who wanted to do vaccines and cytokines of other sorts, and didn't want to be forced into using high-dose as the comparison," he said.

The high-dose regimen never caught on in Europe, where the PegIntron trial was performed.

"I think EORTC has voted with their feet, because all their trials are observation-controlled," Kirkwood said to The Cancer Letter. "Unfortunately, with PegIntron, the trial showed only relapse-free interval benefit. And that took us to the issue, in this ODAC hearing, which is, I think, very important to establish, which is the impact of benefit that a significant [delay in] relapse in and of itself should be considered an advance in melanoma."

PegIntron for Patients Who Decline High-Dose

Kirkwood and several other premier melanoma experts who testified before ODAC on behalf of Schering-Plough earlier this week said they continue to regard high-dose interferon as the treatment of choice, but would offer PegIntron to patients who are unable or unwilling to take the high-dose treatment.

One of the least popular features of the high-dose treatment is the month-long induction phase, during which patients are infused five times a week. This is followed by three-times-a-week infusion at a lower dose over 48 weeks.

PegIntron requires weekly self-administered injections. Though the low-dose regimen was continued for five years, in the EORTC clinical trial, only 13 percent of patients were able to complete this course of treatment.

"Basically, when a patient is confronted [with high-dose regimen], the prospect of daily IV for four weeks, then three times a week thereafter for a year, that's the deal-breaker," Kirkwood said at the ODAC hearing.

"They say to me, 'I just can't miss four weeks straight for therapy. Thank you, but no thank you,'" Kirkwood said. "So this is a new modality. It does build upon considerable experience with high-dose. It is biologically active, but it is tolerable."

The new drug may boost the number of patients who choose adjuvant therapy, melanoma experts said.

"For stage III patients, only one-third pursue adjuvant therapy," Kirkwood said. "This is a huge gap."

Vernon Sondak, chairman of the Department of Cutaneous Oncology at Moffitt Cancer Center, said his institution, too, advocates high-dose interferon.

"What we found over the years is that many of our patients with microscopic nodal disease are the ones who are most reluctant to embark on high-dose interferon," said Sondak. "This is a better-risk disease if it's caught earlier."

However, physicians were unable to cite cooperative group data pointing to a clear advantage in relapse-free survival for patients who received high-dose interferon, Sondak said at the meeting.

Experts said that 40 percent of patients in the European study had microscopic disease found through sentinel node dissection. "That's the group to which practicing oncologists probably would apply these data,"

Kirkwood said to The Cancer Letter. Kirkwood was not involved in the development of PegIntron.

Hand In the Fire vs. Burning Charcoal

Relative merits of high-dose interferon versus PegIntron may never be known since a non-inferiority trial comparing the regimens would require at least 3,000 patients, and possibly as many as 6,000, Kirkwood estimated.

At the advisory committee meeting, ODAC member Gary Lyman, director of Health Services and Outcomes Research Program in Oncology at Duke University, asked the melanoma experts to describe how PegIntron would be used.

"Dr. Kirkwood, before you go, does this mean that if this drug was available, you would still offer high-dose interferon as your first choice?" asked Lyman, who chaired the committee.

"It does," Kirkwood replied.

"There are three options that we offer our patients: high dose interferon, especially if they have stage IIIB and IIIC, which was the majority of patients in the original E1684 trial," added Charles Balch, professor of surgery, oncology and dermatology at Johns Hopkins Medicine. "Or they go on to a clinical trial, and the third is to have follow-up without treatment. And I would submit that in my practice there is a substantial number of patients who might benefit from adjuvant interferon who either can't or won't go on high-dose interferon."

FDA officials asked the committee to decide whether the agent's efficacy—an improvement in relapse-free survival—was worth the price in toxicity. The EORTC study showed a two-fold increase in depression (59% vs. 24%), a 2% incidence of cardiac arrhythmias, and discontinuation of treatment due to toxicity in 44% of treated patients.

"I don't think this is any more toxic than the high-dose regimen," said ODAC temporary member Bruce Redman, professor of medicine at the University of Michigan. "I think the advantage is to get rid of the four weeks of daily therapy. The disadvantage is that you are committing someone to five years of therapy. Although only 10 to 15 percent have made it out to four years, it's still a commitment."

Redman said he was not concerned about the depression side effect. "Regarding depression, depression is known," he said. "It happens with high-dose interferon at a significant rate. It is not a permanent depression."

Ronald Richardson, consultant at the Department of Medical Oncology at Mayo Clinic, said he was struggling with the issue of relative toxicities of the two regimens.

"I am not sure holding my hand in the fire is the same as picking up a piece of burning charcoal," Richardson said. "I am struck by the fact that 44% of these folks went off treatment due to toxicity. The sponsor says that toxicities were manageable with dose reduction, yet half the patients discontinued therapy even after the dose adjustments."

Lyman agreed that the low-dose regimen is toxic. "In my own mind, I am balancing this with my own very considerable experience in treating this disease and the devastating nature of it once it does metastasize," he said. "I am leaning in the direction that this could be helpful. My concern is that high-dose interferon, which has demonstrated survival impact, might not get discussed up-front in some settings."

ODAC member Ralph Freedman, clinical professor at the Department of Gynecologic Oncology at M.D. Anderson Cancer Center, said the relapse-free survival data were convincing.

"It's possible that there may be a subgroup with microscopic disease that is benefiting more than others, but I don't know whether one could determine that, because it would take too long to do the study," Freedman said. "I am not sure we can accept the previous overall survival data, because the dynamic of the disease has changed. Patients are getting treated sooner, and they are treated more expertly with the surgical methods. There is no survival advantage for any therapy in this disease. So, in that circumstance, the agency might be in position to accept relapse-free survival."

In the U.S., PegIntron is indicated in combination with Rebetol (ribavirin) for the treatment of chronic hepatitis C in patients three years of age and older with compensated liver disease.

The agent is also indicated in the U.S. for use alone for the treatment of chronic hepatitis C in patients with compensated liver disease previously untreated with interferon alpha and who are at least 18 years of age.

The company withdrew its application in Europe, but Committee for Medicinal Products for Human Use nonetheless issued a provisional opinion stating that PegIntron shouldn't be approved for the melanoma indication. The committee cited the absence of survival benefit and concerns about toxicities.

Agency Concerned About Votrient Toxicity

The Votrient application appeared to have gone to the committee because of the FDA staff members'

concerns about liver toxicity.

However, the drug's efficacy appeared to have impressed the committee. Even with the crossover feature in the placebo-controlled trial, Votrient produced a five-month improvement in median PFS [HR 0.46 (0.34-062)].

The drug demonstrated hepatotoxicity as well as other toxicities associated with VEGF inhibitors. The agent was studied in a 435-patient randomized trial with 2:1 randomization. On the study, conducted outside the U.S., there were two deaths associated with hepatic insufficiency.

Richard Pazdur, director of the FDA Office of Oncology Drug Products, said the drug appeared to be active and its potential to demonstrate a survival advantage may have been obscured by the patients' ability to cross over from the observation arm to the treatment arm after their disease progressed.

"I think that most importantly, 50% of these patients had crossed over, yet we are seeing a pretty good trend here, granted that it doesn't meet the prespecified level," Pazdur said at the meeting.

"This drug is effective in terms of PFS, and probably would have shown significance in overall survival if not for the crossover," said ODAC member Mikkael Sekeres, associate professor of medicine at the Cleveland Clinic Taussig Cancer Center. "It's a highly toxic drug. Similarly, other agents in its class are highly toxic, and I hope the company will be vigorous in surveillance should this drug get approved."

Committee chairman Lyman said Votrient's toxicity was comparable to that of similar agents used to treat renal cell cancer. "Determining where this fits in the current armamentarium is a challenge," he said.

Obituary:

NIH Scientist, Administrator Ruth Kirschstein; Promoted Women, Minorities In Science

By Kirsten Boyd Goldberg

Ruth Kirschstein, a former acting director of NIH whose career at the institutes spanned more than 50 years, died Oct. 6 at the NIH Clinical Center. She was one week shy of her 83rd birthday, and lived on the NIH campus in Bethesda, Md.

Kirschstein was a legendary scientist and administrator who helped test polio vaccines and broke glass ceilings by becoming the first woman to head an NIH institute when she was appointed director of the National Institute of General Medical Sciences in 1974. She was also known for her ability to work with members of Congress and their staffs, but she made no secret of her fierce loyalty to NIH and to the ideal of public service for the improvement of public health.

"Ruth embodied the spirit of the NIH. She was an icon," NIH Director Francis Collins wrote in an email to NIH employees on Oct. 7. "She was loved and admired by so many at the NIH, across the medical research community, among hundreds of members of Congress, and around the world. Knowing Ruth, she would cringe if she heard us praise her—modesty was one of her strongest suits."

Her husband Alan Rabson, deputy director of NCI, and their son Arnold Rabson, a molecular geneticist at the University of Medicine and Dentistry of New Jersey-Robert Wood Johnson Medical School, were with her when she died.

Kirschstein served as director of NIGMS for 19 years, where she championed innovative programs in basic biomedical science and research training. She was a strong advocate for women and minorities in science, but she was willing to help mentor any scientist or administrator who approached her.

"Those of us fortunate enough to have known Ruth Kirschstein will always remember her for generously sharing her time and talent with those who needed help," said Mark Lively, president of the Federation of American Societies for Experimental Biology. "She was a great leader who inspired thousands by her intelligence, commitment, and compassion. With her passing we have lost a great scientist and an extraordinary public servant."

She served as NIH deputy director for six years when Harold Varmus became director in 1993. She served twice as acting NIH director, including one stint of 17 months before Elias Zerhouni became director in 2002. She then served as a senior adviser to Zerhouni.

In 2002, Congress renamed NIH's graduate student fellowship program after Kirschstein.

"There are few at the NIH who have not been touched by her warmth, wisdom, interest, and mentorship," Collins wrote.

Kirschstein was born Oct. 12, 1926, in Brooklyn, N.Y. "I wanted to be a doctor from a very young age, even before I went to high school," Kirschstein said in an interview for an NIH history project. "And I'm not sure exactly what motivated me. I had a father who was a chemist. I had a mother who was extremely ill through most of my childhood, and spent a long time in the hospital. It may have been that, that motivated me partly, as well.

"When I applied for medical school women were not very commonly applying for school—I actually applied to every medical school in the United States," she said. "At least one of them wrote me and said, 'We only take men.' And that sort of was not a very good thing, and it didn't make me very happy. Today, over 50 percent of each medical school class are women.

"But the problem is that women are still not in sufficient leadership positions in medical schools and in universities," Kirschstein said. "There are very few women deans of medical schools. There are not many chairwomen of departments, and where we have been very successful, and I am absolutely thrilled, there are something like 10 women presidents of major universities—we need more. If you have a population of leaders who are all men, they are never going to think of women. They are never going to think of minorities. They are only going to think of people like themselves."

Kirschstein graduated magna cum laude from Long Island University in 1947, earned an M.D. from Tulane University School of Medicine in 1951, where she and Rabson met, and went to an internship in medicine and surgery at Kings County Hospital, Brooklyn. She studied pathology, serving residencies at Providence Hospital in Detroit, Tulane University, and the NIH Clinical Center, where she became a medical officer in 1956.

From 1957 to 1972, Kirschstein worked as a pathology researcher at the NIH Division of Biologics Standards, which later became the FDA Center for Biologics Evaluation and Research. In 1961, she was appointed chief of the Laboratory of Pathology, where she tested the safety of vaccines for polio, measles, and rubella. She helped select the oral Sabin polio vaccine, which was licensed in 1962.

In 1965, the World Health Organization asked Kirschtein to serve on its Expert Group on International Requirements for Biological Substances, and in 1967, she was a consultant to WHO on the use of the live poliovirus oral vaccine. In 1972, she was named assistant director of the Division of Biologics Standards, and was appointed deputy director when the division became a bureau of the FDA later that year.

Kirschstein helped push NIH to begin more extensive HIV/AIDS research when the disease first appeared in the U.S. in the 1980s.

After serving as director of the NIGMS, Kirchstein was the first acting associate director of the NIH Office of Research on Women's Health, and was NIH acting director from July to November 1993.

She was a 20-plus year breast cancer survivor and in recent years had heart failure related to the breast cancer treatment. She also was diagnosed with multiple myeloma during one of her heart failure events. Her cause of death was not released.

"Ruth worked up to her last days," Collins said in a statement. "Last week, in fact, I was on a conference call with her, and her insightful contribution made it clear she had not missed a beat."

She received numerous honors, including the U. S. Public Health Service Superior Service Award in 1978, the Presidential Meritorious Executive Rank Award in 1980, both the PHS Special Recognition Award and the Presidential Distinguished Executive Rank Award (the highest honor for a career civil servant) in 1985, the FASEB Public Service Award in 1993, and the Women of Achievement Award from the Jewish Anti-Defamation League in 2000.

"Dr. Kirschstein devoted her life to advancing medical progress, promoting diversity and scientific excellence, training future generations of scientists, and serving as a mentor to scores of researchers and scientific administrators," said Darrell Kirch, president and CEO of the Association of American Medical Colleges. "From her work on the Sabin vaccine to her many leadership positions at the NIH, she maintained a singular focus on scientific excellence, while demonstrating a steadfast devotion to public service. Dr. Kirschstein leaves a legacy that will continue to enrich the scientific enterprise and the health of the American people for generations to come."

"The loss of Dr. Kirschstein is felt throughout the research community," said former Illinois Congressman John Edward Porter, chairman of Research!America. "Her leadership and commitment to science and public service were inspirational, and she is sorely missed."

"I know I speak for all of the NIH and our entire community, when I say that the world has lost one of its dearest, most dedicated public servants, one with a huge heart and brilliant mind," Collins said.

NIH will plan a memorial to Kirschstein, according to her family's wishes, at a later date, Collins said.

Capitol Hill:

House Member Waters Down Breast Cancer Prevention Bill

By Paul Goldberg

Rep. Debbie Wasserman Schultz (D-Fla.) has watered down the controversial bill that stemmed from her experience with breast cancer.

While the old version of the bill (H.R. 1740)

stressed breast cancer in young women, the new version also refers to "breast health awareness." The star of the Democratic Party has also dropped the provision to promote breast self-exams for girls in junior high school.

Breast self-exams have not been demonstrated to improve mortality from breast cancer.

The bill attracted a large number of co-sponsors—371, more than enough to assure passage in the House—but was stuck in Committee on Energy and Commerce. On the Senate side, a companion bill introduced by Sen. Amy Klobuchar (D-Minn.) has not been able to attract a sufficient number of co-sponsors.

The bill earned enthusiastic support from Komen for the Cure and several Jewish organizations, but was opposed by the National Breast Cancer Coalition. The American Cancer Society has not taken an official position on the legislation, but its top scientific officer has criticized the bill in the press.

Now, with the bill's language softened, at a hearing of the Health Subcommittee of the Committee on Energy & Commerce ACS said it supported the bill. NBCC President Fran Visco testified at the hearing, but didn't mention the legislation directly.

The new version of the bill has not yet appeared on the Congressional database. However, according to copies circulating on the Hill, the legislation would charge CDC with conducting "a national evidence-based education campaign to increase awareness of young women's knowledge" related to "breast health."

The former version of the bill surprised breast cancer experts by proposing a specific agenda—such as "blood component analysis," genetic testing and lowering of breast cancer risk through "changes of lifestyle, including diet, exercise, and environmental factors. Experts in breast cancer prevention noted that no such strategies exist. The new version of the bill crossed out the most puzzling of these proposals (The Cancer Letter, April 10, June 19).

Under both version of the bill, the HHS secretary would be mandated to create an advisory board to help craft an educational campaign. Under the new version, the committee would be expanded to include experts in public health and survivorship.

Testifying at an Energy & Commerce hearing Oct. 7, ACS Chief Medical Officer Otis Brawley, commended Wasserman-Schultz for "working to develop legislation that relies on evidenced-based programs and services to help address the unique needs of young women who have breast cancer or who are at risk for breast cancer."

Both versions of the bill would give CDC $9 million a year over five years to launch these programs. A portion of these proposals was inserted in the report accompanying the House version of the 2010 appropriations bill (The Cancer Letter, June 24).

"Personalized Medicine"

Duke To Consult Experts To Examine Allegations

(Continued from page 1)

clinicaltrials.gov/ct2/show/NCT00545948).

The trials were cosponsored by Duke and Alimta's sponsor Eli Lilly. The closed trial, co-sponsored by Duke and BMS, tested the agent dasatinib in neoadjuvant non-small cell lung cancert (http://www.clinicaltrials.gov/ct2/show/NCT00564876). According to the database, the study was terminated because of "lack of accrual."

Two other Duke trials that cite work by Potti and Nevins remain open. They are:

—A co-sponsored trial with the Department of Defense comparing docetaxel with doxorubicin for breast cancer (http://www.clinicaltrials.gov/ct2/show/NCT00636441) and

—A study of dasatinib in advanced NSCLC (http://www.clinicaltrials.gov/ct2/show/NCT00787267).

Duke is working with "independent experts" to investigate the allegations, said Michael Cuffe, vice dean, medical affairs, Duke University School of Medicine, and vice president, medical affairs, at Duke University Health System.

The text of Cuffe's statement follows:

"We always welcome scientific dialogue and appreciate the questions that have been raised in the paper in Annals of Applied Statistics. In light of the specific issues raised about the application of this work to studies involving patients, we believe that pausing to re-confirm the scientific underpinnings of this work is in the best interest of the science and, ultimately, in our commitment to more effectively treat patients with cancer.

"After reviewing the specific concerns that relate to clinical studies, a decision was made by Duke investigators of the involved studies to voluntarily pause enrollment of new patients.

"We are working to engage independent experts in this field to fully explore these questions. More importantly, we have initiated a number of actions to confirm that patients in the study are receiving accepted therapy.

"Providing optimal care to patients, including

clinical trial participants, is our highest priority, and rigorously evaluating the science on which clinical studies are based is critical to ultimately improving the standard of care. We believe that taking a time-out to re-evaluate this work is the proper approach."

NIH Grantees Win Nobel Prizes In Medicine And Chemistry

The 2009 Nobel Prize in physiology or medicine is shared by three NIH grantees: **Elizabeth Blackburn**, of University of California, San Francisco; **Carol Greider,** of Johns Hopkins University School of Medicine; and **Jack Szostak**, of Massachusetts General Hospital, Harvard Medical School and Howard Hughes Medical Institute.

The three researchers are honored for discovering how chromosomes are protected against degradation by telomeres through the enzyme telomerase. Their discoveries added a new dimension to the understanding of the cell, shed light on disease mechanisms, and introduced new directions for the development of potential new therapies for disease such as cancer.

NIH has provided a total of more than $32 million to the three researchers for their study of telomeres, telomerase, and the molecular functions of cells. The National Institute of General Medical Sciences provided more than $13 million to support Blackburn, more than $6 million to support Greider, and more than $3 million to support Szostak. NCI and the National Institute of Dental and Craniofacial Research provided more than $2 million and $400,000, respectively, to support Blackburn's work. Greider has received more than $7 million from the National Institute on Aging.

"The work by Drs. Greider, Blackburn and Szostak has been truly groundbreaking and has given researchers worldwide a much better understanding of how telomeres and telomerase affect the life-span of a cell and, in turn, how a cell can become immortal, which is a hallmark of a cancer cell," said NCI Director John Niederhuber.

The 2009 Nobel Prize in chemistry is shared by two NIH grantees, **Thomas Steitz**, of Yale University, and **Ada Yonath**, of the Weizmann Institute of Science, Rehovot, Israel. The two researchers share the award with a former NIH grantee, **Venkatraman Ramakrishnan**, of the MRC Laboratory of Molecular Biology, Cambridge, UK.

The three researchers are honored for studies of the structure and function of the ribosome. Ribosomes produce proteins, which in turn control the chemistry in all living organisms.

"Understanding the ribosome's inner-workings is important for a scientific understanding of life," said NIH director Francis Collins. "Thanks to the 3D models created by these three researchers showing how various antibodies bind to the ribosome, scientists can now develop new antibiotics which will ultimately save lives and decrease suffering."

NIH has provided a total of more than $17 million to the three researchers.

In Brief:

NCCS Selects New President

The National Coalition for Cancer Survivorship selected Thomas Sellers as its president and CEO, effective Oct. 19.

He will succeed long-time NCCS President & CEO Ellen Stovall, who will continue to serve as a senior advisor to the organization.

"As a 10-year cancer survivor who has held significant executive positions with the American Cancer Society, The United Way, and in Massachusetts state government, Tom Sellers brings substantial knowledge, professional and life experience to be an effective leader of NCCS and a passionate advocate for cancer survivors," said Robert Sachs, chairman of the NCCS Board of Directors.

"Tom brings to NCCS his personal cancer survivorship experience, combined with notable and successful professional achievements in the cancer community," Stovall said. "These, plus his other many qualifications bode well for a seamless transition of leadership and the future of NCCS."

Sellers led the fundraising, community relations, and development activities for a $30 million ACS project to build a 50,000-square-foot Hope Lodge in Boston to provide free lodging and services to cancer patients in treatment. Sellers also served as chief financial officer for the Massachusetts and New England Divisions of ACS from 1995 to 2009. From 1996-98 Sellers also served as executive director of the Greater Boston Regional Office of ACS. He formed the Boston Crusade Against Cancer.

Sellers also has served as a board member of the Kenneth Schwartz Center at Massachusetts General Hospital, Health Law Advocates, and the Massachusetts Prostate Cancer Coalition.

A graduate of the Harvard Kennedy School with a master's degree in public administration, Sellers has also served in the public sector as assistant commissioner for finance, MA Department of Public Welfare, and deputy commissioner, MA Department of Correction.

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