Cancer Consult

Highlights from the 2008 American Society of Hematology Annual Meeting
Dear Colleagues and Friends:

This issue of *Cancer Consult* is devoted to the Taussig Cancer Institute’s participation in the American Society of Hematology (ASH) Annual Meeting, which took place in December 2008 in San Francisco. This was a noteworthy meeting for ASH as it represented the 50th anniversary of the society. This annual meeting has become our department’s most important scientific meeting. It is a wonderful mix of educational lectures, and offers a unique blend of basic, translational and clinical research presentations. Twenty-four-thousand people attended, with close to 6,000 abstracts submitted for consideration.

The Cleveland Clinic Taussig Cancer Institute sponsored our first Friday Educational Symposium: “Bone Marrow Failure Syndromes: Optimizing Outcomes Worldwide Through Disease Understanding.” These “Super Friday” symposiums are competitively awarded by ASH, and we were proud to be selected as a sponsor. Drs. Mikkael Sekeres and Jaroslaw Maciejewski were the co-directors of this international symposium that reached more than 400 participants.

The Taussig Cancer Institute presented 16 oral and 49 poster presentations. Our Lymphoma Program co-authored an abstract that was accepted for the Plenary Session. Dr. Yogen Saunthararajah presented data concerning the genesis of cancer that was accepted as one of the “Best of ASH” abstracts. In addition, Drs. Sekeres, Smith and I had the privilege of serving as abstract reviewers for this year’s meeting.

I hope you find this edition of *Cancer Consult* valuable, as it highlights many of the Taussig Cancer Institute’s presentations during the ASH Annual Meeting. Our strong presence at this important event is indicative of continued recognition of our research efforts and points to the strength of the Department of Hematologic Oncology and Blood Disorders. Our most important mission is to deliver outstanding care to our patients and ultimately to win the war on cancer. I would like to thank all of our colleagues and friends for your ongoing support. A directory of our physicians is included with this newsletter. Please feel free to contact any of us about your patients.

Sincerely yours,

Brian J. Bolwell, MD
Chairman, Department of Hematologic Oncology and Blood Disorders
Bone Marrow Failure Syndromes: Optimizing Outcomes Worldwide Through Disease Understanding

Clinical Trials Under Way to Improve Outcome in AML

Partnership Streamlines Drug Development

Myeloma Program Expands with Return of Researcher

Clinical Trial Shows Promise in Some Non-Hodgkin's Lymphomas

Study Shows that Future Cancer Treatments Could Be Less Damaging, Toxic to Patients

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Bone Marrow Failure Syndromes affect hundreds of thousands of people worldwide. The epidemiology, risk factors, and molecular characterization of these diseases vary among different countries, with incidence rates for aplastic anemia ranging from 2 per million in the U.S., Europe, and Israel to 7 per million in some Chinese provinces. Myelodysplastic syndromes are even more prevalent, with an incidence ranging from 1 per 100,000 in Japan to 12 per 100,000 in areas of the United Kingdom, and 3.4 per 100,000 in the U.S.

Understanding of the molecular underpinnings of these disorders has exploded in the past decade, and with it pathobiologically-driven therapies and predictors of response to therapies, the availability of which also vary across the world.

Cleveland Clinic hosted a well-attended satellite symposium during the 50th ASH Annual Meeting to share current understanding of bone marrow failure syndromes, directed by Mikkael Sekeres, MD, MS, Department of Hematologic Oncology and Blood Disorders at Taussig Cancer Institute.

“This symposium evolved from the close collaboration we have achieved at Taussig Cancer Institute between clinical and translational researchers,” says Dr. Sekeres, who co-designed the CME with Jaroslaw Maciejewski, MD, PhD, Chairman of the Department of Translational Hematologic and Oncologic Research. “We included both the basic and clinical aspects of these diseases, which attracted each of us to devote our careers to their study. We showcased the interplay between clinical and translational research, and how it can result in concrete changes. Some aspects of our collaboration have earned international recognition.”

He pointed to both the recognition of the RARS-T abnormality by the World Health Organization, and upcoming revisions to the international prognostic scoring system (IPSS) that have grown out of Dr. Maciejewski’s application of innovative technologies in translational research.

“In the past, we were able detect genetic abnormalities in about 50 percent of patients with bone marrow failure syndromes,” says Dr. Sekeres. “But by using SNP-Array technology, Dr. Maciejewski is able to detect these abnormalities in 80 percent of patients. These abnormalities are clandestine but real, and they have prognostic implications.”

Several international experts joined the faculty for the course, including Pierre Fennaux, MD, PhD, from the University of Paris, France, who addressed Preventing AML Transformation; and Aristoteles A.N. Giagoudidid, MD, PhD, of St. Johannes Hospital in Duisburg, Germany, who shared his experience in Rationally Targeting the Molecular Underpinnings of the Disease.

Dr. Sekeres says the international scope of the symposium showcased the robust collaboration among specialists from throughout the world in studying and treating bone marrow failure disorders. “We have strong relationships around the U.S. and throughout the world,” he says. “We recognize that there is strength in numbers.”

By including presentations from the Leukemia & Lymphoma Society and the Aplastic Anemia & Myelodysplastic Syndromes Foundation, Dr. Sekeres says the event also addressed the need to include patients in clinical trials.

“In adult oncology as a whole, less than 10 percent of patients participate in clinical trials,” he says. “Our speakers highlighted the resources available to patients through patient advocacy groups, including direct economic support for travel and participation in clinical trials.”
“We showcased the interplay between clinical and translational research, and how it can result in concrete changes.”
Clinical Trials Under Way to Improve Outcome in AML

Acute myeloid leukemia (AML) is a difficult disease to treat. Although 65 percent of patients achieve complete remission with chemotherapy, only 15 to 30 percent remain free of the disease for five years. New treatment medications and approaches are desperately needed.

The possibility of employing biological targeted therapies with or without chemotherapy in the treatment of hematological malignancies has generated excitement over the last few years. Members of the Taussig Cancer Institute Department of Hematologic Oncology and Blood Disorders are among investigators evaluating these therapies in AML. A team led by Anjali Advani, MD, presented results of a Phase I trial of imatinib mesylate with daunorubicin and cytarabine for patients with c-kit positive relapsed AML at the 2008 ASH Annual Meeting.

“Although AML is not associated with one specific mutation, AML cells do share biological characteristics that may allow the application of molecular targeted therapies,” says Dr. Advani. C-kit, a tyrosine kinase receptor expressed on more than 90 percent of relapsed AMLs, mediates leukemic proliferation and anti-apoptotic effects. Signaling pathways including STAT3 and STAT5 may be activated downstream of c-kit. Higher c-kit expression is associated with a shorter time to relapse and shorter overall survival.

“Therefore, targeting the c-kit receptor in AML may improve the outcome for patients,” says Dr. Advani.

C-kit inhibitors are not active enough as single agents in AML. However, it is possible that c-kit inhibitors may be effective when used in combination with other therapies, including chemotherapy.

“Imatinib mesylate is a potent c-kit inhibitor that has demonstrated some activity in relapsed/refractory AML,” says Dr. Advani. “In this trial, we combined imatinib mesylate with standard induction therapy for patients with c-kit+ relapsed AML.”

Twenty-one patients had enrolled at the time of the presentation. “Eleven of the 19 evaluable patients achieved complete remission (CR) or complete remission with incomplete platelet recovery (CRp), an encouraging result that merits evaluation in a larger Phase II study,” says Dr. Advani.

Dr. Advani and her colleagues continue to open clinical trials to improve the outcome for patients with AML.
The partnership, designed under the guidance of John Sweetenham, MD, Brad Pohlman, MD, and Chairman Brian Bolwell, MD, of the Department of Hematologic Oncology and Blood Disorders, streamlines the complex processes involved in developing and advancing new anticancer treatments through clinical studies. The goal is to accelerate the development of successful therapies for hematologic malignancies.

While most national clinical trials are conducted by cooperative groups — vast networks of physicians, researchers, medical centers and universities across the country — the Clinical Trial Center for Hematologic Malignancies will expedite the advancement of new drugs, since the trials will all be conducted by a single clinical center with access to a large volume of patients. The partnership plans to undertake more than six clinical trials over the next three years, enrolling 100 to 150 patients, increasing the number of trials typically completed for these types of cancers in this timeframe.

Investigator Stephen Smith, MD, Associate Staff in the Department of Hematologic Oncology and Blood Disorders, says the Taussig Cancer Institute brings a team of highly capable clinical researchers and a strong research infrastructure to the partnership, while the Leukemia & Lymphoma Society has a long history of involvement in major breakthroughs in treating hematologic cancers nationwide. Since its launch, the center has opened one study for treating lymphoma, and expects to launch another this spring.

“The first study combines two new drugs — considered ‘targeted therapies’ due to the specific manner they affect tumor cells — to find out if they are safe and effective together in patients with relapsed B-cell lymphoma,” says Dr. Smith. “This study builds upon recent advances in understanding the complex processes that keep tumor cells alive.”

Dr. Smith says that research has shown that lymphoma cells live and grow in a precarious state, relying on a delicate balance of proteins that perform the tasks that keep tumor cells alive. The two medications are known for disrupting the cell’s handling of proteins, which offsets this balance and pushes cancerous cells toward self-destruction. This study is the first to use these specific medications together (even though each has shown promise against lymphoma alone), to determine the combination’s safety and effectiveness.

The second trial, beginning enrollment this spring, is slated to start at the Cleveland Clinic main campus as well as regional Cleveland Clinic Cancer Centers at Hillcrest and Fairview hospitals.

“This study is designed to test one of the most specific types of anticancer therapies ever developed — a drug that blocks a particular genetic ‘message’ telling a lymphoma cell to produce a cancer-stimulating protein. By blocking this message, the drug removes a major impetus for tumor cell growth,” says Dr. Smith. “We’ll be enrolling patients with certain non-Hodgkin’s lymphomas that have relapsed after initial treatment.”

He says news of the partnership generated excitement at this year’s ASH meeting, where he served as a reviewer of abstracts in the category of chemotherapy treatments for lymphoma. “ASH is fertile ground for the development of promising new therapies for lymphoma,” he says.
Dr. Reu graduated from the Eberhard-Karls Universität Tubingen in Tubingen, BW, Germany, before completing his internship, residency and fellowship training at Cleveland Clinic. He returned to Germany for two years to head the AML Task Force at the University of Heidelberg, but welcomed the opportunity to return to Cleveland Clinic.

“I like the way medicine is practiced at Cleveland Clinic,” says Dr. Reu. “This environment provides a unique setting to pursue my epigenetic research and continue to deliver high quality patient care.”

Dr. Reu is leading basic and clinical research in myeloma. His lab in the Taussig Cancer Institute focuses on DNA methylation, regarded as one of the most significant epigenetic events. Cytosine-phosphate-guanine (CpG) methylation in the promoter region of certain genes may be the earliest alteration in some cancers. It is correlated with silencing of genes.

“Medications that can inhibit the shutdown of these tumor suppressor genes are already FDA approved for myelodysplastic syndromes (MDS), and they’re being tested for other cancers,” says Dr. Reu. “They are incorporated into the DNA and bind the enzyme that is responsible for methylation, thereby inactivating it.”

But cell division in myeloma is significantly slower than in MDS, which suggests that dosing schedules would need to be altered to get the same effect. Dr. Reu has approval to open a clinical trial of a promising epigenetic drug in multiple myeloma.

In his lab, Dr. Reu is involved in basic research to uncover agents that reactivate specific genes.

“Currently available drugs will reactivate any gene that is silenced by DNA methylation,” he explains. “I’m working to find the pathways necessary for reactivation of only the genes that we want to reactivate. Ultimately, this could lead to the development of agents that are far more specific.”

In addition to his work in cancer research, Dr. Reu is collaborating with colleagues in cardiology to establish an amyloid center.

“Amyloidosis is a disease where abnormal proteins are deposited in the tissue between cells, thereby disrupting organ function,” says Dr. Reu. “The most common form, AL amyloidosis, is very similar to multiple myeloma because it is caused by the same cells.”

Dr. Reu and Mazen Hanna, MD, a cardiologist with advanced training in heart failure, plan to incorporate multiple disciplines and offer treatment approaches that include novel systemic therapies, heart and stem cell transplantation.
Clinical Trial Shows Promise in Some Non-Hodgkin’s Lymphomas

A Phase II clinical trial of a novel drug for relapsed/refractory Non-Hodgkin’s Lymphoma presented during a plenary session at the ASH Annual Meeting showed promising results according to study co-investigator John Sweetenham, MD, Department of Hematologic Oncology and Blood Disorders.

While he cautions that the data are preliminary, Dr. Sweetenham says that the fact that this is an orally available molecule with a new target is generating excitement.

The drug, fostamatinib, targets a new pathway known as Syk (spleen tyrosine kinase), which is tumor specific and may selectively kill tumor cells while decreasing potential side effects.

“The results were particularly impressive in chronic lymphocytic leukemia (CLL) and diffuse large B-cell lymphoma (DLBCL), which in many ways are on opposite ends of the spectrum. Patients can live with CLL for a very long time before it becomes resistant to chemotherapy, whereas DLBCL is relatively aggressive and fast-growing,” he says.

“Normally in these very preliminary studies, we’re looking to determine toxicity of the treatment rather than necessarily seeing responses to the drug. But there were a significant number of responses in these two groups.”

In a heavily pretreated population with few therapeutic options, the overall response rate was 55 percent in CLL and 22 percent in DLBCL.

Besides the encouraging results, Dr. Sweetenham says that the fact that it can be offered as a pill is very attractive to patients and favorably impacts compliance. “With so many of the new agents being intravenous treatments that carry problems with drug delivery, this is a welcome alternative,” he says.

However, he describes himself as naturally cautious.

“There’s no such thing as a free lunch and it did have side effects, including quite marked fatigue and diarrhea,” he says. “And what we don’t know yet is how easy it is going to be to combine this drug with other types of chemotherapy, which certainly is where its future impact is going to be.”

Dr. Sweetenham expects that larger studies will help experts determine the future applications of fostamatinib. But, he says, the most important thing may not be the drug itself, but its concept.

“We’re now in a position where we are assessing drugs that have been designed to work in a particular way, so this is no longer chance observation that something works. These are designer drugs,” he says. “It’s an important step on the way to individualized therapy.”

Results of the study also point to the importance of enrolling patients in clinical trials.

“Patients who participated in this study truly benefited from this drug, which they couldn’t have gotten without being part of a clinical trial,” he says.
Study Shows that Future Cancer Treatments Could Be Less Damaging, Toxic to Patients

Cleveland Clinic researchers presented findings at the 50th Annual ASH Meeting that suggest cancer could be treated in a novel way that is much less toxic.

The researchers found that they could alter an existing chemotherapy drug to stop the growth of cancer cells and encourage the growth of healthy cells. Current treatments kill both cancer cells and healthy cells, which leads to numerous side effects.

The results of the studies suggest that the mechanisms that cause cancer cells to divide and grow uncontrollably are often different from the mechanisms that drive the growth of healthy stem-cells. This difference can be exploited to selectively stop the growth of the cancer cells without stopping the growth of healthy stem-cells.

“Today, most cancer chemotherapy works the margins — the chemotherapy is marginally more poisonous to cancer cells than normal cells,” said lead investigator Yogen Saunthararajah, MD, of Taussig Cancer Institute. “Therefore, treatment is difficult and risky for patients and can only be given for a few days at a time, with long periods without treatment during which the cancer can regrow.

“Using this alternative approach, which in the test-tube has opposite effects on cancer cells versus healthy stem cells, perhaps therapy can be given regularly and for longer periods, to get the maximum benefits of treatment. We are excited that we can modify the use of existing drugs to produce this effect, which will allow us to start clinical trials soon.”

The research team studied bone marrow samples of myelodysplastic syndrome (MDS) and leukemia patients as well as healthy blood stem cells to discover that the enzyme known as DNMT1 plays opposite roles in the healthy stem cells versus the cancerous cells. Therefore, inhibiting the function of this enzyme produced opposite effects on the healthy cells versus the cancerous cells. The drug used to inhibit this enzyme, decitabine, is already available for clinical use, allowing for clinical studies to be conducted in the next year to determine if using decitabine in this new method can reproduce the effects seen in the test tube in patients.

The research team emphasized that this work needs to undergo the peer review process and publication, and that clinical trials must be conducted to further test this approach in patients. This study was highlighted as a “Best of ASH” presentation by the American Society of Hematology, the world’s largest professional association of blood specialists.

The U.S. Department of Defense has agreed to fund further preclinical studies to continue to improve this approach as a treatment of cancer.
Study Questions Timing of Induction Therapy in Older AML Patients

Research completed by Mikkael Sekeres, MD, MS, Department of Hematologic Oncology and Blood Disorders, and investigators from M.D. Anderson was featured in the Jan. 1, 2009 issue of Blood.

The study included more than 1,300 patients with acute myeloid leukemia (AML) and showed that every day of delay from diagnosis to the start of therapy worsens survival in younger adults, while delay does not impact survival in the elderly.

“In an ideal patient, who is younger than 60 with a core binding factor cytogenetic abnormality, standard induction chemotherapy will achieve complete remission (CR) nearly 85 percent of the time,” says Dr. Sekeres. “But most patients are older, with other cytogenetic abnormalities or secondary AML. In this group, outcome from standard therapy is much worse, with CR rates less than 50 percent and treatment mortality rates that approach 25 percent.”

The combined database from Cleveland Clinic and M.D. Anderson included 1,660 AML patients treated from 1994 to 2005. Excluded patients included those with promyelocytic leukemia, those under age 17, those with white blood cell counts more than 50,000/mm³, those diagnosed more than three months before therapy, those who began therapy immediately on the date of diagnosis, and those with incomplete data. The final dataset consisted of 1,317 patients who were all treated with a remission induction regimen that included cytarabine. These patients were typical of other large AML studies in the distribution of pretreatment covariates, the rates of CR and overall survival (OS), and the effect of covariates on outcome.

Cytogenetics were determined using metaphase karyotyping based on analysis of 20 or more cells. Patients with complex cytogenetics or -7 abnormalities were classified as “unfavorable”; those with core binding abnormalities were classified as “favorable”; and remaining patients, including those with insufficient metaphase to determine cytogenetic abnormalities, were placed in the “intermediate risk” category. Both univariate and multivariate analyses were completed.

“Our data suggest that in younger patients with WBC less than 50,000/mm³, AML should continue to be considered an oncologic emergency. Outcomes were worse in the 41 percent of younger patients whose treatment was delayed for five or more days,” says Dr. Sekeres. “The findings raise the question of whether it is prudent to delay therapy in younger patients to determine eligibility for clinical trials that may or may not offer better outcomes.”

However, in patients 60 or older, the time from diagnosis to treatment did not appear to affect complete remission or overall survival rates.

“Since indirect data suggest that older patients derive very little benefit from standard induction therapy, waiting until cytogenetic or molecular results become known and offering individualized, investigational therapy to this group is probably beneficial,” says Dr. Sekeres.

To refer a patient to Dr. Sekeres, call 216.444.5385 or email sekerem@ccf.org.
Acute Myeloid Leukemia (AML)
A Phase II Study of Imatinib Mesylate (Gleevec) as Maintenance Therapy after Induction and Consolidation Chemotherapy in Patients with Newly Diagnosed C-kit Positive AML Less than 60 Years of Age
Pl: Anjali Advani, MD

A Phase IIB, Randomized, Double-Blinded, Placebo-Controlled Study of Low Dose Cytarabine and Lintuzumab Compared to Low Dose Cytarabine and Placebo in Patients 60 Years of Age and Older with Previously Untreated AML
Pl: Mikkael Sekeres, MD, MS

Acute Lymphocytic Leukemia (ALL)
An Intergroup Phase II Clinical Trial for Adolescents and Young Adults with Untreated Acute Lymphoblastic Leukemia (ALL)
Pl: Anjali Advani, MD

Bone Marrow Transplant
Multiple Unit Unrelated Donor Umbilical Cord Blood Transplantation for Patients with Hematologic Diseases
Pl: Ronald Sobecks, MD

Myelodysplastic Syndromes (MDS)
A Phase II Study of Revlimid in Combination with Azacitidine in Patients with Advanced MDS
Pl: Mikkael Sekeres, MD, MS

A Phase II Trial of RAD001 in Low and Intermediate-1 Risk Myelodysplastic Syndrome
Pl: Anjali Advani, MD

A Phase Ila, Open-Label, Dose Confirmation Study of Oral Clofarabine in Previously Treated Adult Patients with Myelodysplastic Syndromes (MDS)
Pl: Mikkael Sekeres, MD, MS

Cancer Consult provides information from Cleveland Clinic Taussig Cancer Institute specialists about innovative research and diagnostic and management techniques.

Cleveland Clinic Taussig Cancer Institute is at the forefront of the cancer drug discovery and development revolution. Through our cancer research projects led by some of the world’s leading scientists, we have identified new molecules with anti-tumor effect, which may lead to new drug therapies. Key collaborative relationships with the world’s top biotech firms, university research labs, renowned scientists, and major health organizations enhance our research initiatives.
For more information on clinical trials or to refer a patient, call 216.444.7923 or 866.223.8100.

**Multiple Myeloma**

An Open-Label, Single-arm, Phase II Study of Carfilzomib in Patients with Relapsed and Refractory Multiple Myeloma  
*PI: Fred Reu, MD*

**Non-Hodgkin’s Lymphoma**

A Phase I/II Study of CMC-544 Administered in Combination with Rituximab in Subjects with Follicular or Diffuse Large B-Cell Non-Hodgkin’s Lymphoma  
*PI: Anjali Advani, MD*

A Phase I Trial of the Combination of Everolimus (RAD001) and Bortezomib (Velcade) for Relapsed or Refractory Indolent and Mantle Cell Non-Hodgkin’s Lymphoma  
*PI: Stephen Smith, MD*

A Phase I/II Study of Clofarabine in Patients with Relapsed T-cell and NK-Cell Lymphomas  
*PI: Brad Pohlman, MD*

A Randomized Phase IIB Placebo-controlled Study of R-ICE Chemotherapy (Rituximab, Ifosfamide, Carboplatin and Etoposide) with and without SGN-40 (anti CD-40 humanized monoclonal antibody) for Second-Line Treatment of Patients with Diffuse Large B-Cell Lymphoma (DLBCL)  
*PI: Brad Pohlman, MD*
Fellow Highlights New Technology at ASH

For second-year hematology/oncology fellow Ramon Tiu, MD, the ASH meeting provided a rare opportunity to showcase his role in promising research using the latest technology, SNP-Array (SNP-A) karyotyping, in acute myeloid leukemia (AML) and myelodysplastic syndromes (MDS).

Dr. Tiu works under the tutelage of Jaroslaw P. Maciejewski, MD, PhD, Chairman of the Department of Translational Hematologic and Oncologic Research. The primary focus of his research has been on advancing cytogenetic diagnosis in AML and MDS using SNP-A.

“What we have found is that we’re not just detecting new abnormalities using SNP-A, but that these new abnormalities are important clinically in patient prognosis,” says Dr. Tiu.

SNP-A is a novel molecular tool initially intended to detect changes in the human genome that can help define specific predispositions to certain types of diseases. “But what we have found is that in addition to being a genotyping tool, SNP-A is a good karyotyping tool that allows us to see specific defects in the chromosomes that may be important in disease pathogenesis. We found a group of patients who had normal findings using standard metaphase cytogenetics, but who actually had hidden chromosomal abnormalities,” says Dr. Tiu.

Two of Dr. Tiu’s abstracts were selected for oral presentations at the ASH Annual Meeting.

Dr. Tiu’s presentation on “Chromosomal Defects Detected by SNP-Array-Based Karyotyping Are Independent Predictors of Survival in Acute Myeloid Leukemia,” showcased research comparing standard metaphase cytogenetics to SNP-A.

In his second presentation, “SNP-Array Based Karyotyping Complements Routine Cytogenetics in Diagnosis and Risk Stratification Schemes of MDS,” Dr. Tiu showed the benefits of using both standard and new technology in improving cytogenetic diagnosis and prognostication in MDS.

“There has been a lot of uncertainty in myelodysplastic syndromes, since they are highly heterogeneous,” says Dr. Tiu. “For many years, it has sort of been a wastebasket diagnosis for patients with bone marrow failures issues that could not fit in a specific nosologic category. But there has been a recent move to try to modify the current prognostic system in these diseases.

“As much as SNP-A is very good at detecting unbalanced abnormalities, there are conventional abnormalities that you can’t detect,” he says, “such as balanced abnormalities exemplified by certain types of translocations or rearrangements. So both technologies have a place in the correct diagnosis and risk stratification of AML and MDS patients.”

Dr. Tiu says his experience at ASH confirmed his decision to pursue a career in cancer research. As a young investigator, he sees the breadth and depth of ongoing work in the field and the vast opportunities ahead.

“It was a great honor to represent Cleveland Clinic and the Taussig Cancer Institute in front of the most prominent experts in the field and to have them be pleased with our work,” says Dr. Tiu. “It’s a testament to the commitment of my mentor who has been so instrumental in my career and to the hard work of everyone in the laboratory.”
A Sampling of 2008 Journal Publications


Join top CEOs, venture investors, medical leaders and journalists as they highlight new technologies, economics and the newest innovations in cancer therapeutics, diagnostics and disease management. The 7th Annual Medical Innovation Summit offers an exciting lineup of speakers, panel discussions, live surgeries and clinical presentations to learn about the latest trends in medical innovation and what they mean to you.

The Summit provides an unrivaled perspective on the newest medical technologies and the financial drivers behind those innovations. It is dedicated to providing singular insights, networking opportunities and actionable take away for all participants.

Once again, the summit also will include the unveiling of the “Top 10” Medical Innovations for 2010, with moderator Michael Roizen, MD, Chairman of Cleveland Clinic’s Wellness Institute.

**INSTITUTE LOCATIONS**

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216.476.7000

Hillcrest Hospital
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Independence
Cancer Center
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**Strongsville**
Family Health and Surgery Center
16761 Southpark Center
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**Willoughby Hills**
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