MULTIPLE MYELOMA RESEARCH FOUNDATION

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Accelerating the Search for a Cure

Guest Editors

H. Mellstedt MD, PhD, Cancer Centre Karolinska
K. Anderson MD, Dana Farber Cancer Institute
P. R. Greipp MD, Mayo Clinic

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MYELOMA FOCUS

Newsletter of The Multiple Myeloma Research Foundation

Special Edition

The MMRF Reports From Stockholm

The Multiple Myeloma Research Foundation is proud to present this special newsletter which focuses on three exciting events that took place recently in Stockholm, Sweden.

Leaders of the Workshop and Roundtable meet with the MMRF and Carty Foundation. (L-R) Dr. Nilsson, Dr. Österborg, Dr. Millstedt, K. Giusti, Dr. Stevenson, C. McCarty, Dr. Anderson.

August 31-September 1
The 2nd Annual Experts Roundtable on Immune Therapy. World-renowned leaders share ideas and collaborate to fight myeloma.

September 1
1999 Senior Research Award winners announced by the MMRF and McCarty Cancer Foundation.

September 1-5
The VIIth International Workshop on Multiple Myeloma. 800 clinicians and researchers share their most recent research findings.

The MMRF Funds More Groundbreaking Research

The Multiple Myeloma Research Foundation is proud to announce our 1999 Senior Research Awards in conjunction with the McCarty Cancer Foundation. The MMRF distributed nearly $600,000 to Senior Research Award Winners in Sweden, bringing our distribution of research funding to $1.5 million. These awards have gone to leading scientists throughout the world to support efforts in the most promising areas of myeloma research.

> Over 70% of the research we have funded has been published or presented at major medical meetings.

Dr. Bergsagel, (center) receiving Senior Research Award in Sweden from the MMRF, Kathy Giusti (left) and McCarty Cancer Foundation, Craig McCarty (right).

Continued and Award Winners Announced on page 9

Welcome Letter

Kathy Giusti addresses the VIIth International Workshop in Stockholm.

Dear Friends,

The MMRF recently attended the VIIth International Workshop on Multiple Myeloma with Karen South, our medical writer, to document the presentations and symposia in detail. This Workshop is the only physicians meeting dedicated solely to multiple myeloma, and its mission is to provide the most comprehensive information on myeloma from the world's foremost leaders in myeloma research - information critical to our patient and family member audience.

Many of the researchers presenting at this workshop had either received funding from us, or had attended one of our roundtables such as the one on immune therapy described in this newsletter. To date, we have distributed approximately $1.5 million to fund research, and over 70% of the grant-funded research has already been published or presented at a major medical meeting. Our ability to fund exceptional research as fast as we can, and the success of our stringent review process, is having an incredible impact on accelerating the search for a cure for multiple myeloma.

> "...we have distributed approximately $1.5 million to fund research..."

I am extremely pleased to bring to you this special edition newsletter which reports on our Immune Therapy Roundtable, the VIIth Myeloma Workshop and our 1999 Senior Research Awards. If you would like a copy of this newsletter for a friend or family member, please call us at 203-972-1250, or visit our website at www.multiplemyeloma.org

Kathy Giusti

Families Funding Research

The Assink Family

A Special Thank You to Dean Assink and his Family

In October of 1996, Dean Assink met Kathy Giusti. Mr. Assink had just been diagnosed with multiple myeloma and wanted to talk with a fellow patient in his age group. Early in their discussions, he realized how educated she was about the disease, and how driven and focused she was to find a cure. Mr. Assink was inspired by these discussions and set out to educate himself about multiple myeloma so that he might also join in the battle against the disease.

Since then, Dean Assink and his family have been active fund-raisers for the MMRF. The Assink Family not only personally donate to the MMRF, but also solicit donations. Mr. Assink believes that "everyone is gifted in certain areas, some are doctors or researchers, some work for foundations, but others can help out by raising funds for finding a cure." He knows that the money he raises for the MMRF will be used efficiently and effectively to find a cure.

Immune Therapy Roundtable

Funded by MMRF and the McCarty Cancer Foundation

Multiple Myeloma: From Bone Marrow Events to Vaccine Development

The MMRF's 2nd Annual Experts Roundtable on Immune Therapy created and funded by the MMRF and the McCarty Cancer Foundation, was co-chaired by Dr. Ken Anderson of the Dana Farber Institute, and Dr. Freda Stevenson of Southampton University in the UK.

Collaborating at the Roundtable in Sweden (L-R) Anders Österborg, MD, PhD; Nikhil C. Munshi, MD; William S. Dalton, MD, PhD; Frederico Caligaris-Cappio, MD; Kenneth Nilsson, MD, PhD; P. Leif Bergsagel, MD; Alberto Orfao, MD, PhD; and Ann Traynor, MD.

Look for the proceedings in Immunology Today

This forum is unique and essential because it allows clinicians and researchers to meet in a small group to share ideas and information, build collaboration, compare techniques, and eliminate the duplication of effort.

Why is the Bone Marrow Environment Important in Multiple Myeloma?

Multiple myeloma results from an abnormality of the plasma cell. Because the malignant plasma cells reside primarily in the bone marrow, understanding events in the bone marrow environment is essential to understanding multiple myeloma.

All cells of the immune and blood system, including the plasma cell, arise from stem cells in the bone marrow. Thus, cells that eventually become myeloma cells come from the bone marrow.

What Events in the Bone Marrow Environment Promote Myeloma Cell Growth?

The bone marrow environment is an area of complex interactions involving numerous cell types, growth factors, and blood vessels. Several events have been identified that promote myeloma cell growth including:

1) Genetic changes occur that shift a normal cell into a malignant precursor cell.

Normal plasma cells produce immunoglobulins that are composed of heavy and light chains, which function as antibodies. Dr. Bergsagel reported on a genetic abnormality involving the gene for immunoglobulin's heavy chain, which was detected in 60% of patients with multiple myeloma.

2) Bone marrow adhesion molecules help myeloma cells attach. Once attached in the bone marrow, myeloma cells release growth factors that make the bone marrow favorable to growth.

Dr. Van Camp reported results indicating that myeloma cells activate adhesion molecules that promote attachment to receptors in bone marrow. Dr. Caligaris-Cappio discussed results that suggest an interaction between a myeloma cell receptor and a receptor known to play a key role in adhesion.

3) Normal bone marrow cells produce cytokines, such as Interleukin-6, that stimulate growth and prevent natural cell death in myeloma cells.

In the body, normal cell growth and normal cell death (apoptosis) are controlled by genetic cell programs. Myeloma cells have these programs, but they have genetic changes that increase cell growth and prevent normal cell death, which allows continued survival of the malignant cells. Dr. Nilsson discussed the role of these altered genes in multiple myeloma, and the growth factors that stimulate cell growth and continued cell survival. Myeloma cells are stimulated by these growth factors because they have specific surface receptors for the growth factors on their surfaces.

4) Vascular endothelial (cell) growth factor increases and results in growth of new blood vessels (angiogenesis).

Angiogenesis, which is the development of new, tiny blood vessels, is seen with many tumors. These blood vessels increase blood supply and may feed tumor cells. Angiogenesis can be measured by increases in microvessel density (MVD) in bone marrow sections. Dr. Munshi reported on a correlation between MVD and survival. Results are shown on the following page.

What Does This Mean for Treatment?

The bone marrow environment that

continued next page

Immune Therapy Roundtable

Funded by MMRF and the McCarty Cancer Foundation

Microvessel Density	Event Free Survival	Overall Survival	Complete Response Duration
Greater than 4	31 months	51 months	27 months
Less than 4	51 months	95+ months	82+ months

Title Microvessel Density

promotes myeloma growth may be changed to a less favorable environment by blocking signals that encourage myeloma cells to attach in bone marrow and by blocking bone marrow production of cytokines, which promote cell growth and prevent cell death. Anti-angiogenesis agents, such as thalidomide, can inhibit new blood vessel growth in bone marrow, thus cutting supply to tumor cells.

What Can Be Done to Strengthen the Immune System's Attack Against Myeloma Cells?

The plasma cell is an important cell of the immune system, but the immune system contains many other cells that work to protect the body, including T lymphocytes (T-cells) and dendritic cells.

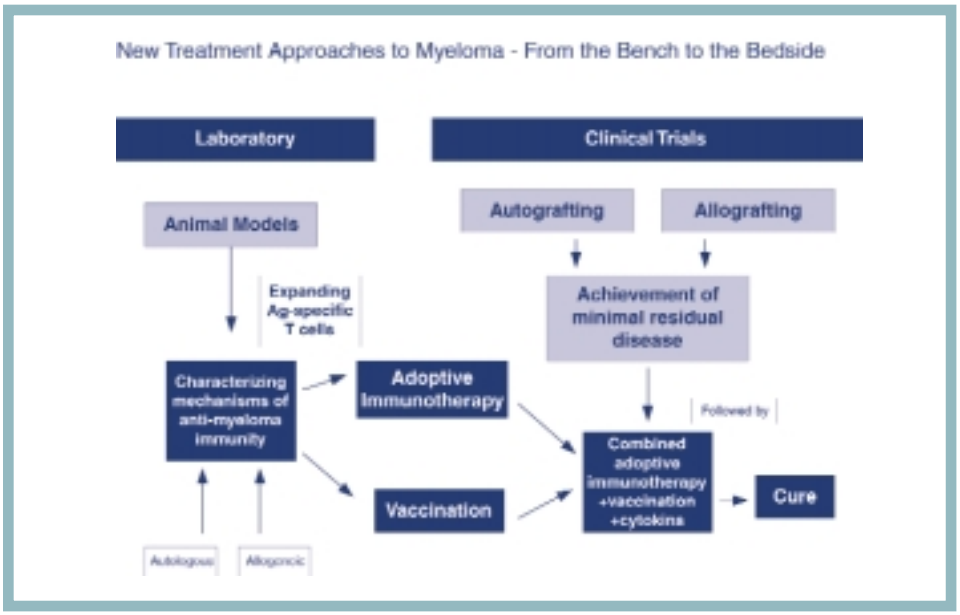
Dr. Anderson reported on new treatment approaches based on improving autologous and allogeneic immunity to myeloma. The purpose of these new approaches is to encourage the immune system to eliminate every myeloma cell that remains after high-dose chemotherapy and transplantation. These remaining myeloma cells are responsible for relapses after therapy.

Activation of a specific marker on myeloma cells could increase the myeloma cell's ability to attract patient T-cells. These T-cells would destroy the myeloma cells in the same way that they normally destroy other foreign organisms.

What Is The Role of Dendritic Cells (DCs)?

DCs are specialized cells of the immune system that present antigens to T-cells and initiate, direct, and regulate immune responses.

Dr. Orfao reported new information about three different groups of DCs in normal human blood. These groups of DCs have different characteristics and produce different growth factors and may play different roles in the immune process.



How Do We Know That T-cells Can Destroy Myeloma Cells?

Complete remission has been achieved in some patients receiving allogeneic stem cell transplantation (ASCT) and donor lymphocyte infusion (DLI). This is due to a graft vs myeloma (GVM) response. In GVM, T-cells in the DLI attack and destroy the myeloma tumor cells in the patient. Because this may also correlate with graft vs host disease (GVHD), GVM response needs to be increased and GVHD minimized.

Are Vaccines Against Multiple Myeloma Possible?

Research is being done on several different types of vaccines against myeloma.

Dr. Mellstedt discussed naturally occurring tumor-specific T-cells in patients with multiple myeloma and chronic lymphocytic leukemia (CLL), which are both B cell diseases. These tumor-specific T-cells seem to recognize the same idiotype or section of immunoglobulin. These similar situations may provide interchangeable results that would help in the development of an idiotype vaccine for multiple myeloma.

Dr. Lacy reported preliminary results from a clinical trial of DC-based idiotype vaccination in 15 patients. Early clinical results indicate that DC-based vaccination with idiotype is possible and safe.

Dr. Stevenson presented information on DNA vaccines against multiple myeloma. These DNA vaccines contain tumor-associated genes and also genes for certain abnormally occurring antigens. These DNA vaccines also contain an alert signal, Tetanus Toxin, that helps activate the immune system. The purpose of the vaccine is to create an immune response against tumor antigens at the gene level.

The VIIth International Workshop on Multiple Myeloma

The VIIth International Workshop on Multiple Myeloma was held September 1-5, 1999, in Stockholm, Sweden. The Workshop has grown tremendously in size and scientific importance since its inception in 1987. This year's workshop attracted approximately 800 participants, compared to 40 in its first year. Dr. Håkan Mellstedt, Chairman of the event said,

> "...these international workshops have become an important forum to present and discuss new achievements, which enrich science and help our patients."

Dr. Mellstedt Special Editor and Chairman of VIIth International Workshop

Prognostic Indicators and Risk Factors in Multiple Myeloma

What Are Prognostic Indicators?

In patients with multiple myeloma, certain laboratory test results correlate with how the disease will progress. Early determination of these test results, called prognostic indicators, help establish the level of disease at diagnosis and provide a baseline against which disease progression can be measured. In some cases, prognostic indicators can indicate how well a current treatment is working.

What Are The Prognostic Indicators in Multiple Myeloma?

Dr. Greipp reported on prognostic indicators for multiple myeloma as defined in a Phase III trial containing more than 400 patients with multiple myeloma. Data were from a central laboratory and a standard local laboratory (the important difference being that the central laboratory could perform more advanced testing than the local laboratory). Central laboratory data indicated plasmablastic multiple myeloma; plasma cell labeling index of 1% or greater; and beta 2-microglobulin of 4 or greater as the most important risk factors.

Analysis of local laboratory data indicated principal risk factors as beta2-microglobulin of 4 or greater; hemoglobin of 10 or less; and creatinine of 2 or greater. However, these data did not correlate with significant patient survival, thus underscoring the importance of additional tests provided by the central laboratory, including plasmablastic multiple myeloma and plasma cell labeling index.

Dr. Facon reported that partial or complete deletion of chromosome 13, a genetic finding, was found in 38% of patients with multiple myeloma. For patients without deletion of chromosome 13, mean survival time was significantly longer, 48.8 months compared with 28.3 months for patients with the deletion. In addition, high beta2-microglobulin was an important prognostic indicator. Patients with beta2-microglobulin level of 3mg/L or greater had a mean survival time of 37.5 months versus 53.3 months for patients with a beta2 microglobulin level of less than 3mg/L. Used together beta2-microglobulin level and chromosome 13 deletion provide a strong prognostic indicator.

Prognostic Indicators

	Central Laboratory Data		Survival
Risk Level	PCLI/β2M	Patients	Median
Low	low/low	93	5.5
Intermediate	low/high	192	3.9
	high/low	25	3.9
High	high/high	77	2.4
	PB alone	37	1.9

PB = Plasmablastic
PCLI = Plasma cell labeling index
β2M = beta2-microglobulin

continued next page

TRANSPLANTATION

Numerous presentations and extensive discussion at the Multiple Myeloma Workshop in Stockholm revolved around bone marrow (BM) and peripheral blood stem cell (PBSC) transplantation. As reported, clear-cut answers are not available. In fact, some study results seem contradictory.

AUTOLOGOUS TRANSPLANTATION

Dr. Bjorkstrand reported on autologous stem cell transplantations performed from 1986 to 1998 in more than 5,400 patients with multiple myeloma. In responsive patients, transplantation appeared to be more effective when done early in the course of the disease.

Dr. Gertz reported findings that appear to show that the median survival from time of diagnosis is not different in patients who receive delayed stem cell transplantation from that reported for patients who receive early transplantation. Dr. Gertz's results showed that the patients' levels of beta2-microglobulin and plasma cell labeling index appeared to have a major impact on overall outcomes (see "Prognostic Indicators" pg 5). Beta 2 microglobulin level and bone marrow labeling index significantly predicted overall survival.

Dr. Barlogie reported the results of treatment with two cycles of high-dose melphalan followed by transplant in 1,000 patients with a median age of 53 years. At 8 years, treatment-related mortality was 2.7%. Forty percent of the patients achieved complete remission, which lasted a median of 2.4 years. Several factors were identified as favorable for complete remission including: beta2-microglobulin levels of 2.5mg/L or less; albumin levels of more than 3.5g/dL; and absence of a chromosome 13 deletion.

Dr. Barlogie, University of Arkansas for Medical Sciences, reports findings at the Workshop in Stockholm.

Dr. Fermand presented results from a study that compared overall survival for patients 55 to 65 years of age who received either high-dose therapy and autologous PBSC transplantation or conventional chemotherapy. The median overall survival in the group receiving high-dose therapy and autologous PBSC transplantation was 60.5 months compared with 51.6 months for those receiving conventional chemotherapy.

Dr. Alexanian reported findings in 60 patients, under 60 years of age, with multiple myeloma, of high or intermediate tumor mass, and M protein who received high-dose therapy supported by autologous stem cells. All patients had previously achieved remission to primary therapy. Results indicated sensitivity of the myeloma to primary therapy, as measured by the rate and amount of reduction of serum M-protein, identified responsive patients more likely to achieve complete remission. These findings could be very helpful in the determination of individual therapy.

ALLOGENEIC TRANSPLANTATION

Allogeneic transplantation for multiple myeloma has a lower relapse rate than autologous transplantation. However, superior overall survival is seen with autologous transplantation because of higher transplant-related mortality with allogeneic transplantation.

Dr. Gahrton reported figures that show transplantation with allogeneic bone marrow has improved significantly during the last 5 years. This is due to a significant improvement in survival, a result of a reduction in transplant-related mortality. The median survival with bone marrow cell transplantation before February, 1994 was 12 months and after February 1994, 43 months. Before 1994, transplant-related mortality at 12 months was 40% and after 1994, 20%.

Results of additional analysis demonstrate that survival following syngeneic transplantation tended to be superior to that of autologous transplantation and was significantly better than survival following allogeneic transplantation. This was due to a lower transplant-related mortality with syngeneic than with allogeneic and a lower relapse rate than with autologous transplantation. Overall four-year survival from syngeneic transplant was 77%, with autotransplantation 46%, and with allotransplantation 31%.

In some, donor lymphocyte infusions (DLI) have been effective therapy for relapsed multiple myeloma after

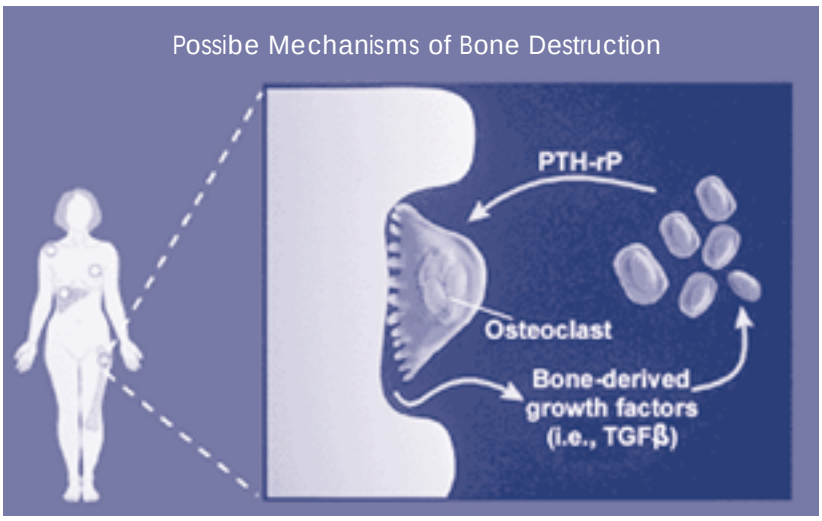
continued next page

allogeneic stem cell transplantation. Dr. Lockhorst reported a 60% response rate and 37% complete response rate using DLI in 17 patients. Infused donor lymphocytes fight against patient myeloma cells in a type of "graft versus myeloma" effect. Dr. Lockhorst noted that the addition of interferon-alpha and interleukin-2 may increase this effect.

Dr. Bensinger reported results from 138 patients receiving autologous and 106 receiving allogeneic stem cell transplants. After four years of follow-up, results suggested no advantage for allogeneic over autologous transplants. Incidence of relapse or disease progression after allogeneic transplant was one-half the incidence after autologous transplant. This may be due to the "graft vs. myeloma" effect, similar to that seen with DLI therapy. Thus, the goal for allogeneic transplant is to reduce early associated mortality.

During the workshop, several discussions focused on the number of peripheral blood stem cells (PBSC) used in transplantation. Dr. Glaspy noted that higher CD34+ cell doses are associated with fewer engraftment delays. The most extensively studied strategy to enhance the number of CD34+ cells harvested from patients is stem cell factor in combination with filgrastim. Dr. Bensinger reported an analysis of 104 allogeneic PBSC transplants that indicated very high CD34+ dose is associated with graft vs. host disease. However, these results also suggest that the occurrence of graft vs. host disease may protect against relapse.

Specific selection and transplantation of stem cells, which have a CD34+ surface marker, can improve transplant attachment and growth. In addition, because remaining tumor cells in transplanted autologous stem cells may contribute to patient relapse, specific cell selection may help eliminate tumor cells from transplanted stem cells. Dr. Schiller reported that in 190 patients receiving autologous PBSC transplantation, specific selection of CD34+ cells significantly reduced tumor cell contamination. However, the significance of this is not known.



PTH-rP: Parathyroid Hormone - related protein.
TGFβ: Transforming Growth Factor Beta

"Autologous transplant continues to demonstrate improved CR rate over standard therapy and longer survival, particularly in CR patients. Resolution of the best timing of autologous transplant, early or late, awaits the results of the current Intergroup trial lead by Dr. Barlogie, which compares PBSC transplant with 'standard' chemotherapy as initial therapy followed by 'late' transplant. Allogeneic transplant continues to show a lower relapse rate than autologous transplant. Mortality rate appears to be decreasing, but the cause is not fully known. Syngeneic transplant shows promising improvement in survival. DLI appears to induce frequent CR in allogeneic transplant failures. " - Philip R. Greipp, MD, Mayo Clinic.

BISPHOSPHONATES

WHAT ARE BISPHOSPHONATES?

Bisphosphonates are a group of compounds used in patients with multiple myeloma to help: reduce bone disease advancement, decrease bone pain, and reduce fractures.

Dr. Berenson discussed recent data on the bisphosphonates pamidronate (Aredia®) and zoledronate. Results of a Phase III trial in patients with multiple myeloma demonstrated that pamidronate reduced bone pain and significantly reduced the occurrence of fractures and delayed the time to first fracture. Addition of pamidronate to

continued next page

chemotherapy lowers the skeletal morbidity rate. Zoledronate has been shown effective in controlling hypercalcemia at very low doses. Study results indicate that a 4mg dose of zoledronate was as effective in preventing bone resorption as a 90mg dose of pamidronate. Doses of zoledronate, up to 8mg, significantly reduced markers for bone resorption; and trials of zoledronate, up to 16mg, are ongoing. The ability to achieve similar effectiveness with lower dosing of a more potent bisphosphonate could lessen the risk of nephrotoxicity.

DO BISPHOSPHONATES HAVE ANTI-TUMOR ACTIVITY?

Bisphosphonates may have an indirect effect and/or direct effect on tumor cells. Bisphosphonates may remove factors within the bone marrow that are important to the growth and/or survival of tumor cells. Bisphosphonates also may have a direct anti-tumor effect.

Dr. Bartl reported on a three-year study in 160 patients, with Stage I multiple myeloma, treated with amino-bisphosphonates from time of diagnosis. Results showed a reduction in skeletal events; a reduction of tumor growth; and a decline of M-protein levels in the first year with no chemotherapy. Based on these results, a placebo-controlled study will be carried out.

EMERGING THERAPEUTICS

Several new therapeutics were discussed during the Multiple Myeloma Workshop.

THALIDOMIDE

Dr. Barlogie reported on a recently completed Phase II clinical trial of the drug thalidomide in 179 patients with advanced and refractory myeloma. Thirty-five percent of patients were more than 60 years of age, 83% had received prior high-dose therapy, and 66% had a deletion of chromosome 13, an unfavorable prognostic indicator. (see Prognostic Indicators pg. 6)

Results of this trial show an effect in one-third of the patients and are shown in the two charts below.

Patient Characteristics	%
AGE > 60	35
> 3 Years of Rx	53
Prior Transplant ≥ 1	82
≥ 2	63
> 30% BM PC	50
B2M > 4mg/L	43
CRP > 1 mg/L	44
Deletion 13	66

Patient Responses	%	
CR	2	32%
Near-CR	8	
75%	7	
50%	9	
25%	6	
Stable	9	
Progression	59	

CR: Complete Response

RITUXIMAB

Rituximab, a monoclonal antibody is approved to treat patients with a type of non-Hodgkin's lymphoma and has been used successfully in treating many other B cell malignancies. Rituximab targets and destroys B cells that have CD20 antigen. CD20 exists on some earlier stage multiple myeloma B cells, but is absent on plasma cells of many patients with multiple myeloma. Rituximab appears to be active in only some patients with multiple myeloma, possibly those with CD20+ plasma cells. Currently, a Phase II clinical trial is being conducted to evaluate rituximab in combination with conventional chemotherapy. Study results identify interferon-gamma(IFN-g) as a potent inducer of CD20 on plasma and B cells from patients with multiple myeloma. This suggests that IFN-g could be used to increase CD20 positive myeloma cells and thus make more myeloma cells susceptible to rituximab. A clinical study to determine benefits of combined IFN-g and rituximab therapy is planned.

continued next page

(continued from page 8)

166 Holmium-DOTMP

166 Holmium-DOTMP is a radio-pharmaceutical that is bone-seeking. Radiation is provided by 166 Holmium that is attached to DOTMP, which is a bone-seeking drug. Use of 166 Holmium-DOTMP makes it possible to deliver radiation directly to bone marrow while sparing other organs from the radiation.

Dr. Giralt presented early results from Phase I/II studies using 166 Holmium-DOTMP in combination with high-dose chemotherapy and with or without total body irradiation (TBI) as preparation for autologous stem cell transplantation in patients with multiple myeloma. Therapy was well tolerated and early results for 15 patients show promise. Because primary tumor burden in patients with multiple myeloma is in the bone marrow, a targeted radio-pharmaceutical that is selectively taken up by bone could help reduce tumor cells and improve outcomes. The two studies are being continued with additional dose escalation.

Nearly $600,000 granted to Senior Research Awards

The MMRF Funds More Groundbreaking Research continued

The high value of these grants affords established senior researchers the unique opportunity to implement biological, or clinical, research projects that would otherwise not be possible.

In an effort to facilitate even more exciting and promising research, the MMRF also offers Fellows Awards valued at $40,000, to researchers who are relatively new to the field of multiple myeloma. 1999 Fellows Award applicants will be reviewed with the International Myeloma Foundation and the winners will be announced in October. You can read about them in the next issue of *Myeloma Focus.*

MMRF 1999 Senior Awards (funded with the McCarty Cancer Foundation)

Name	Institution	Title
Dr. Helen Tighe	U.C. San Diego	Immunostimulatory DNA: application to DNA-based vaccines for Multiple Myeloma
Dr. Bjarne Bogen	University of Oslo	Id specific "T" cells in Multiple Myeloma
Dr. William T. Bellamy	University of Arizona	Angiogenic growth factors as a therapeutic target in Myeloma
Dr. Hyman I. Levitsky	Johns Hopkins University	Tumor vaccines for Myeloma patients
Dr. Keith E. Stockerl-Goldstein	Stanford University	Mixed Chimera transplants followed by idiotype vaccinations for Multiple Myeloma
Dr. Noopur Raje	Dana Farber Cancer Institute	The role of Kaposi's Sarcoma associated virus in Multiple Myeloma pathogenesis
Dr. Leif Bergsagel	Cornell University	Transgeneic mouse model of Multiple Myeloma

Dr. Levitsky and Dr. Tighe (Senior Research Award recipients) join Kathy Giusti and Craig McCarty in Sweden for The Senior Research Awards.

Craig McCarty presenting grant award to Dr. Bogen (R), University of Oslo.

Dr. Stockert-Goldstein (R), Stanford University, accepting Senior Research Award.

Your Personal Medical Dictionary

Allogeneic Transplantation: Transplantation from a human donor who is not an identical genetic match.

Angiogenesis: The growth of new blood vessels.

Antibodies: Any of various proteins (immunoglobulins) that are generated in reaction to foreign proteins (antigens), thus producing an immunity against that protein.

Antigen: A substance that stimulates the production of an antibody to which it subsequently binds.

Autologous Transplantation: Transplantation whereby the patient's own cells are reinfused.

B Cells: (also called B lymphocyte) These are the precursors of plasma cells.

Beta2-Microglobulin: A protein that is shed by cells. It is part of the human histocompatibility complex (HLA) and can be detected in the blood.

CD34+: A cell surface marker -CD stands for cluster of differentiation and the 34+ indicates a specific antigen for which this cell is positive. Stem cells are CD34+.

Chromosome 13: Chromosomes are strands of DNA that are composed of genes containing instructions for all the production of body proteins. In some individuals with multiple myeloma, part of the short arm of chromosome 13 is deleted.

Conventional Chemotherapy: Chemotherapy that does not require stem cell rescue.

Cytokines: Factors produced by cells that influence other cells.

Filgrastim: A growth factor - GCSF (granulocyte colony stimulating factor) that stimulates the growth of white cells in the bone marrow.

Hemoglobin: The substance in the red blood cell that carries oxygen.

Idiotype: Part of an antibody that determines exactly what antigen the antibody acts against.

Idiotype Vaccine: A vaccine that uses the idiotype of an antibody as the antigen with which to stimulate an immune response.

Immune System: The system in the body that protects it from foreign substances, cells, and tissues by producing the immune response.

Immune Response: The interaction of an antigen with lymphocytes to induce the formation of antibodies.

Immunoglobulin: An antibody that is produced by the plasma cell. Normally, it is made up of two types of proteins, one is called the heavy chain, the other the light chain.

Immunotherapy: The treatment of, or prevention against, a disease achieved through manipulation of the patient's immune system.

Interleukin -2 (IL-2):A cytokine (growth factor) that is produced by T-cells, which are lymphocytes.

Interleukin -6 (IL-6): A cytokine (growth factor) that is produced by cells called fibroblasts and stimulates production of immunoglobulins by B cells.

Interferon (IFN): A substance produced in the body by infected cells that protects noninfected cells from viral infection.

Melphalan: A chemotherapy agent (commercial name- Alkeran®).

Monoclonal Antibody: An identical copy of an antibody.

Myeloma Protein (M-Protein): A protein produced by malignant plasma cells found in the blood or urine and used as a marker for the amount of myeloma in the body.

Nephrotoxicity: Toxicity to the kidneys.

Osteoclast: A cell that functions in the absorption and removal of bony tissue.

Peripheral Blood Stem Cell (PBSC) transplantation: A transplantation using stem cells that have been collected from the peripheral blood rather than the bone marrow.

Plasma Cell: A cell of the immune system that makes and secretes antibodies into the serum.

Plasma Cell Labeling Index (PCLI): The percentage of plasma cells that are actively dividing.

Plasmablast: A precursor of the plasma cell.

Precursor Cell: An earlier form of a cell, for example, B cells are precursors of plasma cells.

Stem Cells: The precursors to all blood and immune cells.

Syngeneic Transplantation: Transplantation in which the donor is an identical twin of the recipient.

T-Lymphocytes: (also called T-cells) Cells of the immune system that are involved in a number of immune reactions.

MYELOMA FOCUS

Newsletter of The Multiple Myeloma Research Foundation

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The information herein is not intended to replace the services of trained health professionals (or to be a substitute for medical advice.) You are advised to consult with your healthcare professional with regard to matters relating to your health, and in particular, regarding matters which may require diagnosis or medical attention.

Immune Therapy RoundtableFunded by MMRF and the McCarty Cancer Foundation

Top Row (L-R) Dr. Berenson, Dr. Bogen, Dr. Österborg, Dr. Nilsson, Dr. Van Camp, Dr. Stewart, Dr. Lokhorst, Dr. Van Ness, Center Row (L-R) Dr. Orfao, Kathy Giusti, Dr. Bergsagel, Dr. Hart, Dr. Kwak, Dr. Anderson, Dr. Klein, D. Tighe, Dr. Lacy, Front Row (L-R): Dr. Munshi, Dr. Stevenson, Dr. Dalton, Dr. Levitsky, Dr. Bataille, Craig McCarty, Dr. Mellstedt, Dr.Thielemans.

More Highlights from VIIth International Workshop on Multiple Myeloma Through the Internet

Starting on October 6th

Educate yourself! Get the answers!

Learn from the experts at your own convenience with this full Audio/Video and Slide Presentation

For info on accessing the broadcast go to www.multiplemyeloma.org

The MMRF "Friends for Life" Fall Gala

in Greenwich, CT.
November 13, 1999.
Featuring:
1999 Leadership Award Honoree
General H. Norman Schwarzkopf

and
Master of Ceremonies

Deborah Norville
of Inside Edition

Get Involved!!!
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NOTE TO OUR READERS:

The MMRF and our medical experts have made every attempt to report these preliminary research findings as quickly and as accurately as possible. If you have any concerns about your medical condition, please consult your personal physician.

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