BIOGRAPHICAL SKETCH

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NAME: **Perrotti, Danilo, M.D., Ph.D.**

eRA COMMONS USER NAME (credential, e.g., agency login): **PERROTTI**

POSITION TITLE: **PROFESSOR**

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education.*

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Liceo Scientifico "F.D. Assissi", Rome, Italy	B.S.	1984	
University of Rome "La Sapienza" Italy	M.D.	1991	
University of L'Aquila, Italy	Ph.D.	1997	Medical Biotechnology

A. Personal Statement

I have been involved in research dealing with normal and malignant hematology since 1993. My interest has been always focused on understanding the molecular mechanisms responsible for the emergence, maintenance and progression of myeloid leukemias giving more emphasis to Chronic Myelogenous Leukemia (CML). The ultimate goal is to find molecular targets useful for the development of new therapeutic drugs targeting leukemic stem cells. In this regard, my laboratory has all the technical and scientific expertise required for performing *in vitro* and *in vivo* (mice) basic and translational research using state-of-the-art cell/molecular biology and signaling methodologies with primary normal and leukemic stem/progenitor bone marrow and peripheral blood cell subpopulations.

My research (*reviewed in the articles cited below*) has generated paradigm shifts to the way scientists look at potential way to approach basic and translational science (see work on: RNA metabolism and leukemia; the discovery of the decoy activity of miRNAs (e.g. miR-328); using PP2A activating drugs (PADs) to restore tumor suppressor phosphatases (e.g. PP2A) in drug-resistant leukemic stems and progenitors to treat CML-CP and -BC, Ph^+-ALL, AML, MPNs; and, recently, on the requirement of a miRNA tumor suppressor activity (e.g. miR-300) and of lncRNAs (e.g. TUG1) for maintenance of CML and AML stem cell-driven leukemogenesis (*Silvestri et al. Blood Cancer Discovery 2020*). My research program in the leukemia field always resulted from successful national and international collaborations and has been supported by NCI and DOD grants since my first Faculty appointment in 2003. I am also a former Scholar of the Leukemia and Lymphoma Society.

1. Perrotti D, Jamieson C, Goldman J, Skorski T. Chronic myeloid leukemia: mechanisms of blastic transformation. *J Clin Invest.* 2010;120(7):2254-64
2. Perrotti D, Harb JG. BCR-ABL1 kinase-dependent alteration of mRNA metabolism: potential alternatives for therapeutic intervention. *Leuk Lymphoma.* 2011 Feb; 52 *Suppl* 1:30-44.
3. Perrotti D. and Neviani P. Targeting A Tumor Suppressor To Suppress Tumor Growth: News and Views on Protein Phosphatase 2A (PP2A) as a Target for Anti-cancer Therapy. *Lancet Oncol.* 2013; 14(6): e229-38.
4. Perrotti D, Silvestri G, Stramucci L, Yu J, Trotta R. Cellular and Molecular Networks in Chronic Myeloid Leukemia: the leukemic stem, progenitor and stromal cell interplay. *Current drug targets*, 2017.

B. Positions and Honors

Professional Experience:

1997-1999 Postdoctoral Researcher, Kimmel Cancer Inst., Thomas Jefferson University, Philadelphia, PA.
1999-2002 Research Instructor, Kimmel Cancer Institute, Thomas Jefferson University, Philadelphia, PA
2003-2008 Assistant Professor (Full-time; Tenure-track), MVIMG, OSUCCC, The Ohio State University
2008-2013 Associate Professor (Tenure), Dept. Mol. Virol., Immunol. and Medical Genetics, and Member of the Comprehensive Cancer Center, The Ohio State University, Columbus OH 43210.
2010-pres. Honorary Professor of Medicine, Dept. Haematology, The Imperial College of London, London UK.
2013-pres. Professor (Tenure), Dept. of Medicine and Dept. of Biochemistry and Molecular Biology; Director Basic Hematologic Research and Member of the Experimental Therapeutic Program, Greenebaum Cancer Center, The University of Maryland School of Medicine, Baltimore MD.

Honors and Awards (Selected)

1990-95 Fellowship from the Italian Ministry of Health, Universities and Scientific Research
1995-pres. Active Member, American Association for Cancer Research (AACR)
1996-pres Member, American Society of Hematology (ASH)
1997-2000 American Italian Foundation for Cancer Research Award (New York, NY)
2002-2005 Elsa U. Pardee Foundation for Cancer Research Award

2003 Lauri Strauss Leukemia Research Foundation Award
2004-pres Member, Alliance *former Cancer and Leukemia Group B (CALGB)*
2007-12 Career Development Award, Scholar - *Leukemia and Lymphoma Society* (LLS) of America
2008 SBS Excellence in Research and Teaching Award, College of Medicine, OSU (Columbus, OH)
2010 T. Archdeacon and B. Mills Recognition Award for outstanding research, LLS of America
2010 Ryan Gibson Foundation Award; Leukemia & Lymphoma Society (LLS) of America
2013-pres Member European Haematology Association (EHA)
2017 Sebetia Ter International Career Award – Silver Medal from the President of Italy

Professional Activities (extramural, selected):

Grant Reviewer (selected)

2004-2005 DOD-CMLRP Hypothesis and Therapeutic Developmental Awards, CML Research Program-Congressional directed Medical Research program, US Dept of Defense.
2002-present Permanent Reviewer, AIRC (Italian Association for Cancer Research).
2008-present *Ad hoc* Cancer Research UK National Research Council
2009-present *External Reviewer* Cancer Research UK National Research Council
2010-2012 *Ad hoc* Member, CAMP (NIH-NCI) Study Section.
2011-2013 Reviewer, Leukemia & Lymphoma Society Grants
2012 Reviewer, NIH-NCI "Research Answers to NCI's Provocative Questions" Grants
2017 Reviewer, Reviewer, LRP National Cancer Institute, NIH

Ad hoc Reviewer (selected journals) Nearly 450 articles reviewed since 2003 in over 50 scientific journals including: Blood, Cancer Cell, Cancer Research, Cell Death and Differ., J. Clin. Invest., J. Clin. Oncol., J. Exp. Med., Leukemia, Mol. Cell. Biol., Nat. Genet., Nat. Cell Bio., Nat. Med., Nat. Struc. Biol., Nat. Rev. Cancer, Oncogene.

Editorial Board: 2007-2009 – Associate Editor, Cancer Research; Cell Death & Disease; 2010-present: Review Editor, Frontiers in Cancer Molecular Targets and Therapeutics

Extramural activities (selected recent)

2007-2018 Reviewer or Coordinating Abstract Reviewer, and Chair - Simultaneous Sessions American Society of Hematology (ASH) Annual Meetings.
2009-present Co-Organizer, Reviewer and Chair at the Annual European School of Haematology / iCMLF International Conference on CML Biology and Therapy
2009 Consultant, Hematology Advisory Board Meeting ChemGenex Pharmaceutical.
2009-2010 Consultant, CML Scientific Advisory Board Meeting, Bristol-Myers Squibb.
2010-present Co-Organizer and Chair Post-ASH International Workshop on MPN and CML
2011 Member, Acute Lymphoblastic Leukemia Working Group, NCI Leukemia Steering Committee
2011 Consultant, Advisory Board Meeting at the ASH) Annual Meeting, Pfizer Inc.
2016-present Advisory Board Meeting Stony Brook Cancer Center, Stony Brook University NY. May 2016.
2018 Scientific Program Committee Member, AACR Program Planning Committee Section: *ncRNAs*

Invited Speaker: (2003-pres.): 151 National and International Meetings and/or Universities

C. Contribution to Science (selected, 124 published)

1. **Altered mRNA metabolism in cancer**. Dr. Perrotti and co-workers were the first to report that oncogene-dependent alterations of RNA metabolism significantly contribute to leukemia emergence, maintenance and progression. They discovered that the BCR-ABL1 oncoprotein, product of the t(9;22) translocation, exerts its leukemogenic potential and promotes CML disease progression in part by altering expression and function of specific RNA binding proteins (*Eiring AM et al., Blood 2008*) and microRNAs (*Eiring et al., Cell 2010*) essential for the correct proliferation, survival and differentiation of myeloid progenitors. Specifically, they reported that increased levels of BCR-ABL1 kinase activity, as those found in blast crisis CML, leads to differentiation arrest through hnRNP E2-dependent translational inhibition of C/EBPα expression (*Perrotti D. et al., Nature Genet. 2002; Chang JS. et al Blood 2007*); functional inactivation of p53 tumor suppressor activity through La-dependent translational enhancement of MDM2 expression (*Trotta R. et al., Cancer Cell 2003*); aberrant activation of mitogenic and survival signals via hnRNP K-dependent translational stimulation of Myc expression (*Notari M. et al., Blood 2006*); and to hnRNP A1/SET-dependent inhibition of PP2A tumor suppressor activity, a necessary step for full activation of BCR/ABL oncogenic signalosome and for positive autoregulation of wild type and tyrosine kinase inhibitor-resistant oncogene expression and activity in both leukemic stem/progenitor cells (*Iervolino et al., Mol. Cell Biol. 2002; Neviani P. et al., Cancer Cell 2005; Harb J.G. et al. Leukemia 2013*). Furthermore, such aberrant pathways could be therapeutically targeted by XPO1 inhibitors (e.g. FDA-approved KPT-330) in patients with advanced Ph^+ leukemias (*Walker C. et al., Blood 2013*).

- **Perrotti D***, Harb JG. BCR-ABL1 kinase-dependent alteration of mRNA metabolism: potential alternatives for therapeutic intervention. ***Leuk Lymphoma.*** 2011 Feb; 52 Suppl 1:30-44. Review. *(*): corresponding author*

- Eiring AM, Neviani P, Santhanam R, Oaks JJ, Chang JS, Notari M, Willis W, Gambacorti-Passerini C, Volinia S, Marcucci G, Caligiuri MA, Leone GW, **Perrotti D**. Identification of novel posttranscriptional targets of the BCR/ABL oncoprotein by ribonomics: requirement of E2F3 for BCR/ABL leukemogenesis. ***Blood***. 2008 Jan 15;111(2):816-28.
- Walker CJ, Oaks JJ, Santhanam R, Neviani P, Harb JG, Ferenchak G, Ellis JJ, Landesman Y, Eisfeld AK, Gabrail NY, Smith CL, Caligiuri MA, Hokland P, Roy DC, Reid A, Milojkovic D, Goldman JM, Apperley J, Garzon R, Marcucci G, Shacham S, Kauffman MG, **Perrotti D**. Preclinical and clinical efficacy of XPO1/CRM1 inhibition by the karyopherin inhibitor KPT-330 in Ph+ leukemias. ***Blood.*** 2013 Oct 24;122(17):3034-44.

2. **Block of myeloid maturation in blast crisis CML**. Dr. Perrotti and co-workers dissected the molecular mechanism responsible for differentiation arrest in myeloid CML blast crisis (CML-BC). Specifically, they show that, in most of clinical cases, block of differentiation in CML-BC is a BCR-ABL1 kinase-dependent effect that relies on increased BCR-ABL1 expression/activity that, upon constitutively activating the MEK1/ERK pathway, leads to increased expression of hnRNP E2 which, in turn, inhibits translation of C/EBPα, the major regulator of granulocytic differentiation, upon binding a C-rich element within the *CEBPA* mRNA 5'UTR (*Perrotti et al., Nat. Genet. 2002; Chang et al., Blood 2007*). Moreover, they showed that suppression of granulocytic differentiation in myeloid CML-BC requires downregulation of miR-328, a microRNA positively regulated by C/EBPα and capable of directly restraining the translation inhibitory effect of hnRNP E2 and restoring differentiation of primary myeloid CML-BC progenitors (*Eiring AM. et. al., Cell 2010*).

- **Perrotti D***, Cesi V, Trotta R, Guerzoni C, Santilli G, Campbell K, Iervolino A, Condorelli F, Gambacorti-Passerini C, Caligiuri MA, Calabretta B. BCR-ABL suppresses C/EBPalpha expression through inhibitory action of hnRNP E2. ***Nat Genet.*** 2002 Jan;30(1):48-58. *(*): corresponding author*
- Chang JS, Santhanam R, Trotta R, Neviani P, Eiring AM, Briercheck E, Ronchetti M, Roy DC, Calabretta B, Caligiuri MA, **Perrotti D**. High levels of the BCR/ABL oncoprotein are required for the MAPK-hnRNP-E2 dependent suppression of C/EBPalpha-driven myeloid differentiation. ***Blood.*** 2007 Aug 1;110(3):994-1003.
- Eiring AM, Harb JG, Neviani P, Garton C, Oaks JJ, Spizzo R, Liu S, Schwind S, Santhanam R, Hickey CJ, Becker H, Chandler JC, Andino R, Cortes J, Hokland P, Huettner CS, Bhatia R, Roy DC, Liebhaber SA, Caligiuri MA, Marcucci G, Garzon R, Croce CM, Calin GA, **Perrotti D**. miR-328 functions as an RNA decoy to modulate hnRNP E2 regulation of mRNA translation in leukemic blasts. ***Cell.*** 2010; 140(5):652-65.

3. **MicroRNA decoy activity.** Dr. Perrotti and co-workers were the first to describe the microRNA decoy activity. The showed that microRNAs not only can suppress gene expression upon binding the mRNA 3'UTR but they also can simultaneously interact with RNA binding proteins (decoy activity) in a seed-sequence independent manner and interfere with their ability to regulate mRNA processing, stability and translation (*Eiring AM et al., Cell 2010; Balkhi MY. et al., Sci. Signal 2013*). This article received printed and/or audio/visual press coverage from international and national journals, including Science (AAAS), Nature Medicine, Nature Reviews of Cancer, Leukemia and Lymphoma Society and a Cell Previews "MicroRNAs: From Decay to Decoy by Michaela Beitzinger, Gunter Meister

- Eiring AM, et al.. miR-328 functions as an RNA decoy to modulate hnRNP E2 regulation of mRNA translation in leukemic blasts. ***Cell.*** 2010; 140(5):652-65.

4. **The tumor suppressor PP2A as a druggable anti-cancer agent.** Dr. Perrotti and co-workers were the first to show that inactivation of the tumor suppressor protein phosphate 2A (PP2A) is a common and therapeutically druggable event during leukemogenesis. Specifically, they reported that PP2A is inactivated in chronic and blastic phase CML and other oncogenic kinase-driven hematopoietic disorders (e.g. Ph-negative MPNs, Ph^+ ALL, and AML) through the activity of its endogenous inhibitors (e.g., SET), which are aberrantly regulated by oncogenic tyrosine kinases (*Neviani P. et al., Cancer Cell 2005; Neviani et. al J. Clin. Invest. 2007; Samantha et al., Oncogene 2009; Roberts KG., et al. Cancer Res. 2010; Oaks, JJ. et al., Blood 2013*). Interestingly, SET-dependent inhibition of PP2A activity is a BCR-ABL1 kinase-dependent and –independent effect in leukemic progenitor and stem cells, respectively; however, in both cell population it requires JAK2 activity. Moreover, we were the first to show that genetic or pharmacologic restoration of PP2A enzymatic activity by PP2A-activating drugs (PADs) can impair LSC and progenitor cell survival both in vitro and in animal models without harming normal hematopoiesis or inducing adverse/toxic effects. Mechanistically, PP2A reactivation simultaneously leads to BCR-ABL1 inactivation/degradation and to direct inactivation of BCR-ABL1 kinase-dependent and –independent mitogenic, survival and self-renewal signals in LSCs and leukemic progenitors (*Neviani et al., J. Clin. Invest 2007; Neviani et al., J. Clin. Invest 2013).* We were also the first to determine that an oncogenic tyrosine kinase (e.g. BCR-ABL1) can exert its oncogenic potential regardless of its kinase activity, and that this might be cell context-dependent. Persistence of leukemic quiescent LSCs in BM requires inhibition of the tumor suppressor PP2A and expression — but not activity — of the *BCR-ABL1* oncogene. Specifically, BCR-ABL1 is acting as scaffold protein to recruit and maintain an active oncogenic signalosome in stem cells while CML progenitors become addicted to its kinase activity. BCR-ABL1 expression, but not kinase function, was required for recruitment of JAK2, activation of a JAK2/β-catenin survival/self-renewal pathway, and inhibition of PP2A (*Neviani et al., J. Clin. Invest 2013*). This work led to a) the discover by other groups that PP2A is inactivated in almost all hematologic malignancies and in several solid cancers where this tumor suppressors is not genetically altered, and b) to the generation of other PADs with clear anti-cancer activity and very

low toxicity profile (*reviewed in Perrotti and Neviani, Lancet Oncol. 2013; Neviani, Perrotti, Clin. Cancer Res. 2014*). Notably, PP2A Inhibiting Drugs (PIDs; e.g. LB100) alone and in combination with TKIs arrest proliferation of TKI-resistant CML progenitors but do not exert effects on qLSC survival and, enhance leukemogenesis when used alone *in vitro* and *in vivo (Perrotti et al., Science Translational Medicine, 2019).*

This work resulted in outstanding publications that received strong press coverage (over 100 national/international websites and journals), public media attention in over 40 US states, several scientific commentaries/articles and three national and/or international patents (US patents 8,318,812 - 2012; 8,633,161 - 2014; and 9,220,706 -2015). This work was also highlighted in the Annual Report of the Dept. of the Army-CDMRP to the US Congress.

- Neviani P, Santhanam R, Trotta R, Notari M, Blaser BW, Liu S, Mao H, Chang JS, Galietta A, Uttam A, Roy DC, Valtieri M, Bruner-Klisovic R, Caligiuri MA, Bloomfield CD, Marcucci G, **Perrotti D**. The tumor suppressor PP2A is functionally inactivated in blast crisis CML through the inhibitory activity of the BCR/ABL-regulated SET protein. ***Cancer Cell***. 2005 Nov;8(5):355-68
- Neviani P, Santhanam R, Oaks JJ, Eiring AM, Notari M, Blaser BW, Liu S, Trotta R, Muthusamy N, Gambacorti-Passerini C, Druker BJ, Cortes J, Marcucci G, Chen CS, Verrills NM, Roy DC, Caligiuri MA, Bloomfield CD, Byrd JC, **Perrotti D**. FTY720, a new alternative for treating blast crisis chronic myelogenous leukemia and Philadelphia chromosome-positive acute lymphocytic leukemia. ***J Clin Invest.*** 2007 Sep;117(9):2408-21.
- Neviani P, Harb JG, Oaks JJ, Santhanam R, Walker CJ, Ellis JJ, Ferenchak G, Dorrance AM, Paisie CA, Eiring AM, Ma Y, Mao HC, Zhang B, Wunderlich M, May PC, Sun C, Saddoughi SA, Bielawski J, Blum W, Klisovic RB, Solt JA, Byrd JC, Volinia S, Cortes J, Huettner CS, Koschmieder S, Holyoake TL, Devine S, Caligiuri MA, Croce CM, Garzon R, Ogretmen B, Arlinghaus RB, Chen CS, Bittman R, Hokland P, Roy DC, Milojkovic D, Apperley J, Goldman JM, Reid A, Mulloy JC, Bhatia R, Marcucci G, **Perrotti D**. PP2A-activating drugs selectively eradicate TKI-resistant chronic myeloid leukemic stem cells. ***J Clin Invest.*** 2013; 123(10):4144-57.
- **Perrotti D***, Agarwal A, Lucas CM, Narla G, Neviani P, Odero MD, Ruvolo PP, Verrills NM. Peer Reviewed Comment on "PP2A inhibition sensitizes cancer stem cells to ABL tyrosine kinase inhibitors in BCR-ABL human leukemia". ***Science translational medicine***. 2019;11(501). Epub 2019/07/19. doi: 10.1126/scitranslmed.aau0416. PubMed PMID: 31316003. (*) corresponding author

5. **miR-300: a druggable dual activity tumor suppressor required for leukemogenesis and inhibiting NK cell anti-tumor activity**. Dr. Perrotti and co-workers discovered that miR-300 is a cell context-independent tumor-naïve bone marrow microenvironment (BMM, hypoxia and MSC exosome)-induced tumor suppressor with an anti-proliferative and a PP2A-activating function that are sequentially activated through a dose-dependent differential target selection mechanism in CML (CP and BC). miR-300 anti-proliferative activity induces leukemic stem cell (LSC) quiescence whereas the PP2A-activating function kills in vitro and in PDXs nearly all leukemic but not normal quiescent HSCs and dividing progenitors. Drug-resistant quiescent LSCs escape miR-300-induced PP2A-mediated apoptosis by upregulating TUG1 lncRNA that dose-dependently uncouples miR-300 functions and allows LSC entry into quiescence whilst preventing their apoptosis. Both activities also account for the suppression of NK cell growth and anti-tumor cytotoxicity observed in untreated and TKI-treated leukemia patients. These findings have strong biological and therapeutic implications and represent a paradigm shift to the notion that the activity of a tumor suppressor is only defined by its ability to suppress tumorigenesis. Additionally, they highlight the ability of lncRNA to qualitatively modulate dual activity miRNAs. Moreover, the concept that sees the tumor naïve BMM supporting leukemia development suggest that MIR300-TUG1 induction may represent the step leading to formation and initial expansion of the qLSC pool. Thus, LSC entry into dormancy is a tumor-naïve BMM-initiated events independent from the leukemia-induced BM niche remodeling that sustains and, likely, reinforces but not induce LSC quiescence.Thus, To our knowledge, this is the first example of a non-cell context-dependent dual activity tumor suppressor miRNA induced by the tumor-naïve microenvironment capable of inhibiting innate anti-cancer immunity while promoting LSC quiescence and selectively inducing LSC/progenitor cell apoptosis through its PP2A-activating function. Accordingly, we found that PADs can overcome the BM microenvironment protective effect on survival of TKI-resistant quiescent CML LSCs. Similar findings have been found in complex karyotype (CK) AML. Thus, the importance of MIR300 and PP2A-activating drugs for formation/survival and eradication of drug-resistant CML (CP and BC) and CK-AML LSCs and progenitors with leukemia-initiating function.

- Silvestri, G.*, Trotta R.*, Stramucci, L., Ellis, J. Harb, J., Neviani, P., Wang S., Eisfeld A.K., Zhang, B., Srutova., K., Gambacorti-Passerini, C., Pineda, G., Jamieson, C., Stagno, F., Vigneri, P., Nteliopoulos, G., May, P.C., Reid, A., Garzon, R., Roy, D.C., Mototuou, M.M., Guimond, M., Hokland, P., Deininger, M., G., F., Harman, C., Dazzi, F., Milojkovic, D., Apperly, J., Marcucci, G., Qi, J., Machova-Polakova, K., Zou, Y., Fan, X., Baer, M.R., Calabretta, B., **Perrotti, D**. Persistence of Drug-resistant Leukemic Stem Cells and Impaired NK-cell Immunity in CML Patients Depend on MIR300 Antiproliferative and PP2A-activating Functions ***Blood Cancer Discovery*** 2020;1(1). Epub March 4, 2020. doi: 10.1158/0008-5472.BCD-19-0039; PMCID: *(*) Co-first Authors*
  https://bloodcancerdiscov.aacrjournals.org/content/early/2020/03/03/0008-5472.BCD-19-0039

D. Research Support

- **Pending Support**
  none

- **Ongoing Research Support**

DOD CA180744 02/01/2019- 1/31/2021 **Role: PI**
Title: miRNA-mediated Rescue of NK Cell Cytotoxicity Against Drug-Resistant Quiescent Leukemia Stem Cells
The goal of this project is to determine whether downregulation of miR-300 alone or associated with miR-155 upregulation rescues CML NK cell proliferation and cytotoxic activity against drug-resistant CML stem cells .

- **Completed/Ended Research Support**

NCI-NIH 1R21CA209183-01 07/13/2016-06/30/2019 **Role: PI**
Title: Role of SETBP1 in adult Ph+ acute lymphoblastic leukemia
The goal of this project is to assess the role of SETBP1 and that of the PP2A inhibitory complex in the survival and self-renewal of Ph+ B-ALL stem cells.

NIH/NCI R01CA163800 01/31/2012-01/31/2019 **Role: PI**
Title: Role of microRNAs in the regulation of CML stem cell survival and self-renewal
The goal of this project is to assess the role of microRNAs targeting in a canonical or decoy manner the BCR-ABL1/Jak2/SET-PP2A/b-catenin pathway in survival/self-renewal of leukemic stem and progenitor cells.

NIH/NCI 5R01CA095512-05 04/01/2008-01/31/2014 **Role: PI**
Title: Role of RNA-binding proteins in BCR/ABL leukemogenesis.
The goal of this project is to assess the importance of altered mRNA metabolism in CML disease progression, self-renewal and survival of the CML stem cell and investigate the role of microRNA in the biology of blast crisis CML.

Karyopharm Therapeutics Inc. 11/07/2011 - 8/07/2013 **Role: PI**
Targeting karyopherins with KPT-330 in Ph^+ Acute Leukemias

LLS Career Development award (Scholar) 07/01/2007-06/30/2012 **Role: PI**
Title: Activating Phosphatases as therapeutic strategy for leukemias characterized by activated oncogenic tyrosine kinases: Role of PP2A in Chronic Myelogenous Leukemia

DOD-CML NIA – W81XWH-07-1-0270 04/01/2007-03/31/2010 **Role: PI**
Title: Restoration of PP2A tumor suppressor activity as therapeutic strategy for CML-BC.
The goal of this project is to assess whether PP2A activating drugs can prevent CML blastic transformation

NIH/NCI R01 CA095512-02 08/01/2003-07/31/2007 **Role: PI**
Title: Role of RNA binding protein in BCR/ABL leukemogenesis
The goal of this project is to assess the importance of altered mRNA metabolism in BCR/ABL leukemogenesis and in particular investigating the signaling pathways responsible for activation of hnRNP A1, hnRNP E2 and hnRNP K and identification of the mRNAs regulated by the activity of these RNA binding proteins.

DOD-CML, DAMD17-03-1-0184 07/01/2003-06/30/2006 **Role: PI**
Title: Effect of BCR/ABL oncoprotein on mRNA translation: possible mechanisms of CML disease progression.
The goal of this project was to assess the importance of translational regulation in CML disease progression.

Lauri Strauss Leukemia Foundation 04/01/2003-03/31/2004 **Role: PI**
Title: Role of the BCR/ABL oncogene in Suppression of neutrophilic differentiation

Elsa U. Pardee Foundation 06/01/2002-12/31/2003 **Role: PI**
Title: Translational Regulation by the p210 BCR/ABL oncoprotein

American-Italian Cancer Foundation 07/01/1997-06/30/1999 **Role: PI**
Title: Role of RNA binding Proteins in leukemia

Leukemia and Lymphoma Society (LLS) SCOR (PI: J. Byrd) 10/01/2010-08/31/2013 **Role: Co-PI**
Title: Experimental Therapeutics Project 4 – Molecular Target-Based Therapeutics for Leukemia.

Cariplo Biomedical Foundation (PI: Gambacorti C.) 04/01/2010 - 3/31/2012 **Role: Co-PI**
Title: A high throughput functional genomics analysis of the progression of Chronic Myeloid Leukemia to blast crisis

NCI-NIH P50 CA140158 (SPORE-DRP) (PI: JC Byrd) 08/17/2009-07/31/2013 **Role: Co-PI**
Title: Specialized Programs of Research Excellence