Hematology

Cincinnati Children's

Division Data Summary

Research and Training Details

Number of Faculty	9
Number of Joint Appointment Faculty	2
Number of Research Fellows	3
Number of Support Personnel	63
Direct Annual Grant Support	$1,408,575
Direct Annual Industry Support	$108,310
Peer Reviewed Publications	9

Clinical Activities and Training

Number of Clinical Fellows	5
Number of Other Students	3
Inpatient Encounters	2,559
Outpatient Encounters	4,233

Division Photo

Row 1: T Kalfa, P Malik
Row 2: C Joiner, E Mullins, K Kalinyak
Row 3: R Gruppo, C Quinn

Significant Publications

Swensen JJ, Agarwal AM, Esquilin JM, Swierczek S, Perumbeti A, Hussey 0, Lee M, Joiner CH, Pont-Kingdon G, Lyon E, Prchal JT. **Sickle cell disease resulting from uniparental disomy in a child who inherited sickle cell trait**. *Blood.* 116(15):2822-2825. Oct 14, 2010.

Dr. Joiner and Dr. Perumbeti collaborated with investigators at Columbia and the University of Utah to define a novel case of sickle cell disease resulting from uniparental disomy in a child who had only one parent with sickle cell trait. This genetic mechanism has been described for other diseases and in cancer, but has never been demonstrated to result in sickle cell disease.

Hammill AM, Risinger MA, Joiner CH, Keddache M, Kalfa TA. **Compound heterozygosity for two novel mutations in the erythrocyte protein 4.2 gene causing spherocytosis in a Caucasian patient**. *Br J Haematol.* 152(6):780-783. Mar, 2011.

Dr. Kalfa and Dr. Joiner collaborated with Dr. Mehdi Keddache and Dr Kejian Zhang in the Division of Human Genetics to define two never-before-described mutations in protein 4.2 of the red blood cell membrane that combined to produce a significant hemolytic anemia. These were the first mutations in protein 4.2 found among Caucasian populations.

Yang MQ, Laflamme K, Gotea V, Joiner CH, Seidel NE, Wong C, Petrykowska HM, Lichtenberg J, Lee S, Welch L, Gallagher PG, Bodine OM, Elnitski L. **Genome-wide detection of a TFIID localization element from an initial human disease mutation**. *Nucleic Acids Res.* 39(6):2175-2187. Mar, 2011.

Collaborating with investigators at the National Institutes of Health and Yale University, Dr. Joiner participated in this study on novel cis-elements involved in transcriptional regulation on genes. The work interdigitates with Dr. Joiner's study of the mechanisms controlling the expression of the potassium-chloride cotransport

protein involved in volume regulation in red blood cells and its abnormalities in sickle cell disease.

Flick MJ, Chauhan AK, Frederick M, Talmage KE, Kombrinck KW, Miller W, Mullins ES, Palumbo JS, Zheng X, Esmon NL, Esmon CT, Thornton S, Becker A, Pelc LA, Di Cera E, Wagner DO, Degen JL. **The development of inflammatory joint disease is attenuated in mice expressing the anticoagulant prothrombin mutant W215A1E217A**. *Blood.* 117(23):6326-6337. Jun, 2011.

Dr. Palumbo and Dr. Mullins worked with members of the Division of Experimental Hematology and Cancer Biology to define the role of coagulation proteins in inflammatory arthritis.

Division Highlights

Special Hematology Laboratory of the Division of Hematology

The Special Hematology Laboratory offers a number of novel diagnostic tests for blood diseases. This year saw the introduction of specialized testing for von Willebrand's disease, which is offered by only a hand-full of laboratories across the country. Novel tests for platelet function are under development, under the leadership of Dr. Ralph Gruppo. In collaboration with the Division of Human Genetics, the Laboratory is also developing genetic diagnostic tests for hemoglobin disorders and red cell membrane defects.

Division Collaboration

Gastroenterology, Hepatology, and Nutrition » N. Yazigi, MD

Clinical care of children with liver disease and hematologic disorders (T. Kalfa, MD, PhD.)

Radiology » R. Fleck, Jr., MD

Evaluation of children with transfusional hemosiderosis (iron overload) by liver MRI. (T. Kalfa, MD, PhD.)

Clinical Pharmacology » A. Vinks, PharmD, PhD, FCP

Pharmacokinetics in sickle cell disease. (C. Joiner, MD, PhD, K. Kalinyak, MD)

Anesthesia » N. Weidner, MD

Pain management in sickle cell patients. (K. Kalinyak, MD, C. Quinn, MD, MS)

Human Genetics » K. Zhang, MD, MBA

Genetic diagnostic services for hematology patients. (C. Joiner, MD, PhD, T. Kalfa, MD, PhD)

Experimental Hematology and Cancer Biology » P. Malik, MD

Comprehensive Sickle Cell Center; Gene transfer into hematopoietic stem cells. (A. Perumbeti, MD, C. Joiner, MD, PhD)

University of Cincinnati Division of Hematology/Oncology » R. Franco, PhD; G. Atweh, MD

Comprehensive Sickle Cell Center; Sickle cell pathophysiology, fetal hemoglobin induction. (C. Joiner, MD, PhD)

University of Cincinnati Division of Endocrinology » R. Cohen, PhD

Comprehensive Sickle Cell Center; Red blood cell survival and hemoglobin glycosylation. (C. Joiner, MD, PhD)

Experimental Hematology and Cancer Biology; Bone Marrow Transplantation and Immune Deficiency » P. Malik, MD; S. Davies, MBBS, PhD, MRCP

Comprehensive Sickle Cell Center; Gene transfer therapy in sickle cell diseases. (A. Perumbeti, MD, K. Kalinyak, MD, C. Joiner, MD, PhD)

Developmental Biology » J. Degen, PhD

Hemophilia and Thrombophilia Program; Role of coagulation programs in cancer metastasis. (J. Palumbo, MD)

Behavioral Medicine and Clinical Psychology » M. Mitchell, PhD

Comprehensive Sickle Cell Center; Adherence to hydroxyurea therapy. (K. Kalinyak, MD, C. Joiner, MD, PhD)

Experimental Hematology and Cancer Biology » J. Degen, PhD

Hemophilia and Thrombophilia Program (E. Mullins, MD)

Clinical Pharmacology; Experimental Hematology and Cancer Biology » A. Vinks, PharmD, PhD, FCP ; P. Malik, MD

Comprehensive Sickle Cell Center; Zileuton therapy for sickle cell disease. (K. Kalinyak, MD, C. Joiner, MD, PhD)

Experimental Hematology and Cancer Biology; Pulmonary Medicine » P. Malik, MD; W. Hardie, MD ; M. Ednick, DO

Comprehensive Sickle Cell Center; Multidisciplinary clinic for sickle cell patients, inflammation in sickle cell disease. (K. Kalinyak, MD, C. Joiner, MD, PhD)

Experimental Hematology and Cancer Biology; Cardiology; Radiology; Pulmonary Medicine » P. Malik, MD; R. Fleck, MD; W. Gottleibson, MD; A. Towbin, MD ; C. Kerschmar, MD

Comprehensive Sickle Cell Center; Cardiovascular complications of sickle cell disease. (K. Kalinyak, MD, C Joiner, MD, PhD)

Experimental Hematology and Cancer Biology » Y. Zheng, PhD

Comprehensive Sickle Cell Center; signaling pathways in red blood cells. (T. Kalfa, MD, PhD)

Anesthesia » C. Kurth, MD

Hematology Program; Clinical evaluation of transcutaneous hemoglobin analysis. (K. Kalinyak, MD, C. Joiner, MD, PhD)

Radiology » A. Towbin, MD

Hematology Program; Clinical evaluation of sickle cell patients. (K. Kalinyak, MD, C. Joiner, MD, PhD)

Sports Medicine » J. Divine, MD, MS

Comprehensive Sickle Cell Center; Evaluation and counseling of athletes for sickle cell trait (C. Joiner, MD, PhD)

University of Cincinnati Division of General Internal Medicine » T. Diers, MD

Comprehensive Sickle Cell Center; Transition of sickle cell patients to adult care. (K. Kalinyak, MD, C. Joiner, MD, PhD)

Pulmonary Medicine » M. Ednick, DO; W. Hardie, MD

Clinical Care and research in sickle cell patients. (K. Kalinyak, MD, Quinn, MD, MS)

Adolescent Medicine » L. Ayensu-Coker, MD

Clinical care for bleeding disorders in adolescent girls. (E. Mullins, MD, C. Tarango, MD)

Cardiology » D. Nelson, MD, PhD; J. Jeffries, MD, MPH, FAAP, FACC ; A. Lorts, MD; J. Towbin, MD, FAAP, FACC, FAHA

Clinical management of anti-coagulation of cardiac patients. (C. Tarango, MD)

Experimental Hematology and Cancer Biology » Y. Zheng, PhD

NIDDK Center of Excellence in Molecular Hematology. (C. Joiner, MD, PhD)

Neurology » M. Kabbouche, MD

Clinic for children with sickle cell disease and stroke. (C. Quinn, MD, MS)

Cardiology » T. Kimball, MD

PFAST Study. (C. Quinn, MD, MS)

Experimental Hematology and Cancer Biology » Y. Zheng, PhD

Rac1 targeting suppresses human non-small cell lung adenocarcinoma cancer stem cell activity. *PLoS One.* Feb 2011;6(2):e16951. (J. Palumbo, MD)

Experimental Hematology and Cancer Biology; Rheumatology » M. Flick, PhD; J. Degen, PhD; S. Thornton, PhD

The development of inflammatory joint disease is attenuated in mice expressing the anticoagulant prothrombin mutant W215A1E217A. *Blood.* Jun 2011;117(23):6326-6337. (E. Mullins, MD, J. Palumbo, MD)

Human Genetics; Oncology » M. Keddache, MS; A. Hammill, MD, PhD

Compound heterozygosity for two novel mutations in the erythrocyte protein 4.2 gene causing spherocytosis in a Caucasian patient. *Br J Haematol.* Mar 2011;152(6):780-783. (C. Joiner, MD, PhD, T. Kalfa, MD, PhD)

Oncology; Gastroenterology, Hepatology and Nutrition » B. Mizukawa, MD; J. Heubi, MD

Cooperating G6PD mutations associated with severe neonatal hyperbilirubinemia and cholestasis. *Pediatr Blood Cancer.* May 2011 ;56(5):840-842. (K. Kalinyak, MD, T. Kalfa, MD, PhD)

Experimental Hematology and Cancer Biology » P. Malik, MD

Therapy for beta-globinopathies: a brief review and determinants for successful and safe correction. *Ann N* Y *Acad Sci.* Aug 2010; 1202:36-44. (A. Perumbeti, MD)

Faculty Members

Clinton H. Joiner, MD, PhD, Professor

Executive Co-Director, Cancer and Blood Diseases Institute
Director, Division of Hematology
Director, Comprehensive Sickle Cell Center

Research Interests Mechanisms of cell volume regulation; sickle cell disease and other hemoglobinopathies

Ralph A Gruppo, MD, Professor

Director, Hemophilia Thrombosis Center

Research Interests Coagulation; hemophilia; thrombosis

Theodosia Kalfa, MD, PhD, Assistant Professor

Research Interests Study of erythropoiesis and red blood cell structural membrane biology

Karen Ann Kalinyak, MD, Professor

Clinical Director, Hematology Oncology Program

Research Interests Hematology; bone marrow failure; sickle cell anemia; hemoglobinopathy

Eric Mullins, MD, Instructor

Research Interests Interactions between hemostatic factors and the immune system in inflammatory disease; hemophilia

Joseph S. Palumbo, MD, Assistant Professor

Research Interests Interactions between the hemostatic system and innate immunity effecting tumor progression

Ajay Perumbeti, MD, Instructor

Research Interests Hemoglobin regulation, genetic therapies for sickle cell anemia, hematopoietic stem cells in hemoglobinopathies

Charles Quinn, MD, Associate Professor
Director, Hematology Clinical and Translational Research
Research Interests Sickle cell disease: causes and treatment of stroke; pathophysiologic role of hemoglobin desaturation; acute sickle cell pain; survival and long-term follow-up in children with disease

Cristina Tarango, MD, Assistant Professor
Research Interests Thrombosis and hemostasis, medical education

Joint Appointment Faculty Members

Mi-Ok Kim, PhD, Assistant Professor
Center for Epidemiology and Biostatistics

Punam Malik, MD, Associate Professor
Experimental Hematology and Cancer Biology

Trainees

- Sharat Chandra, MD, PL-V, University of South Alabama
- Alex George, MD, PhD, PL-VI, Cincinnati Children's Hospital Medical Center
- Pooja Khandelwal, MD, PL-IV, University of Arizona College of Medicine
- Maa-Ohui Quarmyne, MD, PL-V, Mt. Sinai Hospital
- Brian Turpin, DO, PL-V, Cincinnati Children's Hospital Medical Center

Significant Accomplishments

The Division of Hematology

The Division of Hematology was established in October 2010 as part of the newly formed Cancer and Blood Diseases Institute. Clinton Joiner, MD, PhD, was named division director. The division has nine faculty members and encompasses two comprehensive treatment centers for sickle cell disease and bleeding disorders. In addition, division faculty members care for numerous patients with rare blood disorders. We also have strong research collaborations with the Division of Experimental Hematology and Cancer Biology and maintain a portfolio of basic, translational and clinical research studies.

Center of Excellence in Molecular Hematology

The Divisions of Hematology and Experimental Hematology received a major award from the National Institutes of Health as a Center of Excellence in Molecular Hematology. One of six such programs in the country funded by the National Institute of Diabetes and Digestive and Kidney Diseases, the center provides core services to laboratories studying hematopoiesis and blood disorders, as well as enrichment programs and pilot funding to facilitate hematology research. Funding for the center exceeds $3.5 million over five years. Clinton Joiner, MD, PhD, serves as codirector of the center.

National and International Faculty Activities

The national and international reputations of the hematology faculty are reflected in their professional activities. Clinton Joiner, MD, PhD, was invited to present a plenary address to the First Global Conference

on Sickle Cell Disease in Accra, Ghana, in July 2010. Joseph Palumbo, MD, was an invited speaker at the 10th International Congress on Inflammation in Paris in June 2011 and at the national meeting of the Federation of American Societies of Experimental Biology. Charles Quinn, MD, presented at World Sickle Cell Disease Awareness Day, sponsored by the Centers for Disease Control in Atlanta in June 2011. Theodosia Kalfa, MD, PhD, was invited to speak in September 2011 at an international symposium in Paris organized by the French Institut National de la Transfusion Sanguine.

Division Publications

1. Akunuru S, Palumbo J, Zhai QJ, Zheng Y. **Rac1 targeting suppresses human non-small cell lung adenocarcinoma cancer stem cell activity**. *PLoS One*. 2011; 6:e16951.
2. Flick MJ, Chauhan AK, Frederick M, Talmage KE, Kombrinck KW, Miller W, Mullins ES, Palumbo JS, Zheng X, Esmon NL, Esmon CT, Thornton S, Becker A, Pelc LA, Di Cera E, Wagner DD, Degen JL. **The development of inflammatory joint disease is attenuated in mice expressing the anticoagulant prothrombin mutant W215A/E217A**. *Blood*. 2011; 117:6326-37.
3. Hammill AM, Risinger MA, Joiner CH, Keddache M, Kalfa TA. **Compound heterozygosity for two novel mutations in the erythrocyte protein 4.2 gene causing spherocytosis in a Caucasian patient**. *Br J Haematol*. 2011; 152:780-3.
4. Konstantinidis DG, George A, Kalfa TA. **Rac GTPases in erythroid biology**. *Transfus Clin Biol*. 2010; 17:126-30.
5. Mizukawa B, George A, Pushkaran S, Weckbach L, Kalinyak K, Heubi JE, Kalfa TA. **Cooperating G6PD mutations associated with severe neonatal hyperbilirubinemia and cholestasis**. *Pediatr Blood Cancer*. 2011; 56:840-2.
6. Perumbeti A, Malik P. **Therapy for beta-globinopathies: a brief review and determinants for successful and safe correction**. *Ann N Y Acad Sci*. 2010; 1202:36-44.
7. Swensen JJ, Agarwal AM, Esquilin JM, Swierczek S, Perumbeti A, Hussey D, Lee M, Joiner CH, Pont-Kingdon G, Lyon E, Prchal JT. **Sickle cell disease resulting from uniparental disomy in a child who inherited sickle cell trait**. *Blood*. 2010; 116:2822-5.
8. Wang W, Brugnara C, Snyder C, Wynn L, Rogers Z, Kalinyak K, Brown C, Qureshi A, Bigelow C, Neumayr L, Smith-Whitley K, Chui DH, Delahunty M, Woolson R, Steinberg M, Telen M, Kesler K. **The effects of hydroxycarbamide and magnesium on haemoglobin SC disease: results of the multi-centre CHAMPS trial**. *Br J Haematol*. 2011; 152:771-776.
9. Yang MQ, Laflamme K, Gotea V, Joiner CH, Seidel NE, Wong C, Petrykowska HM, Lichtenberg J, Lee S, Welch L, Gallagher PG, Bodine DM, Elnitski L. **Genome-wide detection of a TFIID localization element from an initial human disease mutation**. *Nucleic Acids Res*. 2011; 39:2175-87.

Grants, Contracts, and Industry Agreements

Grant and Contract Awards		Annual Direct / Project Period Direct
GRUPPO, R		
ATHNdata.Quality Counts		
American Thrombosis & Hemostasis Network		
	01/15/11-01/14/12	$18,208
Hemophilia Prevention Network		
Hemophilia Foundation of Michigan (Centers for Disease Control and Prevention)		
U01 DD 000203	10/01/97-09/29/11	$18,000

Hemophilia Compehensive Care & Prevention Core Center for Bleeding Disorders
Hemophilia Foundation of Michigan (Maternal and Child Health Bureau)
H30 MC 00015 10/01/97-05/31/11 $14,500

JOINER, C

Ohio Sickle Cell Alliance for Research - Per Patient
National Institutes of Health(New England Research Institutes)
U10 HL 083721 03/01/09-02/28/11 $9,521

Cincinnati Sickle Cell Project
Health Resources & Services Administration(Ohio Department of Health)
03130011SK0411 07/01/98-06/30/11 $117,363

Cincinnati Comprehensive Sickle Cell Center
National Institutes of Health
U54 HL 070871 04/01/08-02/29/12 $799,480

Mitchell, M	Project 3	$65,935
Joiner, C	Project 4	$247,408
Malik, P	Project 5	$247,401
Joiner, C	Scholar	$58,305
Joiner, C	Admin Core	$78,511
Malik, P	Bench-to-Bedside	$101,920

KALFA, T

Rac1 and Rac2 Guanosine Triphosphatases in Erythroid Function and Differentiation
National Institutes of Health
K08 HL 088126 02/11/08-11/30/11 $119,125

TCD with Transfusions Changing to Hydroxyurea (TWiTCH)
National Institutes of Health(St. Jude's Children's Hospital)
R01 HL 095647 08/21/09-03/15/11 $45,495

KALINYAK, K

Stroke With Transfusions Changing To Hydroxyurea
National Institutes of Health(St Jude's Children's Hospital)
U01 HL 078787 04/01/06-07/31/11 $22,633

PALUMBO, J

Mechanisms Linking Metastasis to Tumor Procoagulant and Innate Immunity
National Institutes of Health
R01 HL 085545 07/20/06-06/30/12 $242,750

QUINN, T

PFAST: Patent Foramen Ovale and Stroke in Sickle Cell Disease
Doris Duke Foundation(The University of Texas Southwestern)
11/01/10-10/31/11 $1,500

Current Year Direct $1,408,575

Industry Contracts

GRUPPO, R

Novo Nordisk Pharmaceuticals	$27,395
PTC Therapeutics Inc.	$9,240
Rho Inc.	$9,216
Grifols, Inc.	$4,047
Wyeth Pharmaceuticals	$1,566

KALINYAK, K

GlaxoSmithKline	$2,877
Novartis Pharmaceuticals	$6,160
MALIK, P.	
HemaQuest Pharmaceuticals, Inc.	$12,374
PALUMBO, J	
Novo Nordisk Pharmaceuticals	$35,435
Current Year Direct Receipts	**$108,310**
Total	**$1,516,885**