2014 Research Annual Report

Rheumatology

Division Summary

RESEARCH AND TRAINING DETAILS	
Number of Faculty	**10**
Number of Joint Appointment Faculty	**3**
Number of Research Fellows	**1**
Number of Research Students	**5**
Number of Support Personnel	**17**
Direct Annual Grant Support	**$1,877,466**
Direct Annual Industry Support	**$625,860**
Peer Reviewed Publications	**41**

CLINICAL ACTIVITIES AND TRAINING	
Number of Clinical Staff	**3**
Number of Clinical Fellows	**5**
Number of Other Students	**56**
Inpatient Encounters	**390**
Outpatient Encounters	**5,031**

Division Photo

Row 1: H Brunner, H Moncrieffe
Row 2: S Thornton, E Morgan DeWitt, J Taylor, T Ting
Row 3: J Huggins, D Lovell, A Grom, M Henrickson

Significant Accomplishments

Clinical Trials Lead to a New Medication for JIA

Daniel Lovell, MD, MPH, and Division Director Hermine Brunner, MD, MSc, lead the Pediatric Rheumatology Collaborative Study Group (PRCSG), a large research network that coordinates international clinical trials. A recent PRCSG study resulted in the regulatory approval of the interleukin-6 inhibitor, tocilizumab, for the treatment of moderately to severely active JIA by the US Food and Drug Administration as well as the European Medicines Agency. The successful completion of this trial and subsequent regulatory approval markedly increases the types of medications available to achieve inactive disease status and lessens the likelihood of longstanding disability from JIA.

Progress in detecting mechanisms leading to juvenile arthritis and its complications

Alexei Grom, MD, in collaboration the Novartis Institutes for Biomedical Research based in Switzerland, and CAGE performed whole-exome sequencing of patients with systemic juvenile arthritis (SJIA). These patients often develop macrophage activation syndrome (MAS), a severe complication of SJIA. De-novo mutations were identified that support the hypothesis that SJIA/MAS is due to alterations in genes affecting cellular assembly, morphology and function as well as cellular stress.

In collaboration with Experimental Hematology, Sherry Thornton, PhD, utilized animal models of arthritis to assess the role hemostatic factors play in the pathogenesis of arthritis. These studies identified plasminogen (and its interaction with other hemostatic factors) as a part of a mechanism explaining why joint inflammation is restricted to only some but not all joints of a patient with arthritis. This research also suggests that interventions at the level of hemostatic factors can be novel drug targets of inflammatory arthritic diseases.

Advances in the Diagnosis of Neuropsychiatric Lupus

Our Lupus Research Team co-developed and validated Pediatric Automated Neurocognitive Assessment Metrics, a PC-based software program, to serve as a screening tool for neuropsychiatric involvement in children with lupus. This research is complementary to Brunner's innovative MRI-based imaging studies performed together with the Pediatric Neuroimaging Research Center. The investigators demonstrated gray and white matter degenerative changes in children with lupus. Such neurodegeneration is especially pronounced among children with overt cognitive impairment but is also present, albeit to a lesser degree, in children with SLE who have normal cognitive function based on clinical assessment.

Research Highlights

The role hemostatic factors play in the pathogenesis of arthritis

In collaboration with Experimental Hematology, Dr. Thornton utilized animal models of arthritis to assess the role hemostatic factors play in the pathogenesis of arthritis. Differential joint involvement in rheumatoid arthritis has long been appreciated and distinct anatomical location and symmetry/asymmetry of joint disease are important metrics in differential diagnosis of various forms of arthritis. Recent studies indicate plasminogen as a key molecular determinant of inflammatory joint disease that is capable of simultaneously driving or ameliorating arthritis pathogenesis depending on the anatomical location of the joint. Thus, plasminogen (and its interaction with other hemostatic factors) has been identified as a part of a potential mechanism of localization of inflammatory arthritis to specific joints. Furthermore, clinical interventions at the level of hemostatic factors may be a useful strategy in the treatment of some, but not all inflammatory arthritic diseases.

Proof-of-Concept Study Results

The Clinical Trial Unit of the Division led by Drs. Brunner and Lovell served as the coordinating center for a proof-of-concept study that showed early initiation of aggressive therapy of juvenile idiopathic arthritis (JIA) improves the likelihood of achieving clinical inactive disease and clinical remission on medication. This clinical trial was designed by Drs. Giannini and Lovell and innovative statistical analytical techniques were employed by Dr. Huang to accurately delineate the effects of various treatment strategies.

Interdivisional Research findings link Juvennile Fibromyalgia to Adulthood

In interdivisional research with Psychology, Drs. Ting and Kashikar-Zuck recently showed that children and adolescents with Juvenile Fibromyalgia (JFM) have a high likelihood of continued fibromyalgia symptoms into young adulthood with ongoing physical and emotional impairment+, suggesting the condition may be chronic.

Non-Medical Factors Can Reliably Predict HRQOL

Collaboration with researchers of the Division of Psychology provided strong evidence that various non-medical factors can reliably predict health-related quality of life (HRQOL) levels of children with JIA. A finding with particularly high clinical relevance is that child self-efficacy and social support are strongly associated with child-reported HRQOL. This study provides evidence that optimal disease management of JIA can only be brought about by effective drug therapy accompanied by comprehensive medical care and education of the families as well as the affected children.

Pediatric Rheumatology Care and Outcomes Improvement Network improves remission rates

The Pediatric Rheumatology Care and Outcomes Improvement Network (PR-COIN) is a multi-center quality improvement collaborative with the mission to dramatically improve the outcomes of children with JIA. PR-COIN is coordinated by The Anderson Center for Health Systems Excellence, with leadership from the Division of Rheumatology faculty (Principal Investigator, Dr. Morgan DeWitt. This growing network of 13 sites

has a shared registry that includes over 1,400 patients with JIA who have over 7,000 clinical encounters recorded. This database allows teams to track performance on quality measures of care and guide interventions for improved delivery of care. This past year PR-COIN has shown demonstrable improvement in increasing remission rates in children with JIA on medication by 10% over baseline rates.

Ultrasound in Pediatric Rheumatology

In the past year, Clinical Co-Director, Dr. Tracy Ting, has obtained certification in musculoskeletal ultrasound (MSUS) through the American College of Rheumatology. MSUS has many advantages over other imaging modalities, including its relative cost-effectiveness and its mobility, making it instantly accessible at a patient's bedside. It is an emerging area of study in pediatric musculoskeletal diseases with wide ranging implications in improving the care of children with arthritis and similar conditions. Because MSUS substantially improves diagnostic and therapeutic capabilities, it opens research opportunities for the Division of Rheumatology and CCHMC.

Significant Publications

Gitelman DR, Klein-Gitelman MS, Ying J, Sagcal-Gironella AC, Zelko F, Beebe DW, Difrancesco M, Parrish T, Hummel J, Beckwith T, **Brunner HI**. Brain morphometric changes associated with childhood-onset systemic lupus erythematosus and neurocognitive deficit. *Arthritis Rheum*. 2013 65(8):2190-00.

This study provides initial evidence there are morphologic changes in the gray and white matter of children with lupus, irrespective of the presence of clinically overt neuropsychiatric lupus. Brain degenerative changes correlate with cognitive ability. This information can be exploited as an imaging biomarker for neuropsychiatric lupus in children.

Seid M, Huang B, Niehaus S, Brunner HI, **Lovell, DJ**. Determinants of health-related quality of life in children newly diagnosed with juvenile idiopathic arthritis. *Arthritis Care Res (Hoboken)*. 2014 66(2):263-9.

This study identified there are many determinants of health-related quality of life in children newly diagnosed with juvenile idiopathic arthritis only some of which directly related to the JIA. This suggests, to maximally improve health-related quality of life in these patients, the treatment needs to be multifactorial and not just JIA specific.

Wallace CA, Giannini EH, Spalding SJ, Hashkes PJ, O'Neil KM, Zeft AS, Szer IS, Ringold S, Brunner HI, Schanberg LE, **Lovell DJ**. Clinically Inactive Disease in a Cohort of Children with New-onset Polyarticular Juvenile Idiopathic Arthritis Treated with Early Aggressive Therapy: Time to Achievement, Total Duration, and Predictors. *J Rheumatol*. 2014 41(6):1163-70.

This publication provides qualitative data, from the first trial in JIA with clinical inactive disease as the primary outcome as to the frequency and time spent in clinical inactive disease in each of the treatment arms, further establishing the importance of early aggressive therapy in JIA.

Division Publications

1. Ardoin SP, Schanberg LE, Sandborg CI, Barnhart HX, Evans GW, Yow E, Mieszkalski KL, Ilowite NT, Eberhard A, Imundo LF, Kimura Y, Levy D, von Scheven E, Silverman E, Bowyer SL, Punaro L, Singer NG, Sherry DD, McCurdy DK, Klein-Gitelman M, Wallace C, Silver RM, Wagner-Weiner L, Higgins GC, Brunner HI, Jung L, Soep JB, Reed AM, Thompson SD, investigators A. **Secondary analysis of APPLE study suggests atorvastatin may reduce atherosclerosis progression in pubertal lupus patients with higher C reactive protein**. *Ann Rheum Dis*. 2014; 73:557-66.
2. Bernatsky S, Clarke AE, Labrecque J, von Scheven E, Schanberg LE, Silverman ED, Brunner HI, Haines

KA, Cron RQ, O'Neil KM, Oen K, Rosenberg AM, Duffy CM, Joseph L, Lee JL, Kale M, Turnbull EM, Ramsey-Goldman R. **Cancer risk in childhood-onset systemic lupus**. *Arthritis Res Ther*. 2013; 15:R198.

3. Chu Z, LaSance K, Blanco V, Kwon CH, Kaur B, Frederick M, Thornton S, Lemen L, Qi X. **In vivo optical imaging of brain tumors and arthritis using fluorescent SapC-DOPS nanovesicles**. *J Vis Exp*. 2014; .
4. DeWitt EM. **Outcomes research in childhood autoimmune diseases**. *Rheum Dis Clin North Am*. 2013; 39:921-33.
5. DeWitt EM, Brunner HI. **The landscape of comparative effectiveness research in rheumatology**. *Nat Rev Rheumatol*. 2014; 10:57-62.
6. El-hallak M, Lovell D. **Pachydermodactyly mimicking juvenile idiopathic arthritis**. *Arthritis Rheum*. 2013; 65:2736.
7. Gitelman DR, Klein-Gitelman MS, Ying J, Sagcal-Gironella AC, Zelko F, Beebe DW, Difrancesco M, Parrish T, Hummel J, Beckwith T, Brunner HI. **Brain morphometric changes associated with childhood-onset systemic lupus erythematosus and neurocognitive deficit**. *Arthritis Rheum*. 2013; 65:2190-200.
8. Gorelik M, Fall N, Altaye M, Barnes MG, Thompson SD, Grom AA, Hirsch R. **Follistatin-like protein 1 and the ferritin/erythrocyte sedimentation rate ratio are potential biomarkers for dysregulated gene expression and macrophage activation syndrome in systemic juvenile idiopathic arthritis**. *J Rheumatol*. 2013; 40:1191-9.
9. Grom AA. **Juvenile Idiopathic Arthritis: Genetics**. In: I MacKay, N Rose, B Diamond, A Davidson, eds. *Encyclopedia of Medical Immunology*. New York: Springer-Verlag; 2013.
10. Hahn A, Ting TV, Taylor J, Frenck RW, Jr.. **Polyarthritis in a 19-year-old female with systemic lupus erythematosus**. *Clin Pediatr (Phila)*. 2013; 52:991-3.
11. Hashkes PJ, Spalding SJ, Hajj-Ali R, Giannini EH, Johnson A, Barron KS, Weisman MH, Pashinian N, Reiff AO, Samuels J. **The Effect of Rilonacept versus Placebo on Health-Related Quality of Life in Patients with Poorly Controlled Familial Mediterranean Fever**. *BioMed Research International*. 2014; 2014.
12. Hays RD, Spritzer KL, Amtmann D, Lai JS, Dewitt EM, Rothrock N, Dewalt DA, Riley WT, Fries JF, Krishnan E. **Upper-extremity and mobility subdomains from the Patient-Reported Outcomes Measurement Information System (PROMIS) adult physical functioning item bank**. *Arch Phys Med Rehabil*. 2013; 94:2291-6.
13. Hollander MC, Sage JM, Greenler AJ, Pendl J, Avcin T, Espada G, Beresford MW, Henrickson M, Lee TL, Punaro M, Huggins J, Stevens AM, Klein-Gitelman MS, Brunner HI. **International consensus for provisions of quality-driven care in childhood-onset systemic lupus erythematosus**. *Arthritis Care Res (Hoboken)*. 2013; 65:1416-23.
14. Huang B, Giannini EH, Lovell DJ, Ding L, Liu Y, Hashkes PJ. **Enhancing crossover trial design for rare diseases: Limiting ineffective exposure and increasing study power by enabling patient choice to escape early**. *Contemp Clin Trials*. 2014; 38:204-212.
15. Joffe NE, Lynch-Jordan A, Ting TV, Arnold LM, Hashkes PJ, Lovell DJ, Passo MH, Powers SW, Schikler KN, Kashikar-Zuck S. **Utility of the PedsQL rheumatology module as an outcome measure in juvenile fibromyalgia**. *Arthritis Care Res (Hoboken)*. 2013; 65:1820-7.
16. Kashikar-Zuck S, Cunningham N, Sil S, Bromberg MH, Lynch-Jordan AM, Strotman D, Peugh J, Noll J, Ting TV, Powers SW, Lovell DJ, Arnold LM. **Long-term outcomes of adolescents with juvenile-onset fibromyalgia in early adulthood**. *Pediatrics*. 2014; 133:e592-600.
17. Kashikar-Zuck S, Ting TV. **Juvenile fibromyalgia: current status of research and future developments**. *Nat Rev Rheumatol*. 2014; 10:89-96.
18. Kashikar-Zuck S, Zafar M, Barnett KA, Aylward BS, Strotman D, Slater SK, Allen JR, Lecates SL,

Kabbouche MA, Ting TV, Hershey AD, Powers SW. **Quality of life and emotional functioning in youth with chronic migraine and juvenile fibromyalgia**. *Clin J Pain*. 2013; 29:1066-72.
19. Lai JS, Stucky BD, Thissen D, Varni JW, DeWitt EM, Irwin DE, Yeatts KB, DeWalt DA. **Development and psychometric properties of the PROMIS((R)) pediatric fatigue item banks**. *Qual Life Res*. 2013; 22:2417-27.
20. Lipstein EA, Brinkman WB, Sage J, Lannon CM, Morgan Dewitt E. **Understanding treatment decision making in juvenile idiopathic arthritis: a qualitative assessment**. *Pediatr Rheumatol Online J*. 2013; 11:34.
21. Lovell D, Ruperto N, Brunner H, Martini A. **Biologics in paediatric rheumatic disease**. In: RA Watts, P Conaghan, eds. *Oxford Textbook of Rheumatology*. Oxford: Oxford University Press; 2013:650-656.
22. Lovell DJ, Giannini EH, Reiff AO, Kimura Y, Li S, Hashkes PJ, Wallace CA, Onel KB, Foell D, Wu R, Biedermann S, Hamilton JD, Radin AR. **Long-term safety and efficacy of rilonacept in patients with systemic juvenile idiopathic arthritis**. *Arthritis Rheum*. 2013; 65:2486-96.
23. Lovell DJ, Ruperto N, Giannini EH, Martini A. **Advances from clinical trials in juvenile idiopathic arthritis**. *Nat Rev Rheumatol*. 2013; 9:557-63.
24. Miller FW, Cooper RG, Vencovsky J, Rider LG, Danko K, Wedderburn LR, Lundberg IE, Pachman LM, Reed AM, Ytterberg SR, Padyukov L, Selva-O'Callaghan A, Radstake TR, Isenberg DA, Chinoy H, Ollier WE, O'Hanlon TP, Peng B, Lee A, Lamb JA, Chen W, Amos CI, Gregersen PK, Myositis Genetics C. **Genome-wide association study of dermatomyositis reveals genetic overlap with other autoimmune disorders**. *Arthritis Rheum*. 2013; 65:3239-47.
25. Mina R, Brunner HI. **Update on differences between childhood-onset and adult-onset systemic lupus erythematosus**. *Arthritis Res Ther*. 2013; 15:218.
26. Mina R, Klein-Gitelman MS, Nelson S, Eberhard BA, Higgins G, Singer NG, Onel K, Tucker L, O'Neil KM, Punaro M, Levy DM, Haines K, Martini A, Ruperto N, Lovell D, Brunner HI. **Validation of the systemic lupus erythematosus responder index for use in juvenile-onset systemic lupus erythematosus**. *Ann Rheum Dis*. 2014; 73:401-6.
27. Morgan DeWitt M, Rothrock PhD N, Crane M, Paul K, Forrest M, Christopher B. **Advances in Patient Reported Outcomes: The NIH PROMIS Measures**. *eGEMs (Generating Evidence & Methods to improve patient outcomes)*. 2013; 1:12.
28. Nigrovic PA, Muscal E, Riebschleger M, Moorthy LN, Brunner HI, Eberhard BA, Klein-Gitelman M, Prahalad S, Schneider R. **AMIGO: a novel approach to the mentorship gap in pediatric rheumatology**. *J Pediatr*. 2014; 164:226-7 e1-3.
29. Patwardhan A, Henrickson M, Laskosz L, Duyenhong S, Spencer CH. **Current pediatric rheumatology fellowship training in the United States: what fellows actually do**. *Pediatr Rheumatol Online J*. 2014; 12:8.
30. Raghu H, Jone A, Cruz C, Rewerts CL, Frederick MD, Thornton S, Degen JL, Flick MJ. **Plasminogen is a joint-specific positive or negative determinant of arthritis pathogenesis in mice**. *Arthritis Rheumatol*. 2014; 66:1504-16.
31. Ringold S, Weiss PF, Beukelman T, Dewitt EM, Ilowite NT, Kimura Y, Laxer RM, Lovell DJ, Nigrovic PA, Robinson AB, Vehe RK, American College of R. **2013 update of the 2011 American College of Rheumatology recommendations for the treatment of juvenile idiopathic arthritis: recommendations for the medical therapy of children with systemic juvenile idiopathic arthritis and tuberculosis screening among children receiving biologic medications**. *Arthritis Care Res (Hoboken)*. 2013; 65:1551-63.
32. Ringold S, Weiss PF, Beukelman T, DeWitt EM, Ilowite NT, Kimura Y, Laxer RM, Lovell DJ, Nigrovic PA,

Robinson AB, Vehe RK, American Collge of R. **2013 update of the 2011 American College of Rheumatology recommendations for the treatment of juvenile idiopathic arthritis: recommendations for the medical therapy of children with systemic juvenile idiopathic arthritis and tuberculosis screening among children receiving biologic medications**. *Arthritis Rheum*. 2013; 65:2499-512.

33. Schulert GS, Grom AA. **Macrophage activation syndrome and cytokine-directed therapies**. *Best Pract Res Clin Rheumatol*. 2014; 28:277-292.
34. Seid M, Huang B, Niehaus S, Brunner HI, Lovell DJ. **Determinants of health-related quality of life in children newly diagnosed with juvenile idiopathic arthritis**. *Arthritis Care Res (Hoboken)*. 2014; 66:263-9.
35. Ting TV. **Diagnosis and management of cutaneous vasculitis in children**. *Pediatr Clin North Am*. 2014; 61:321-46.
36. Varni JW, Thissen D, Stucky BD, Liu Y, Magnus B, Quinn H, Irwin DE, DeWitt EM, Lai JS, Amtmann D, Gross HE, DeWalt DA. **PROMIS(R) Parent Proxy Report Scales for children ages 5-7 years: an item response theory analysis of differential item functioning across age groups**. *Qual Life Res*. 2014; 23:349-61.
37. Vega-Fernandez P, Zelko FA, Klein-Gitelman M, Lee J, Hummel J, Nelson S, Thomas EC, Ying J, Beebe DW, Brunner HI. **Value of questionnaire-based screening as a proxy for neurocognitive testing in childhood-onset systemic lupus erythematosus**. *Arthritis Care Res (Hoboken)*. 2014; 66:943-8.
38. Verkamp EK, Flowers SR, Lynch-Jordan AM, Taylor J, Ting TV, Kashikar-Zuck S. **A survey of conventional and complementary therapies used by youth with juvenile-onset fibromyalgia**. *Pain Manag Nurs*. 2013; 14:e244-50.
39. Wallace CA, Giannini EH, Spalding SJ, Hashkes PJ, O'Neil KM, Zeft AS, Szer IS, Ringold S, Brunner HI, Schanberg LE, Sundel RP, Milojevic DS, Punaro MG, Chira P, Gottlieb BS, Higgins GC, Ilowite NT, Kimura Y, Johnson A, Huang B, Lovell DJ, Childhood A, Rheumatology Research A. **Clinically Inactive Disease in a Cohort of Children with New-onset Polyarticular Juvenile Idiopathic Arthritis Treated with Early Aggressive Therapy: Time to Achievement, Total Duration, and Predictors**. *J Rheumatol*. 2014; 41:1163-70.
40. Weaver KN, El Hallek M, Hopkin RJ, Sund KL, Henrickson M, Del Gaudio D, Yuksel A, Acar GO, Bober MB, Kim J, Boyadjiev SA. **Keutel syndrome: report of two novel MGP mutations and discussion of clinical overlap with arylsulfatase E deficiency and relapsing polychondritis**. *Am J Med Genet A*. 2014; 164A:1062-8.
41. Wojton J, Chu Z, Mathsyaraja H, Meisen WH, Denton N, Kwon CH, Chow LM, Palascak M, Franco R, Bourdeau T, Thornton S, Ostrowski MC, Kaur B, Qi X. **Systemic delivery of SapC-DOPS has antiangiogenic and antitumor effects against glioblastoma**. *Mol Ther*. 2013; 21:1517-25.

Faculty, Staff, and Trainees

Faculty Members

Hermine Brunner, MD, MSc, MBA, Professor
Leadership Division Director

Edward H. Giannini, MSc, DrPH, Adjunct
Leadership Profersor Emeritus

Alexei A. Grom, MD, Professor
Leadership Research Director

Michael Henrickson, MD, MPH, Associate Professor
Leadership Telemedicine Program Director

Jennifer Huggins, MD, Associate Professor
Leadership Fellowship and Education Program Director

Daniel Joe Lovell, MD, MPH, Professor
Leadership Joseph E. Levinson Endowed Chair in Pediatric Rheumatology; Associate Division Director; Clinic Co-Director

Rina Mina, MD, Assistant Professor
Leadership Quality Improvement Co-Leader & Transitional Service Co-Leader

Halima Moncrieffe, PhD, Instructor

Esi Morgan DeWitt, MD, MSCE, Associate Professor
Leadership Quality Improvement Operations Director

Susan Thompson, PhD, Professor
Leadership Cincinnati Rheumatic Disease Core Center Director

Sherry Thornton, PhD, Assistant Professor
Leadership Director of the Flow Cytometry Core; SURF Director

Tracy Ting, MD, Assistant Professor
Leadership Clinic Co-Director

Clinical Staff Members

- **Janalee Taylor, MSN, RN, CNS, CNP**,
  Quality Improvement Co-Leader & Transition Service Co-Leader

Trainees

- **Jordan Jones, DO**, PGY5 , University of Kansas
- **Khalid Abulaban, MD**, PGY6, Penn State Hershey Medical Center
- **Patricia Vega-Fernandez, MD**, PGY7, University of Texas Health Science Center at San Antonio, Texas
- **Michal Feldon, MD**, PGY4, Tel-Aviv University
- **Grant Schulert, MD**, PGY5, Children's Hospital at Vanderbilt

Division Collaboration

The Division of Rheumatology (Drs. Lovell, Brunner and Giannini) collaborated with Dr. Bin Huang on the analysis of quality of life and biomarker studies in juvenile arthritis. Together with the Rheumatology Clinical Trial Unit, novel trial designs were employed to minimize sample size for a trial of a novel powerful treatment of Familial Mediterranean Fever. (Hermine Brunner, MD, MSc, MBA)

Biostatistics and Epidemiology » Bin Huang, PhD

Together with Dr. Michael Seid, the Division of Rheumatology (Drs. Brunner and Lovell) studied determinants of health-related quality of life in children with juvenile idiopathic arthritis. The first Pediatric Rheumatology Care and Outcomes Improvement Network (PR-COIN) is led by Dr. Morgan-DeWitt, working closely with the Anderson Center. (Hermine Brunner, MD, MSc, MBA)

James M. Anderson Center for Health Systems Excellence » Michael Seid, PhD

There is ongoing collaborative research between Dr. Ting and Dr. Kashikar Zuck to develop evidence-based treatments for children with juvenile fibromyalgia syndromes. Dr. Brunner collaborates with Dr. Beebe on assessing cognitive changes of children with lupus. (Hermine Brunner, MD, MSc, MBA)

Behavioral Medicine and Clinical Psychology » Susmita Kashikar-Zuck, PhD and Dean Beebe, PhD, ABPP-Cn

Dr. Brunner collaborates with Drs. Bennett and Devarajan on the discovery and validation of biomarkers of lupus nephritis. (Hermine Brunner, MD, MSc, MBA)

Nephrology and Hypertension » Michael Bennett, PhD and Prasad Devarajan, MD

Dr. Brunner and Dr. Difrancesco collaboratively investigate imaging functional and structural imaging correlates of neuropsychiatric lupus. (Hermine Brunner, MD, MSc, MBA)

Radiology » Mark Difrancesco, PhD

Dr. Brunner and Dr. Witte conduct collaborative research on lupus nephritis and biomarker discovery. (Hermine Brunner, MD, MSc, MBA)

Pathology and Laboratory Medicine » David Witte, MD

Dr. Grom works with the team to identify mechanisms leading to macrophage activation syndrome. Dr. Thornton collaborates on research facilitating the assessment of Function in Sorted Dendritic Cells. (Alexei Grom, MD; Sherry L. Thornton, PhD)

Immunobiology »

Dr. Huggins and Drs. Brady and Frenck studying evidence-based approaches to optimal vaccination strategies for children with lupus. (Jennifer L. Huggins, MD)

Infectious Diseases » Rebecca Brady, MD and Robert Frenck, MD

Dr. Lovell and Grom collaborate with Dr. Thompson to determine genetic risk factors and genetic predictors of medication response with juvenile idiopathic arthritis. (Alexei A. Grom, MD; Daniel J. Lovell, MD, MPH)

Center for Autoimmune Genomics & Etiology » Susan Thompson, PhD

In collaboration with Dr. Richard Strait, Dr. Thornton studies mechanism of IgG Inhibition in Inflammatory Arthritis. (Sherry L. Thornton, PhD)

Emergency Medicine » Richard Strait, MD

Dr. Sherry Thornton explores with Dr. Matthew Flick hemostatic factors contributing to inflammatory arthritis. (Sherry L. Thornton, PhD)

Experimental Hematology » Matthew Flick, PhD

Grants, Contracts, and Industry Agreements

Grant and Contract Awards — Annual Direct

BRUNNER, H

Childhood Arthritis and Research Alliance
Arthritis Foundation(Duke University)

5554_CARRA 07/05/13-03/01/14 $500

Childhood Arthritis and Research Alliance Registry
Lupus Foundation(Duke University)
5590_CARRA 07/05/13-09/27/13 $115

Childhood Arthritis and Rheumatology Research Alliance
Arthritis Foundation(Duke University)
5686_CARRA 09/01/12-08/31/15 $800

Innovative Efficacy Measures of Lupus Nephritis Therapies
National Institutes of Health
U01 AR 065098 07/26/13-06/30/16 $148,838

Standardizing and Optimizing Childhood Lupus Nephritis
Arthritis Foundation(The Univ of California, San Francisco)
A120939 03/01/13-02/28/15 $7,654

GROM, A

MUNC13-4 gene Polymorphisms in Macrophage Activation Syndrome and Systemic Juvenile Idiopathic Arthritis
National Institutes of Health
R01 AR 059049 08/08/11-07/31/16 $213,750

HUGGINS, J

ACR REF/Amgen Rheumatology Fellowship Training Award
Rheumatology Research Foundation
07/01/13-06/30/14 $25,000

KAUFMAN, K

Reverse Genomics of Anti-Protective Antigen Response
National Institutes of Health(Oklahoma Medical Research Foundation)
U19 AI 062629 09/01/11-08/31/14 $30,108

MONCRIEFFE, H

AAI Early Career Faculty Travel Grant
American Association of Immunologists
05/02/14-06/01/14 $1,250

MORGAN DEWITT, E

Enhancing PROMIS in Pediatric Pain, Rheumatology, and Rehabilitation Research
National Institutes of Health
U01 AR 057940 09/30/09-07/31/14 $52,716

THOMPSON, S

Cincinnati Rheumatic Disease Core Center
National Institutes of Health
P30 AR 047363 08/25/11-06/30/16 $371,792

Flick, M	Core 2	$45,687	
Thornton, S	Core 3	$51,212	
Wagner, M	Core 4	$56,958	
Moncrieffe, H	P&F	$20,644	
Flick, M	P&F	$30,000	

Exome Sequencing Studies in Juvenile Idiopathic Arthritis
Arthritis Foundation

	01/01/13-12/31/14		$92,593

Gene Expression In Pediatric Arthritis
National Institutes of Health

P01 AR 048929	09/01/11-08/31/16		$932,350
Harley, J	Project 1	$50,199	
Lovell, D	Project 2	$39,408	
Grom, A	Project 4	$88,108	
Wagner, M	Core B	$180,911	

Current Year Direct **$1,877,466**

Industry Contracts

BRUNNER, H

Abbott Laboratories	$12,569
Centocor, Inc	$13,756
Eli Lilly and Company	$15,417
GlaxoSmithKline	$8,655
UCB Pharma, Inc	$44,380

HUGGINS, J

Genentech, Inc.	$8,393

LOVELL, D

Astrazeneca	$2,114
Bristol -Myers Squibb	$242,227
Centocor, Inc	$51,937
Genentech, Inc.	$61,668

Novartis Pharmaceuticals		$120,137
Roche Laboratories, Inc		$44,607
	Current Year Direct Receipts	**$625,860**
	Total	**$2,503,326**