

Curriculum Vitae/Bibliography

Douglas A. Plager, Ph.D.

Education

| | | | |
|-------------------------------|--------------------|----------------------------------|-----------|
| Chemistry (Mathematics minor) | B.S. | Winona State Univ., Winona, MN | 1983-1988 |
| Biochemistry | Ph.D. | Univ. of Minnesota, St. Paul, MN | 1988-1994 |
| Immunology / Derm. / Allergy | Research Fellow | Mayo Clinic, Rochester, MN | 1995-2001 |
| Immunology / Derm. / Allergy | Research Associate | Mayo Clinic, Rochester, MN | 2002-2011 |

Honors/Awards

Graduate

| | |
|---|-----------|
| U of MN Graduate School Fellowship | 1988-1989 |
| U of MN Biochemistry Departmental Fellowship | 1988-1991 |
| Molecular Biophysics Training Grant | 1989-1992 |
| Vice President – U of MN Biochemistry Graduate Students | 1991-1992 |

Post-Doctoral

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|---|-----------|
| Allergic Diseases Training Grant | 1996-1999 |
| Dermatology Foundation Research Grant | 2002 |
| Dr. Smith H. and Lucille Gibson Postdoctoral Research Fellowship in Dermatology | 2002-2005 |

Previous Professional Positions and Major Appointments

Academic

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|---|-----------|
| Assistant Professor of Dermatology, Mayo Clinic | 2002-2011 |
| Instructor, Department of Immunology, Mayo Clinic | 2004-2010 |

Research

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| Research Associate, Department of Dermatology, Mayo Clinic | 2002-2011 |
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Professional Memberships and Societies

| | | |
|---|---------------|-----------|
| <i>Journal of Leukocyte Biology</i> | reviewer (15) | 1999-2010 |
| National Eczema Association | member | 1999-2010 |
| American Association of Immunologists (AAI) | member | 1999-2010 |
| The Society for Investigative Dermatology (SID) | member | 2000-2010 |
| <i>Annals of Allergy, Asthma & Immunology</i> | reviewer (9) | 2002-2010 |
| Dermatology Foundation | member | 2003-2009 |
| <i>Journal of Investigative Dermatology</i> | reviewer (1) | 2003 |
| <i>International Journal of Dermatology</i> | reviewer (3) | 2003-2006 |
| <i>Genes and Immunity</i> | reviewer (1) | 2004 |
| <i>American Journal of Respiratory Cell and Molecular Biology</i> | reviewer (1) | 2005 |
| <i>Journal of Immunological Methods</i> | reviewer (1) | 2007 |
| <i>Cellular and Molecular Life Sciences</i> | reviewer (1) | 2007 |
| <i>Veterinary Dermatology</i> | reviewer (4) | 2007-2010 |
| <i>American Journal of Pathology</i> | reviewer (1) | 2007 |
| <i>Journal of Immunology</i> | reviewer (1) | 2008 |

Educational Activities

Teaching

| | | |
|--|-------------|---|
| Current Topics in Hypersensitivity Reactions (Imm 8867) – topic coord./presenter | Mayo Clinic | 2003-2010 |
| Dermatology Research Conference – co-supervisor | Mayo Clinic | 2003-2010 |
| Clinical Research Protocol Development (CR 5600) – protocol reviewer | Mayo Clinic | Fall 2003 |
| Infection and Immunopathology (Imm 8880) – co-instructor | Mayo Clinic | Spring 2005 Spring 2007 Spring 2009 |
| Mayo Graduate School Student Symposium – poster judge | Mayo Clinic | 2005, 2006 |
| 2006 Immunology Written Qualifying Exam – questions submitter/grader | Mayo Clinic | Summer 2006 |
| Current Topics in Hypersensitivity Reactions (Imm 8867) – co-instructor | Mayo Clinic | 2009-2010 |

MentoringFormal:

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|--------------------------|--------------|--|-------------------|
| Rebecca H. Chia | Mayo Clinic | high school mentorship - research | 2/2000 - 6/2000 |
| Joshua R. Blomberg | Mayo Clinic | undergraduate research | 5/2001 - 8/2001 |
| Sandra Nogueira, DVM, MS | U of MN-VMED | graduate student grant writing competition | 4/2003 (winner) |
| Arvind Madaan, MD | Mayo Clinic | Allergy resident research | 11/2003 - 6/2004 |
| Robert M. Mocharla | Mayo Clinic | Summer Undergraduate Research Fellow | 6/2005 - 8/2005 |
| Hesham Ahmed Nada, MBChB | Mayo Clinic | Dermatology research fellow | 11/2005 - 5/2008 |
| Abraham Mohsen Bagheri | Mayo Clinic | Summer Undergraduate Research Fellow | 6/2006 - 8/2006 |
| David L.K. Chen | Mayo Clinic | Summer Mentored Undergrad. Res. Fellow | 6/2006 - 8/2006 |
| Carrie E. Price | Mayo Clinic | high school mentorship - research | 11/2006 - 2/2007 |
| Fima Macheret | Mayo Clinic | medical student research | 11/2006 - 10/2007 |

Informal:

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|---------------------------------|-----------------------|------------------------------------|-----------|
| Physician/Fellow/Technician | Mayo Clinic / U of MN | collaboration, training | 1995-2013 |
| Rochester Regional Science Fair | Rochester Pub. Sch. | judging | 1998-2014 |
| Laura J.B. Davis, MD | Mayo Clinic | research | 2004 |
| Govind Rajagopalan, PhD | Mayo Clinic | IACUC protocol development | 2005 |
| Brad W. Wilkins, PhD | Mayo Clinic | IRB protocol development (#142-05) | 2005 |
| Jun Lu, MD | Mayo Clinic | research protocol development | 2007 |
| Armin Farajzadeh Deroee, MD | Mayo Clinic | research project development | 2009 |

Education Scholarship

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|---|-------------|---------------------|-----------|
| Core Immunology Course | Mayo Clinic | student | 1995 |
| Dermatology Research Conference | Mayo Clinic | presenter, attendee | 1995-2010 |
| Current Topics in Hypersensitivity Reactions (Imm 8867) | Mayo Clinic | presenter, attendee | 1995-2010 |
| Research Orientation, CALD Module I-D | Mayo Clinic | attendee | 2009 |

Departmental/Institutional Memberships and Activities

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|--|-----------|
| Mayo Clinic Department of Dermatology Research Committee – member | 2000-2010 |
| Mayo Clinic Department of Dermatology Atopic Dermatitis Group – chair | 2003-2010 |
| Mayo Clinic Department of Dermatology Cutaneous Lymphoma Group – member | 2004-2010 |
| University of Minnesota, College of Veterinary Medicine – affiliate member/advising graduate faculty | 2004-2009 |
| Mayo Clinic, NIAID T32 Training Grant in Allergic Diseases – faculty | 2004-2010 |
| Mayo Clinic College of Medicine, Immunology – graduate faculty teaching/examining privileges | 2004-2010 |
| Mayo Clinic Translational Immunovirology and Biodefense (TIB) Program – participant | 2004-2007 |
| Mayo Clinic Dermatology Research Unit – Scientific Director | 2007-2010 |
| Mayo Clinic Center for Translational Science Activities (CTSA) – associate member | 2009 |
| Mayo Clinic Health Solutions – consultant (Dr. G. Sarkar project) | 2009 |

Presentations at Regional, National, and International Meetings

1. P Gomes, SM Torres, DA Plager, JJ Lee (2013). Comparison of three staining methods to identify eosinophils in formalin-fixed canine skin. Oral presentation at the North American Veterinary Dermatology Forum.
2. GJ Gleich, DA Plager, KM Leiferman (2009). Eosinophil ribonucleases and their cutaneous lesion-forming activity. Oral presentation at Eosinophils 2009, 6th Biennial International Symposium of the International Eosinophil Society.
3. H Kita, JL Checkel, K Iijima, S Radhakrishnan, VP Van Keulen, BJ McClimon, T Kobayashi, DA Plager, LR Pease (2009). Allergen-specific IgE, IgG, and Th2-type cytokine responses are effectively downregulated by immunotherapy with the novel dendritic cell (DC)-stimulating antibody, B7-DC XAb. Oral presentation at the American Academy of Allergy, Asthma, and Immunology Conference.
4. LM Benson, CJ Mason, O Friedman, H Kita, HR Bergen III, DA Plager (2008). Extensive fractionation and identification of proteins within nasal lavage fluids from allergic rhinitis and asthmatic chronic rhinosinusitis patients. Poster presentation at the 56th ASMS Conference on Mass Spectrometry.

5. AM Bagheri, GM Kephart, S Radhakrishnan, LR Pease, DA Plager (2006). Human-derived B7-DC cross-linking antibody (XAb) modulates canine dendritic cell function. Poster presentation at Annual Biomedical Research Conference for Minority Students.
6. DA Plager, SA Henke, Y Matsuwaki, A Madaan, DL Squillace, RA Dierkhising, A Parneix-Spake, H Kita (2006). Pimecrolimus reduces calcium-dependent eosinophil activation. Poster presentation at The Society for Investigative Dermatology Conference.
7. DA Plager, DA Loegering, JL Checkel, J Tang, GM Kephart, PL Caffes, CR Adolphson, LE Ohnuki, GJ Gleich (2006). Major basic protein homolog (MBP2): A specific human eosinophil marker. Poster presentation at the American Academy of Allergy, Asthma, and Immunology Conference.
8. KR Bartemes, K Iijima, DA Plager, H Kita (2005). Unique gene expression response to the fungus *Alternaria* in a mouse model of innate immunity. Oral presentation at the 4th Biennial Congress of the International Eosinophil Society.
9. LJB Davis, J Ponikau, DA Sherris, DA Plager, H Kita (2004). Gene microarray analysis of CD4-positive T cells in chronic rhinosinusitis (CRS). Poster presentation at the American Academy of Allergy, Asthma, and Immunology Conference.
10. DA Plager, EA Weiss, V Van Keulen, GM Kephart, J Checkel, GJ Gleich, KM Leiferman (2000). Identification of a novel marker for human basophils in tissues. Poster presentation at The Society for Investigative Dermatology Conference.
11. DA Plager, DA Weiler, DA Loegering, LL Haley, RL Eddy, TB Shows, GJ Gleich (2000). Comparison of structure and chromosome location of the human eosinophil major basic protein genes. Poster symposium presentation at the American Academy of Allergy, Asthma, and Immunology Conference.
12. DL Squillace, JL Checkel, DA Loegering, DA Plager, GJ Gleich (2000). Measurement of the eosinophil peroxidase by immunoassay. Poster presentation at the American Academy of Allergy, Asthma, and Immunology Conference.
13. DA Plager, DA Loegering, DA Weiler, JL Checkel, JM Wagner, NJ Clark, S Naylor, SM Page, LL Thomas, I Akerblom, B Cocks, S Stuart, GJ Gleich (1999). A homolog of human eosinophil major basic protein. Oral presentation at the Experimental Biology '99 Conference.
14. DA Plager, JM Wagner, DA Weiler, MDP Davis, GJ Gleich, KM Leiferman (1997). Differential gene expression in atopic dermatitis. Poster presentation at The Society for Investigative Dermatology Conference.
15. DA Plager, GL Nelsestuen (1994). Direct enthalpy measurements for two classes of Ca^{2+} -dependent peripheral membrane-binding proteins. Poster presentation at The Protein Society Conference.
16. DA Plager, GL Nelsestuen (1991). Effect of high pressure on several classes of membrane-binding proteins. Oral presentation at the Biophysical Society Conference.

Research Grants Awarded

Dermatology Foundation Research Grant, 2002

Plager (PI)

7/2002 – 7/2003

Title: Gene Transcript Profiles in Atopic Dermatitis

High-density oligonucleotide microarray analyses will be used to identify early cutaneous gene transcription changes characteristic of naturally-occurring atopic dermatitis, which represent potential therapeutic targets.

Role: Principal Investigator (PI)

Novartis Pharmaceuticals research grant

Kita (PI)

2/2004 – 8/2004

Title: Modulation of Human Eosinophil Survival and Function by Pimecrolimus

Pimecrolimus, the active compound for the treatment of atopic dermatitis in the topical medication Elidel®, will be tested for its effect on human eosinophil survival and function.

Role: Co-Investigator

Small Companion Animal Grant

Nogueira (PI)

2004

University of Minnesota, College of Veterinary Medicine

Title: Anti-Canine Eosinophil Major Basic Protein Polyclonal Antibody Production

Major basic protein, a component of canine eosinophil secondary granules, will be purified to allow generation of a polyclonal antibody capable of detecting eosinophil degranulation within canine tissues. Subsequent use of this reagent includes immunohistochemical analysis of skin from dogs with atopic dermatitis for the presence of eosinophil degranulation.

Role: Co-PI

R21 AI058208-01

Plager (PI)

4/2004 – 3/2006

NIH/NIAID

(NCE to 3/2008)

Title: Global Gene Expression in Chronic Rhinosinusitis

The goal of this project is to apply new technologies to the study of NIAID-funded research. Specifically, high-density oligonucleotide microarray and mass spectrometry analyses will be used to broadly screen nasosinus specimens from chronic rhinosinusitis, allergic rhinitis, and healthy subjects to identify gene expression differences that lead to the chronic, debilitating nature of chronic rhinosinusitis.

Role: PI

Minnesota Partnership for Biotechnology and Medical Genomics

Plager (Co-PI)

7/2007 – 6/2009

Title: Therapeutic Targets for Atopic Dermatitis

(NCE to 3/2011)

Our overall hypothesis is that pathologic and molecular comparisons of human and canine atopic dermatitis will lead to a key canine model of human atopic dermatitis. The activity of B7-DC crosslinking antibody (XAb) on canine dendritic cells *in vitro* and on canines with atopic dermatitis *in vivo* will be assessed. Also, the cutaneous gene transcript profile of canine atopic dermatitis will be generated using high-density oligonucleotide microarrays, and this profile will be compared to that of human atopic dermatitis.

Role: Co-PI

Patents

No patents to date.

Included on the Mayo Clinic Invention Disclosure and Assignment Records for:

- 1) Eosinophil-activating *Alternaria*-derived molecule,
- 2) Basophil-specific monoclonal antibody (1996-109),
- 3) Major basic protein-2 as a specific marker of human eosinophils (2005-174)
- 4) Eosinophil lysates for MBP1 and MBP2 Proteins (2007-284)
- 5) Human Charcot-Leyden crystal protein/Galectin-10 assays (2008-211)

Short-term license of various human eosinophil-related proteins and antibodies to Hycult Biotechnology in 2008.

Licensed J196-1C8 monoclonal antibody (2005-174) to MedImmune in 2009.

Licensed J175-7D4-B2 monoclonal antibody (1996-109) to BioLegend in 2009.

Bibliography

Peer-reviewed Articles

1. P Gomes, SM Torres, DA Plager, CR Jessen, JJ Lee (2013) *Vet. Dermatol.* 24:323-328. Comparison of three staining methods to identify eosinophils in formalin-fixed canine skin.
2. DA Plager, SM Torres, SN Koch, H Kita (2012) *Vet. Immunol. Immunopathol.* 149:136-142. Gene transcription abnormalities in canine atopic dermatitis and related human eosinophilic allergic diseases.
3. DA Plager, JC Kahl, Y Asmann, AE Nilson, JF Pallanch, O Friedman, H Kita (2010) *PLoS ONE* 5:e11450. Gene transcription changes in asthmatic chronic rhinosinusitis with nasal polyps and comparison to those in atopic dermatitis.
4. DA Plager, MDP Davis, AG Andrews, MJ Coenen, TJ George, GJ Gleich, KM Leiferman (2009) *J. Immunol.* 183:4013-4020. Eosinophil ribonucleases and their cutaneous lesion-forming activity.
5. DA Plager, SA Henke, Y Matsuwaki, A Madaan, DL Squillace, RA Dierkhising, H Kita (2009) *Int. Arch. Allergy Imm.* 149:119-126. Pimecrolimus reduces eosinophil activation associated with calcium mobilization.

6. LM Benson, CJ Mason, O Friedman, H Kita, HR Bergen III, DA Plager (2009) *J. Sep. Sci.* 32:44-56. Extensive fractionation and identification of proteins within nasal lavage fluids from allergic rhinitis and asthmatic chronic rhinosinusitis patients.
7. DA Plager, AA Leontovich, SA Henke, MDP Davis, MT McEvoy, GF Sciallis, MR Pittelkow (2007) *Exp. Dermatol.* 16:28-36. Early cutaneous gene transcription changes in adult atopic dermatitis and potential clinical implications.
8. DA Plager, DA Loegering, JL Checkel, J Tang, GM Kephart, PL Caffes, CR Adolphson, LE Ohnuki, GJ Gleich (2006) *J. Immunol.* 177:7340-7345. Major basic protein homolog (MBP2): A specific human eosinophil marker.
9. DA Plager, GM Kephart, EA Weiss, RM Mocharla, R Matsumoto, JL Checkel, GJ Gleich, KM Leiferman (2006) *J. Allergy Clin. Immunol.* 117:626-634. Identification of basophils by a monoclonal antibody directed against pro-major basic protein-1.
10. LE Ohnuki, LA Wagner, A Georgelas, DA Loegering, JL Checkel, DA Plager, GJ Gleich (2005) *J. Immunol. Methods* 307:54-61. Differential extraction of eosinophil granule proteins.
11. DA Plager / MDP Davis, TJ George, EA Weiss, GJ Gleich, KM Leiferman (2003) *J. Allergy Clin. Immunol.* 112:988-994. Interactions of eosinophil granule proteins with skin: Limits of detection, persistence, and vasopermeabilization. (Editor's Choice selection)
12. DA Plager, DA Weiler, DA Loegering, WB Johnson, L Haley, RL Eddy, TB Shows, GJ Gleich (2001) *Genomics* 71:271-281. Comparative structure, proximal promoter elements, and chromosome location of the human eosinophil major basic protein genes.
13. DA Plager, DA Loegering, DA Weiler, JL Checkel, JM Wagner, NJ Clark, S Naylor, SM Page, LL Thomas, I Akerblom, B Cocks, S Stuart, GJ Gleich (1999) *J. Biol. Chem.* 274:14464-14473. A novel and highly divergent homolog of human eosinophil granule major basic protein.
14. DA Plager, GL Nelsestuen (1994) *Biochemistry* 33:13239-13249. Direct enthalpy measurements of the calcium-dependent interaction of annexin V and VI with phospholipid vesicles.
15. DA Plager, GL Nelsestuen (1994) *Biochemistry* 33:7005-7013. Direct enthalpy measurements of factor X and prothrombin association with small and large unilamellar vesicles.
16. DA Plager, GL Nelsestuen (1992) *Protein Science* 1:530-539. Dissociation of peripheral protein-membrane complexes by high pressure.

Book Chapters and Reviews

1. DA Plager, T Bieber, MR Pittelkow (2014). Structure of the Skin and Cutaneous Immunology. In NF Adkinson, Jr., BS Bochner, AW Burks, WW Busse, ST Holgate, RF Lemanske, Jr., RE O'Hehir (eds) *Middleton's Allergy: Principles and Practice, 8th Edition*, Elsevier-Saunders, Philadelphia, PA, pp. 518-539.
2. KM Leiferman, MS Peters, DA Plager, GJ Gleich (2009). Eosinophils. In T Bieber, DYM Leung (eds) *Atopic Dermatitis, 2nd Edition*, Marcel Dekker, New York, NY, pp. 195-228.
3. DA Plager, MR Pittelkow (2009). Structural and Functional Cutaneous Immunology. In NF Adkinson, Jr., BS Bochner, WW Busse, ST Holgate, RF Lemanske, Jr., FER Simons (eds) *Middleton's Allergy: Principles and Practice, 7th Edition*, Mosby, St. Louis, MO, pp. 611-632.
4. DA Plager, KM Leiferman, MR Pittelkow (2003). Structural and Functional Cutaneous Immunology. In NF Adkinson, Jr., JW Yunginger, WW Busse, BS Bochner, ST Holgate, FER Simons (eds) *Middleton's Allergy: Principles and Practice, 6th Edition*, Mosby, St. Louis, MO, pp. 671-686.
5. KM Leiferman, DA Plager, GJ Gleich (2002). Eosinophils and Atopic Dermatitis. In T Bieber, DYM Leung (eds) *Atopic Dermatitis*, Marcel Dekker, New York, NY, pp. 327-355.

6. DA Plager, CR Adolphson, GJ Gleich (2001) *Immunological Reviews* 179:192-202. A novel human homolog of eosinophil major basic protein.
7. DA Plager, DA Loegering, J Tang, GM Kephart, GJ Gleich (2000) *Respiratory Medicine* 94:1011-1012. Eosinophil Proteins. Human eosinophil granule major basic protein homolog: Biochemical, genetic and immunochemical aspects.
8. DA Plager, S Stuart, GJ Gleich (1998) *Allergy* 53:33-40. Human eosinophil granule major basic protein and its novel homolog.