Zdenek Hel, Ph.D.

Curriculum Vitae

PERSONAL INFORMATION:

Name:	Zdenek Hel
Home Address:	645 Clearview Rd., Hoover, AL 35226, USA
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Citizenship:	USA; Czech Republic
RANK/TITLE:	Professor, tenured
DEPARTMENT:	Department of Pathology, Division of Molecular and Cellular Pathology Department of Microbiology (secondary appointment) University of Alabama at Birmingham (UAB)
Business Address:	1825 University Blvd., SHEL 603 Birmingham, AL 35294-2182
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EDUCATION:

Institution	Degree	Month/Year
Charles University, Prague, Czech Republic	M.Sc. (Honors)	06/1990
McGill University, Montreal, Canada	Ph.D. (Honors)	05/1997

POSTDOCTORAL TRAINING:

Year	Institution
1997 – 2002	National Cancer Institute, National Institutes of Health, Bethesda, MD. Animal Models and Retroviral Vaccines Section, PI: Dr. Genoveffa Franchini.

ACADEMIC APPOINTMENTS:

Month/Year	Appointment	Institution
2017 - present	Professor, tenured	Department of Pathology, UAB Division of Molecular and Cellular Pathology Dept. of Microbiology (secondary appointment)
2012 – 2017	Associate Professor, tenured	Department of Pathology, UAB Dept. of Microbiology (secondary appointment)
2011 – 2012	Associate Professor	Department of Pathology, D. Microbiology, UAB
2003 - 2011	Assistant Professor	Department of Pathology, MCP, UAB Dept. of Microbiology (secondary)
2006 - present	Associate Scientist	Comprehensive Cancer Center, UAB
2005 - present	Associate Scientist	Gene Therapy Center. UAB
2004 - present	Associate Scientist	Mucosal HIV and Immunobiology Center, UAB
2003 - present	Associate Scientist	Center for AIDS Research, UAB

AWARDS/HONORS:

2003	Howard Hughes Medical Institute Junior Faculty Award.
1997 -2002	National Institutes of Health - Fogarty International Center Postdoctoral Fellowship, National Cancer Institute, Bethesda, MD, USA.
1997	Dean's List of Honor, Department of Experimental Medicine, McGill University, Montreal, Canada.
1996	Travel Fellowship for the Joint International Meeting of the Society for Leukocyte Biology and European Macrophage Study Group, October 1996, Verona, Italy.
1996	McGill Major Fellowship for Graduate Studies, McGill University, Montreal, Canada.
1994	Travel Fellowship, 30th. National Meeting of Society for Leukocyte Biology, September 1994, Tucson, Arizona, USA.
1994	4th prize in the student competition, Canadian Society for Immunology, Chantaclair, Canada.
1993	1st prize in the student competition, Canadian Society for Immunology, Lake Luis, Alberta, Canada.
1990	Dean's List of Honor, School of Natural Sciences, Charles University, Prague, Czech Republic.

PROFESSIONAL SOCIETIES:

- International AIDS Society
- The American Association of Immunologists
- American Association for Cancer Research
- Czech Immunological Society
- Society for Leukocyte Biology
- Canadian Society for Immunology

NATIONAL COUNCILS AND COMMITTEES:

NIH STUDY SECTIONS:

1) HIV/AIDS Immunology and Pathogenesis, Ad hoc, Challenge Grants Review Group, NIH (June 2009)
2) HIV/AIDS Vaccine Study Section, Ad hoc, NIAID, NIH, Bethesda, MD (July 2009).
3) HIV/AIDS Immunology and Pathogenesis, Special Emphasis Panel/Scientific Review Group 2009, (10 ZRG1 AARR-J, NIAID, NIH (Sep 2009).
4) Oral Mucosal Vaccination against HIV Infection, Special Emphasis Panel/Scientific Review Group (ZDE1), NIDCR, NIH (Mar 2010).
5) Infectious Diseases and Microbiology Integrated Review Group (IDM), Scientific Review Group, Recovery Act Limited Competition: NIH Director's Opportunity for Research (RC4), ZRG1 IDM-C and IDM-L (55) R (May 2010).
6) AIDS Molecular Biology and Opportunistic Infections, Special Emphasis Panel ZRG1 VACC-J (02), NIAID, NIH (Aug 2010).
7) HIV/AIDS Immunology and Pathogenesis (AIP), Special Emphasis Panel ZRG1 AARR-J (02), NIAID, NIH (Dec 2010).
8) HIV/AIDS Immunology and Pathogenesis, Scientific Review Group 2011/05 ZRG1 AARR-J (02) M, NIAID, NIH (Apr 2011).
9) HIV Vaccine Research and Design (HIVRAD) Program, PAR-09-134: ZAI1-JBS-A-J1; NIH, Bethesda. MD (Nov 2011).

10) HIV Vaccine Research and Design (HIVRAD) Program, PAR-12-087: ZAI1-RRS-A-J1; NIH, Bethesda. MD (Sep 2012).
11) AIDS Immunology and Pathogenesis (AIP) Study Section, 2014/01 AIP, NIH, Bethesda, MD, (Dec 2013).
12) NCI/NIH, Special emphasis panel, Retroviral Pathogenesis, Treatment and Prevention, ZCA1 TCRB-U (C1), (Sep 2014).
13) Integrative and Clinical Endocrinology and Reproduction Study Section (ICER), NIH, (Oct 2015).
14) Special emphasis panel, HIV Pathogenesis, NIAID/NIH, ZRG1 AARR-J (91), (Jan 2016).
15) Special emphasis panel, HIV/AIDS, Mentored Patient-Orientated Research, ZRG1 AARR-K(04), (April 2016).
16) Special emphasis panel, RFA-DK-16-016: HIV in Digestive Diseases - Gastrointestinal Mucosa and Liver, NIDDK/NIH, ZRG1 AARR-J (52), (July 2016).
17) Integrative and Clinical Endocrinology and Reproduction Study Section (ICER), NIH, (Oct 2016).
18) Special emphasis panel, AIDS Clinical Studies and Epidemiology, ZRG1, AARR (02), (Dec 2016).
19) Special emphasis panel, AIDS Molecular and Cellular Biology (AMCB), (Mar 2017).
20) Special emphasis panel, Scientific Review Group 2017/05 ZRG1 AARR-K (02) M, (Apr 2017).
21) AIDS Immunology and Pathogenesis Study Section (AIP), permanent member, 2017 – 2018).
22) Special emphasis panel, HIV Pathogenesis, NIAID/NIH, ZRG1 AARR-K(91), (Apr 2018).
23) NIDA HIV/AIDS Aviner Award Review Panel, (Dec 2019).
24) HIV Immunopathogenesis and Vaccine Development Study Section (HIVD), permanent member, (Nov 2018-present).

OTHER NATIONAL COUNCILS AND COMMITTEES:

2008 - present **Research Evaluation and Decision Panel**, **AIDS and Cancer Specimen Resource**, **NIH.** Responsibilities include evaluation of applications for their scientific merit. This evaluation serves as a basis for the decision whether the requested specimen is to be provided.

2010 - present **Creative and Novel Ideas in HIV Research (CNIHR), International AIDS Society**, **Centers for AIDS Research**. Responsibilities include reviewing applications for their feasibility, significance, and scientific merit.

INTERNATIONAL COUNCILS AND COMMITTEES:

2012 **World Health Organization (WHO) Consultant.** WHO and Partners Stakeholders' technical consultation on hormonal contraception and HIV: A review of the science, research developments, and their implications for service delivery and priority research. Geneva, Switzerland, Jan 2012.

2015 **World Health Organization, Geneva, Switzerland. Session chair / Consultant.** WHO and Partners Stakeholders' Meeting on Hormonal contraception and HIV: A review of the science and research, and their implications for research, program, and policy. Dec 8 -11, 2015.

INTERNATIONAL GRANT AGENCY COMMITTEES:

2009 - present **Czech Science Foundation, Czech Republic.** Ad hoc reviewer of grant applications.

2006, 2010 **Research Evaluation Committee, Ministry of Education of the Czech Republic**. Ad hoc reviewer of grant applications.

2013, 2015 **South African Medical Research Council, South Africa.** Ad hoc reviewer.

UNIVERSITY ACTIVITIES:

UNIVERSITY COMMITTEES:

2008 - present **UAB Center for AIDS Research Developmental Grants Program**. Responsibilities include reviewing pilot grant application submitted by internal researchers and providing feedback.

2008 - present **Human and Medical Immunology (HMI) Committee**, **Program in Immunology** (T32). The purpose of this committee is to steer and to coordinate the activities related to the human immunology research at UAB and define program priorities.

2010-2012 **Alternate Senator, UAB Faculty Senate.** representing Joint Health Sciences. Elected on a biannual basis. The purpose of the Faculty Senate is to mediate the communication between the faculty and the administration, promote the concept of shared governance, represent the needs and concerns of the faculty to the administration and trustees of the university, and provide advice to the President. Responsibilities include communicating with the faculty in their respective units, reviewing proposed changes to the university guidelines and Faculty Handbook, contributing to strategic planning, initiating new proposals, and serving on associated committees.

2012-2014 **Elected Senator, UAB Faculty Senate**, representing Joint Health Sciences.

2010-2014 **Member, UAB Faculty Senate Research Committee**. Elected on a biannual basis. The purpose of this UAB-wide Faculty Senate-associated committee is to oversee and coordinate changes in the curriculum, oversee research programs and activities, and provide suggestions for further improvement of the research environment at UAB.

2011-2015 **Member, Faculty Development Grant Program (FDGP) Committee.** The FDGP provides seed money for research, teaching, and service related projects designed to enhance the effectiveness of individual faculty members by providing funds for them to undertake new efforts for which time or money is not generally available.

2016 - 2018 **Alternate Senator, UAB Faculty Senate**, representing Joint Health Sciences.

2016 - present **Member, UAB Faculty Senate Research Committee.**

2016 - present **Member, UAB Faculty Senate Faculty Development Committee.**

2016 - 2018 **Elected Senator-at-Large, UAB Faculty Senate Executive Committee.**

2017 - 2018 **Vice-Chair, Research Committee, UAB Faculty Senate.**

2017 - present **Member, UAB Sparkman Center for Global Health Scholars Program.**

2018 **UAB Center for AIDS Research (CFAR) renewal grant evaluation committee.**

2018 - present **Elected Senator, UAB Faculty Senate**, representing Joint Health Sciences.

DEPARTMENTAL/DIVISIONAL COMMITTEES:

2010 - present **Division of Molecular and Cellular Pathology IRB Review Committee**. Responsibilities include performing internal IRB reviews for the faculty in the Division of Molecular and Cellular Pathology (MCP). Appointed by the chair of the MCP IRB committee.

2010 - 2012 **Faculty Advisory Council (FAC); Department of Pathology.** Elected by the MCP faculty on a biannual basis. The purpose of this committee is to mediate communication between the Faculty and the Department Chair, present faculty issues and concerns and propose suggestions. Responsibilities include representation of the FAC at the Pathology Directors Meeting.

OTHER UNIVERSITY-RELATED ACTIVITIES:

2014 **Czech Science and Technology Mission at UAB.** In collaboration with the Office of the Vice President for Research and Economic Development, organized a visit of leaders of top universities and scientific institutes from the Czech Republic. The aim was to establish collaborations between UAB and Czech researchers. Two Memorandums of Understanding were established with top universities in the Czech Republic (Charles University, Prague, and Palacky University, Olomouc).

MAJOR RESEARCH INTERESTS:

Research in my laboratory focuses on: 1) immunology, pathogenesis, and prevention of HIV-1 infection, 2) characterization of the role of neutrophils and myeloid-derived suppressor cells (MDSCs) in the regulation of immune responses in infection and cancer, 3) characterization of the effect of hormonal contraception on the structural and immunological changes in the human vaginal epithelial barrier and their potential consequences for HIV-1 acquisition and transmission, and 4) development of novel approaches to cancer immunotherapy.

GRANT SUPPORT:

CURRENT:

1R01DK108353 (Hel) 09/24/15-05/31/20
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK/NIH/DHHS).
The Guts of HIV: Innate Immune Dysregulation as a Central Mechanism of Gastrointestinal and Liver Disease in HIV-1-Infected Individuals.
Total Annual Costs: $325,000
Total Costs: $1,625,000
The focus of this project is on the innate immune dysregulation in the liver and gut-associated mucosa of HIV-1-infected ART-treated individuals.

1R01HL129878 (Hel) 09/01/16-8/31/20
National Heart, Lung, and Blood Institute (NHLBI)/NIH/DHHS.
Neutrophil dysregulation as a driving mechanism of cardiovascular disease in HIV-1-infection.
Total Annual Costs: $570,000
Total Costs: $2,275,000
This project focuses on the role of neutrophil activation in the mechanisms underlying increased risk of cardiovascular diseases in HIV-1-infected individuals.

1R01HD083026 (Hel, Hapgood, Co-PIs) 03/23/15-02/29/20
Eunice Kennedy Shriver National Institute of Child Health & Human Development (NICHD/NIH/DHHS)
Combination treatment for protection against HIV-1 and pregnancy.
Total Annual Costs: $540,000
Total Costs: $2,300,000
We propose a series of detailed mechanistic studies aiming at the identification of an optimal combination of progestin and antiretroviral providing maximal protection of young women from HIV-1 infection.

1 U01 AI103401-01 (Saag) 01/01/13-12/31/18
Role on this project: Co-Investigator
UAB-MISS Women's Interagency HIV Study (WIHS).
UAB participation the nationwide sites for the WIHS project. WIHS was established in August of 1993 to investigate the impact of HIV infection on women in the U.S. The core portion of the study includes a detailed and structured interview, physical and gynecologic examinations, and laboratory testing. The WIHS participants enroll in sub-studies, including immunological, cardiovascular, metabolic, physical functioning, and neurocognition.
Administrative Supplement (Hel)
Total Costs: $50,000
Human beta-defensins and anti-HIV activity in the female genital tract.
Determine the anti-viral activity of human β-defensin-2 and 3 (HBD2 and 3) in the cervicovaginal fluid of HIV-1-infected and uninfected women volunteers.

PENDING:

PAST:

R21AI104458 (Hel) 4/2013 – 3/2016
National Institute of Allergy and Infectious Diseases (NIAID/NIH/DHHS).
Neutrophil-mediated immune suppression as a mechanism of HIV-1 pathogenesis.
Annual Total Costs: $220,125
The application addresses in detail the molecular mechanisms of the altered function of neutrophils with regulatory activity in HIV-1-infected individuals.

UAB AMC21 Infectious Diseases (Hel) 11/2013 – 11/2015
Total costs: $50,000
Global Health and Vaccines Initiative, University of Alabama at Birmingham (UAB).
The role of neutrophil-mediated immune suppression in HIV-1/TB co-infection.
The aim of this project is to establish long-term collaboration between the laboratories at UAB and KwaZulu-Natal Research Institute for Tuberculosis & HIV (K-RITH) in Durban, South Africa.

R01 AI074438 (Hel) 8/2007 – 7/2014
National Institute of Allergy and Infectious Diseases (NIAID/NIH/DHHS).
Dysregulation of IgA responses in HIV-1-infected individuals.
Total Annual Costs: $474,902
Total costs: $2,420,500
This study addresses whether the profound depletion of $CD4^+$ T cells from intestinal mucosa and other mucosal tissues results in a perturbation of antigen-specific IgA responses, impairment of the mucosal barrier, and a dysregulation of tolerance induction in the gut tissue. These mechanisms could significantly contribute to the leakage of microbial antigens to the systemic compartment resulting in the chronic activation of $CD4^+$ and $CD8^+$ T cells characteristic for HIV-1 infection.

R21 AI087178 (Hel) 7/2010 – 6/2013
National Institute of Allergy and Infectious Diseases (NIAID/NIH/DHHS).
Depletion of myeloid-derived suppressor cells (MDSCs) in HIV-1 infection.
Total Annual Costs: $183,750; $220,500
Total costs: $404,250
Our results suggest that progression of HIV-1 infection is associated with an alteration in the frequency of circulating MDSCs and associated levels of T cell activation. In particular, we have identified a subset of partially differentiated neutrophils with potent regulatory activity in HIV-1-infected patients. Changes in this important regulatory feedback mechanism may significantly contribute to the chronic immune activation and affect the onset of HIV-1-associated malignancies. Elucidation of the role of MDSCs in HIV-1 infection and mechanism of depletion may result in a design of novel therapeutic strategies based on a controlled expansion of MDSC population restricting chronic immune activation.

PO1 AI083027 10/2009-
10/2012National Institute of Allergy and Infectious Diseases (NIAID/NIH/DHHS).
Program Project Title: **Immunological uniqueness of female genital tract in HIV infection.**
Program Project PI: Mestecky
Total Annual Costs: $2,000,249
Total costs: $4,000,498
Role: Principal Investigator of Project 3 (Hel)
Total Annual Costs of Project 3: $514,720
Total costs of Project 3: $1,029,440
Title of Project 3: **Impact of progesterone-based contraceptives on immune responses in HIV-infected women.**

Recent evidence suggests that women using progesterone-based contraceptives, in particular depot medroxyprogesterone acetate (DMPA; Depo-Provera), are more susceptible to HIV-1 infection, exhibit accelerated disease progression and increased risk of succumbing to the disease compared to women without hormonal contraception. This study addresses whether progesterone-based hormonal contraceptives exacerbate the effect of HIV-1 infection by suppressing antigen-specific cellular and humoral immune responses to HIV-1 and other pathogens via direct or indirect mechanisms. We showed that DMPA suppresses the function of T cells, plasmacytoid dendritic cells and antigen presentation by dendritic cells in vitro and its use is associated with the thinning of vaginal epithelial layer in vivo.

R01 APRC-HCC and AIDS Supplement (Hel) 9/2011 – 8/2012
National Cancer Institute (NIAID/NIH/DHHS).
Title: **Glycans in Hepatocellular Carcinoma (APRC-HCC and AIDS Supplement).**
Role: Principal Investigator (UAB site)
(in collaboration with Dr. Goldman, Georgetown University)
Total Annual Costs: $45,000
The purpose of this administrative supplement is to address the role MDSCs in the hepatitis C infection and hepatocellular carcinoma in HIV-1-infected patients and the effect of MDSCs on the glycosylation of tumor-associated proteins. The overall purpose of the program is to promote research collaborations between hepatocellular carcinoma research laboratories and AIDS laboratories.

UAB CFAR/CCC 301354 (Hel) 4/2010 - 3/2012
Granting agency: UAB CFAR/CCC Malignancy Pilot Grant program
Role: Principal Investigator
Total costs: $100,000
Myeloid-derived suppressor cells (MDSCs) in HIV-1-infected individuals.
This study addresses whether the development of AIDS-associated malignancies in HIV-1-infected individuals is associated with changes in the frequency and functionality of MDSCs.

R21 AI063967 (Hel) 4/2005 - 3/2009
National Institute of Allergy and Infectious Diseases (NIAID/NIH/DHHS).
Immunization with Genetically Modified Hematopoietic Stem Cells.
Total costs: $387,750
The goal of this project was to test whether a transplantation of autologous hematopoietic stem cells (HSCs) transduced with a lentiviral vector expressing the antigen under the control of a specific promoter would result in a long-term maintenance of high levels of antigen-specific memory T cells.

UAB CFAR (Hel) 7/2003 – 7/2004
Granting agency: Center for AIDS Research, UAB
Development of novel DNA-based HIV/AIDS vaccine strategies.
Total costs: $ 28,000
The focus of this project was to optimize DNA-based HIV-1 vaccine strategies by co-administration of gene constructs encoding costimulatory, cytokine, and chemokine molecules and to study the mechanisms of the adjuvant effect.

HHMI (Hel) 2/2003 – 1/2004
Granting agency: Howard Hughes Medical Institute
Total costs: $100,000
Howard Hughes Medical Institute (HHMI) Junior Faculty Award.
The purpose of the HHMI Junior Faculty Award was to provide support for the faculty in the early stage of their career.

CONTRIBUTION TO SCIENCE:

Science thrives when we constantly challenge ourselves to consider new ideas and new approaches to research. Much of my work has involved introducing new ideas to the field of HIV-1 pathogenesis and prevention and immunotherapy of cancer and chronic viral diseases.

1. **Design and Testing of HIV-1 Vaccine Candidates.** With a team of collaborators, we showed that: 1) Antiretroviral treatment (ART) initiated in the acute phase of HIV infection results in a functional cure and control of viremia in the absence of ART; 2) Therapeutic immunization against HIV and possibly other chronic viral infections is feasible and effective; and 3) Peptide-based vaccine delivered on mucosal surface protects against HIV. These breakthrough paradigms shift publications have initiated a series of clinical trials in humans and changes in the treatment of HIV-1 infected individuals. Furthermore, we demonstrated that a vaccine based on the induction of cytotoxic ($CD8^+$) and helper ($CD4^+$) T cells protects against HIV infection in an animal model; this has significantly contributed to HIV vaccine development. We have also demonstrated prevention of infection by intravaginal application of agents enhancing the protective properties of the genital mucosa.

a. **Hel, Z.,** Venzon, D., Poydyal, M., Tsai, W.P., Giuliani, L., Woodward, R., Chougnet, C., Shearer, G., Altman, J., Watkins, D., Bischofberger, N., Abimuku, A., Markham, P., Tattaglia, J., and Franchini, G. 2000. Viremia control following structured treatment interruption and therapeutic immunization of SIV_{251} – infected macaques. **Nature Med.** 6:1140-6. (IF: 30.3; Citations: 168).

b. Belyakov, I.M., **Hel, Z.,** Kelsall, B., Kuznetsov, V.A., Ahlers, J.D., Nacsa, J., Watkins, D.I., Allen, T.M., Sette, A., Altman, J., Woodward, R., Markham, P.D., Clements, J.D., Franchini, G., Strober, W., and J. A. Berzofsky. 2001. Mucosal AIDS vaccine reduces disease and viral load in gut reservoir and blood after mucosal infection of macaques. **Nature Med.** 7:1320-6. (IF: 30.3; Citations: 205).

c. **Hel, Z.**, Nacsa,J., Tryniszewska, E., Tsai, W.P., Washington-Parks, R., Montefiori, D.C., Felber, B.K., Pavlakis, G.N., Tartaglia,J., and G. Franchini. 2002. Containment of SIV infection in vaccinated macaques: Correlation with the magnitude of virus-specific pre- and post-challenge CD4+ and CD8+ T-cell responses. **J. Immunol.** 169:4778-4787. (IF: 5.4; Citations: 125).

d. **Hel, Z.**, Tsai, W.-P., Tryniszewska, E., Nasca, J., Merjham, P.D., Lewsi, M.G., Pavlakis, G.N., Felber, B.K., Tartaglia, J., and G. Franchini. 2006. Improved vaccine protection from simian AIDS by the addition of nonstructural SIV genes despite antigen competition. **J. Immunol.** 176: 85-96. (IF: 5.4; Citations: 48).

2. **Effect of Hormonal Contraception on HIV-1 Infection.** Safe and effective methods of contraception represent a critical component of preventive health care reducing maternal and infant mortality. Several epidemiological studies have suggested a correlation between the use of hormonal contraception and increased risk of HIV-1 infection. We demonstrated that medroxyprogesterone acetate (MPA), one of the most commonly used contraceptives in sub-Saharan Africa, suppresses antigen-specific cellular immune

function via direct and indirect mechanisms. In a clinical study, we showed that the use of MPA is associated with thinning of vaginal epithelial wall and decreased production of IFN-α by plasmacytoid dendritic cells. In a recently published study, we demonstrated that the use of DMPA or NuvaRing was associated with reduced pDCs production of IFNα and TNFα in response to TLR-9 stimulation. The density of CD207+ Langerhans cells in the vaginal epithelium was reduced in NuvaRing and COC users but not in DMPA users. The presented evidence suggests that the use of some types of hormonal contraception are associated with reduced functional capacity of circulating pDCs and altered immune environment in the female reproductive tract. In our most recent studies, we have performed RNA-Seq analysis of vaginal biopsies of hormonal users; the acquired data demonstrate severe suppression of HBD2, HBD3 and SLPI gene expression and protein production by the epithelium of DMPA users (manuscript in preparation).

a. **Hel, Z.**, Stringer, E., Goepfert, P., and Mestecky, J. 2010. Sex steroid hormones, hormonal contraception and the immunobiology of HIV-1 infection. **Endocr. Rev.** 31:79-97. PMID: 19903932, PMCID: PMC 2852204. (IF: 21.1; Citations: 89).

b. Huijbregts, R., Helton, S., Michel, K., Richter, H., Goepfert, P., and **Z. Hel**. 2013. Hormonal contraception and HIV-1 infection: Medroxyprogesterone acetate suppresses innate and adaptive immune mechanisms. **Endocrinology**. 154:1282-1295. PMCID:PMC 3578997. (IF: 4.6; Citations: 45). Associated editorial: **Endocrinology** 2013;154:985. Commentary published in: **Nat. Rev. Endocrinol.** 2013; 9:187.

c. Michel, K.G., Huijbregts, R.P.H., Gleason, J.L., Richter, H., E., and **Z. Hel**. 2015. Effect of hormonal contraception on the function of plasmacytoid dendritic cells and distribution of immune cell populations in the female reproductive tract. **JAIDS**. 68:511-518. PMID: 25763784. 38)

d. Polis, C.B., Achilles, S.L., **Hel, Z.**, Hapgood, J.P. 2017. Is a lower-dose, subcutaneous contraceptive injectable containing depot medroxyprogesterone acetate likely to impact women's risk of HIV? **Contraception.** (Accepted).

e. Hapgood, J.P., Kaushic, C., and **Z. Hel**. 2017. Hormonal Contraception and HIV-1 Acquisition: Biological Mechanisms. **Endocrine Reviews.** (Accepted).

3. **Mucosal Biology of HIV-1 and SIV Infections.** We have performed multiple studies on the effect of HIV-1 and SIV infection on mucosal immune cell populations, effect of Fc receptor on HIV-1 transcytosis, and use of menstrual cells as a readily available source of endometrial immune cells.

a. **Hel, Z.**, Nacsa, J., Kelsall, B., Tsai, W.P., Letvin, N., Parks, R.W., Tryniszewska, E., Picker, L., Lewis, … and G. Franchini. 2001. Impairment of Gag-Specific $CD8^+$ T-Cell function in mucosal and systemic compartments of Simian immunodeficiency virus mac251- and Simian-human immunodeficiency virus KU2-infected macaques. **J. Virol.** 75:11483-95. (IF: 4.8; Citations: 55).

b. **Hel, Z.**, McGhee, J., Mestecky, J. 2006. HIV infection: First battle decides the war. **Trends Immunol.** 27:274. (IF: 10.5; Citations: 49).

c. Sabbaj, S., **Hel, Z.**, Richter, H., Mestecky, J., and P. A. Goepfert. 2011. Menstrual blood T cells as a potential source of endometrial derived $CD3^+$ cells. **PLoS ONE** 6:e28894. PMCID:PMC 3235171.

d. **Hel, Z.**, Xu, J., Denning. W., Helton, S., Heath, S. L., Christmann, B.S., Elson, C.O., Goepfert, P., and Mestecky, J. 2016. Dysregulation of systemic and mucosal humoral responses to microbial and food antigens as a factor contributing to microbial translocation and chronic inflammation in HIV-1 infection. **PLOS Pathogens.** (Accepted; IF:7.6)

4. **Immune therapy of cancer and chronic infectious diseases.** We described a novel approach to immunotherapy based on a transplantation of low numbers of antigen-expressing hematopoietic stem cells (HSCs) following nonmyeloablative or partially myeloablative conditioning. We showed that

continuous antigen presentation by a limited number of differentiated transgenic hematopoietic cells results in an induction and prolonged maintenance of fully functional effector T cell responses. We have also demonstrated that B cells activated via the toll-like receptor-9 (TLR-9) and CD40 receptor up-regulate expression of major histocompatibility complex and costimulatory molecules and that the therapeutic immunization with low numbers of genetically modified B cells stably expressing antigen results in an induction of functional CTLs and protection against the growth of a tumor in an animal model.

a. Guo, S., Xu, J., Denning, W., and **Z. Hel**. 2009. Induction of protective cytotoxic T cell responses by a B cell-based cellular vaccine requires stable expression of antigen. **Gene Ther.** 16:1600-1613. PMCID: PMC2783822

b. Denning, W., Xu, J., Guo, S., Klug, C., and **Z. Hel**. 2011. Limited transplantation of antigen-expressing hematopoietic stem cells induces long-lasting cytotoxic T cell responses. **PLoS ONE** 6:e16897. PMCID: PMC3040734

5. Immunodeficiency diseases: Combined Variable Immunodeficiency Disease (CVID)

The primary reason for studying CVID was its relevance to HIV-1 infection. CVID, the most frequent symptomatic humoral primary immunodeficiency, is associated with chronic T cell activation and reduced frequency of $CD4^+$ T cells, and thus it resembles HIV-1 infection. The underlying cause of immune activation in CVID is unknown. We found that in CVID subjects the concentration of plasma sCD14 is significantly increased and correlates with the level of sCD25, C-reactive protein and the extent of T cell activation. Furthermore, elevated plasma sCD14 is associated with decreased frequencies of $CD4^+$ T, NK, and B cells. The obtained data suggests that chronic T cell activation in CVID is associated with elevated levels of sCD14 and sCD25 but not with the signs of microbial translocation.

a. Litzman, J., Nechvatalova, J., Xu, J., Ticha, O., Vlkova, M., and **Z. Hel**. 2012. Chronic immune activation in common variable immunodeficiency (CVID) is associated with elevated plasma levels of soluble CD14 and CD25 but not endotoxemia. **Clin. Exp. Immunol.** 170:321-32. PMCID: PMC3518892

b. **Hel, Z.**, Nechvatalova, J., Xu, J., Ticha, O., Vlkova, M., and J. Litzman. 2014. Altered serum cytokine signature in common variable immunodeficiency. **J. Clin. Immunol.** 34:971-8. PMID: 25246148.

6. Role of neutrophil subsets in immune regulation and disease pathogenesis. This is the most current direction of research. We demonstrated that neutrophils in the blood of HIV-1-infected individuals express high levels of PD-L1. PD-L1 is induced by HIV-1 virions, TLR-7/8 ligand, bacterial lipopolysaccharide (LPS), and IFNα. Neutrophil PD-L1 levels correlate with the expression of PD-1 and CD57 on $CD4^+$ and $CD8^+$ T cells, elevated levels of neutrophil degranulation markers in plasma, and increased frequency of low density neutrophils (LDNs) expressing the phenotype of granulocytic myeloid-derived suppressor cells (G-MDSCs). Neutrophils purified from the blood of HIV-1-infected patients suppress T cell function via several mechanisms including PD-L1/PD-1 interaction and production of reactive oxygen species (ROS). Collectively, the accumulated data suggest that chronic HIV-1 infection results in an induction of immunosuppressive activity of neutrophils characterized by high expression of PD-L1 and an inhibitory effect on T cell function.

a. Bowers, N., Helton, S., Huijbregts, R.P.H., Goepfert, P., Heath, S., and **Z. Hel.** 2014. Immune Suppression by Neutrophils in HIV-1 Infection: Role of PD-L1/PD-1 Pathway. **PLOS Pathogens. 10:** e1003993, PMCID:PMC 3953441. (IF: 8.8; Citations: 61). (Selected by F1000 Prime).

CURRENT RESEARCH PROJECTS:

1) Innate immune regulatory activity and neutrophil dysregulation as a driving mechanism of pathogenesis in HIV-1-infection.

Recent evidence demonstrates that neutrophils, the most abundant nucleated immune cell population in the body, play an important role in the regulation of adaptive and innate immune systems. We have shown that neutrophils from HIV-1-infected individuals display an activated phenotype, specific transcriptional profile, and increased rate of degranulation. We propose that HIV-1 infection is associated with altered myeloid cell homeostasis resulting in changes in the population frequency and functional activity of diverse granulocytic populations. Dysregulation of granulocytic recruitment, function, and clearance contributes to the pathogenesis of cardiovascular and liver diseases associated with HIV-1 infection. Specifically, neutrophils in the blood of HIV-1-infected individuals express high levels of PD-L1 that is induced by HIV-1 virions and products of microbial translocation including lipopolysaccharide (LPS). Neutrophil PD-L1 levels correlate with the expression of PD-1 on CD4+ and CD8+ T cells, elevated levels of neutrophil degranulation markers in plasma, and increased frequency of low density neutrophils expressing the phenotype of granulocytic myeloid-derived suppressor cells (G-MDSCs). Neutrophils purified from the blood of HIV-1-infected patients suppress T cell function via several mechanisms including PD-L1/PD-1 interaction and production of reactive oxygen species (ROS). The accumulated data suggest that chronic HIV-1 infection results in an induction of immunosuppressive activity of neutrophils characterized by high expression of PD-L1 and an inhibitory effect on T cell function. This newly identified mechanism of immune suppression mediated by neutrophils may alter our understanding of HIV-1 pathogenesis. Furthermore, we have shown that neutrophils from HIV-1-infected individuals display high capacity to undergo NETosis. Production of neutrophil extracellular traps (NETs) likely contributes to increased risk of cardiovascular and liver diseases in HIV-1-infected individuals.

2) Neutrophils and cancer.

Our research focuses on neutrophils and granulocytic myeloid-derived suppressor cells (G-MDSCs), cell populations that have been recently identified to play a critical role in the regulation of adaptive and innate immune responses in cancer and chronic inflammatory conditions. Production of neutrophil extracellular traps (NETs) by neutrophils contributes to increased risk of cardiovascular and liver disease in cancer patients.

3) The impact of hormonal contraceptives on HIV-1 acquisition and transmission.

Safe and effective methods of contraception represent a critical component of preventive health care reducing maternal and infant mortality, especially in women living in resource-limited settings. Depot medroxyprogesterone acetate (DMPA; Depo-Provera) is a highly effective progestin-based contraceptive and one of the most commonly used contraceptives in sub-Saharan Africa. Several epidemiological studies indicate an association between the use of DMPA and an increased risk of HIV-1 infection. Modelling studies indicate that the use of injectable contraceptives may be responsible for hundreds of thousands of new HIV-1 transmissions annually. It is therefore critically important to identify safe forms of contraception without a significant deleterious effect on systemic and mucosal immune environment. We demonstrated that medroxyprogesterone acetate (MPA) suppresses antigen- immune function of T cells and dendritic cells via direct and indirect mechanisms and increases the rate of HIV-1 proliferation. In a clinical study performed at UAB, we analyzed vaginal biopsies and various immune parameters in the blood of women using various forms of hormonal contraceptives. We showed that the use of MPA is associated with thinning of vaginal epithelial wall and decreased production of IFN-α by plasmacytoid dendritic cells. We have shown that MPA reduces defense mechanisms of genital epithelium by suppression of factors critical for the barrier function and structural integrity of the vaginal and cervical epithelium. Decreased production of these factors reduces the resistance of genital epithelial tissue to

microabrasions and increases the probability of HIV-1 transcytosis and transmigration leading to an exposure of target cells in the parabasal epithelium and lamina propria. Furthermore, DMPA and NuvaRing (etonogestrel) significantly suppress the cervicovaginal levels of principal anti-HIV-1 inhibitory factors human β-defensin 2 and 3 and secretory leukocyte protease inhibitor (SLPI). In a recent randomized clinical study in Lusaka, Zambia, we showed that administration of MPA decreases the production of several factors in the cervicovaginal fluid of HIV-1-infected women that may contribute to higher shedding of the virus and potentially to increased rates of viral transmission. In search for safe contraceptives, we have demonstrated that norethisterone (NET) and levonorgestrel (LNG) do not inhibit the function of dendritic cells and T cells and therefore represent safe potential alternative to DMPA.

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14) Denning, W., Helton, S., Xu, J., Goepfert, P., and **Z. Hel**. Depletion of myeloid-derived suppressor cells (MDSCs) in HIV-1-infected individuals. **Keystone Symposia: Viral Immunity**, March 2010, **Banff, Canada.**

15) Denning, W., Helton, S., Xu, J., Goepfert, P., and **Z. Hel**. Depletion of myeloid-derived suppressor cells in HIV-1-infection. **Regulatory Myeloid Cells**, **An International Immunopharmacology Conference,** Oct 2010, **Washington DC.**

16) **Hel, Z.** Myeloid-derived suppressor cells in HIV-1-infection. **14th National CFAR Research Symposium**, Nov 2010, **Los Angeles, CA.**

17) **Hel, Z.**, Xu, J., Helton, S., Denning, W., Goepfert, P., and J. Mestecky. Dysregulation of mucosal humoral responses in HIV-1-infected individuals. **15th International Congress of Mucosal Immunology**. Jul 2011, **Paris, France.**

18) Litzman, J., Nechvatalova, J., Xu, J., Ticha, O., Vlkova, M., and **Z. Hel**. Soluble CD14 in sera of patients with common variable immunodeficiency (CVID) or IgA deficiency (IgAD). **13-th. Meeting of Czech and Slovak Societies of Immunology.** Oct 2011, **Kosice, Slovakia.**

19) Bowers, N.L., Helton, S., Denning, W., Heath, S., Geopfert, P., and Z. Hel. 2013. Neutrophils with the phenotype of myeloid-derived suppressor cells (MDSCs) mediate immune suppression in HIV-1 infection. **Keystone Symposia on Immune Activation in HIV Infection: Basic Mechanisms and Clinical Implications. Breckenridge, CO, USA.**

20) Michel, K.G., Huijbregts, R.P.H., Richter, H., E., and **Z. Hel.** November 2013. Effect of depot medroxyprogesterone acetate on human β-defensin production and structural integrity of the human vaginal epithelium. **What Will it Take to Achieve an AIDS-free World? San Francisco, USA.**

21) Bowers, N.L., Michel, K.G., Huijbregts, R., Heath, S., and Z. Hel. 2014. Neutrophil extracellular traps contribute to chronic inflammation in HIV-1-infection. **Keystone Symposia; HIV Infection. Banff, CA.**

22) Connelly, A., Davis, M., Melendez-Ferro, M., Ong. K, Pal, H., Huijbregts. R., Overton, E.T., and Z. Hel. Human neutrophil subsets mediate disease pathogenesis in HIV-1-infected individuals. **Keystone Symposia: The Resolution of Inflammation in Health and Disease, Dublin, Ireland.** March 2018.

23) Hel, Z., Connelly, A., Davis, M., Melendez-Ferro, M., Ong. K, Pal, H., and Overton, E.T. Characterization of newly-identified human neutrophil subsets and their role in inflammation-induced pathogenesis. **Keystone Symposia: Myeloid Cells, Breckenridge, CO.** April 2018.

24) Connelly, A., Davis, M., Melendez-Ferro, M., Ong. K, Pal, H., Overton, E.T., and Z. Hel. The Role of Newly Identified Neutrophil Subsets in Immune Regulation and Disease Pathogenesis. **33td Congress of the International Society for Advancement of Cytometry, Prague, Czech Republic.** May 2018.

INVITED LECTURES PRESENTED AT REGIONAL MEETINGS, SEMIAR SERIES, NATIONAL AND INTERNATIONAL MEETINGS:

1) **Hel, Z.**, Skamene, E., and Radzioch, D. Posttranscriptional regulation of TNF-α gene expression in macrophages. September 1994. 30th. **National Meeting of the Society for Leukocyte Biology**, **Tucson, Arizona, USA**. Published abstract appears in J. Leuk. Biol., Supplement 1994. (Oral presentation.)

2) **Hel, Z.**, Skamene, E., and Radzioch, D. Stability and translational efficiency of cytokine and protooncogene mRNAs. June 1995. **International Meeting of the Czech Society for Immunology**, **Hradec Kralove, Czech Republic.** (Oral presentation.)

3) **Hel, Z.**, Skamene, E., and Radzioch, D. Characterization of macrophage cytosolic and nuclear proteins binding to the 3'-UTR of TNF-α mRNA. October 1996. **Joint International Meeting of Society for Leukocyte Biology and European Macrophage Study Group**, **Verona, Italy**. Published abstract appears in J. Leuk. Biol., Supplement 1996:15. (Oral presentation.)

4) **Hel, Z.** Therapeutic immunization of SIV-infected rhesus macaques. April 2000. **National Cancer Institute Postdoctoral Fellows Lecture Series**, **NCI, National Institutes of Health, Bethesda, MD.** (Oral presentation.)

5) **Hel, Z.** Therapeutic immunization in AIDS: lessons learned from the SIV/macaque model. Presentation for the Vaccine Division of Aventis-Pasteur. August 1999. **Aventis-Pasteur, Toronto, Ontario, Canada.** (Invited lecture/consultation.)

6) **Hel, Z.** Viremia control following structured treatment interruption and therapeutic immunization of SIVmac251-infected macaques. July 2000. **XIIIth. International AIDS Meeting**, **Durban, South Africa.** (Oral presentation.)

7) **Hel, Z.** Towards the development of prophylactic and therapeutic vaccines against HIV. July 2002. Department of Veterinary Sciences, **MD Anderson Cancer Center, University of Texas., Huston, Texas.** (Oral presentation.)

8) **Hel, Z.** Prophylactic and therapeutic vaccination against HIV: Lessons from the SIV / macaque model. June 2002. Department of Pathology / Center for AIDS Research, **University of Alabama at Birmingham (UAB), Birmingham, Alabama.** (Oral presentation.)

9) **Hel, Z.** Novel vaccine strategies against HIV/AIDS. May 2003. **T cell Biology Group**, **UAB.**

10) **Hel, Z.** DNA-based vaccine candidates against HIV. July 2004. **T cell Biology Group, UAB.**

11) **Hel, Z.** T cell-based vaccines against HIV and Cancer. October 2005. **Universidad de Antioquia**, **Medellin, Colombia.** (Invited lecture.)

12) **Hel, Z.** T cell-based vaccines against HIV and cancer. October 2005. **Advances in Molecular and Cellular Pathology**, Dept. of Pathology, **UAB.** (Invited lecture.)

13) **Hel, Z.** Novel HIV/AIDS Vaccine Strategies. September 2004. **Branch meeting of the American Society for Microbiology, Jacksonville State University, Jacksonville, AL, USA.** (Invited lecture.)

14) **Hel, Z.** Vaccines against HIV and Cancer. Jun 2007. **Institute of Molecular Genetics, Academy of Sciences of Czech Republic (ASCR), Prague, Czech Republic.** (Invited lecture.)

15) **Hel, Z.** Vaccines against HIV and Cancer. Jun 2007. **Biophysical Institute, ASCR, Brno, Czech Republic** (Invited lecture.)

16) **Hel, Z.** Vaccines against HIV and Cancer. Jun 2007. **Charles University, Prague, Czech Republic** (Invited lecture.)

17) **Hel, Z.** Novel strategies for immunotherapy of cancer. May 2008. Division of Hematology & Oncology and Cancer Cell Biology Research Program Conference, **UAB.** (Invited lecture.)

18) **Hel, Z.** Novel T cell-based cancer immunotherapy strategies. Jun 2008. **Tatra Immunology Meeting, European Federation of Immunological Societies (EFIS) and European Journal of Immunology**. **Strbske Pleso, Slovakia**. (Invited lecture.)

19) **Hel, Z.** HIV-1 infection: Immunology, pathogenesis, and prevention. April 2009. **Advances in Molecular and Cellular Pathology, Dept. of Pathology, UAB.** (Invited lecture.)

20) **Hel, Z.** Myeloid-derived suppressor cells in infection and cancer. Jan 2011. **Comprehensive Cancer Center Clinical/Translational Research Concepts Meeting**, **UAB.** (Invited lecture.)

21) **Hel, Z.** Impact of progesterone-based contraceptives on immune responses in HIV-infected women. **US-Zambia Health Research Coordination Meeting, Lusaka, Zambia, Dec 12th-15th, 2011.** Organized by the National Institutes of Health, NIAID, and the Center for Disease Control and Prevention in collaboration with the government of Zambia. (Invited lecture.)

22) **Hel, Z.** Review of the immunobiology of hormonal contraception and HIV-1 infection. **World Health Organization, Geneva, Switzerland.** Jan 31st -Feb 2nd, 2012. WHO and Partners Stakeholders' technical consultation on hormonal contraception and HIV: A review of the science, research developments, and their implications for service delivery and priority research. The meeting is called in response to the recent observations supporting increased rates of HIV transmission in women using hormonal contraception. (Invited lecture/Consultant).

23) **Hel, Z.** Immunosuppression in HIV-1 infection. February 2012**. Molecular and Cellular Pathology Seminar Series, UAB.** (Invited lecture.)

24) **Hel, Z.** The role of neutrophils in HIV-1 infection / Effect of hormonal contraception on HIV-1 transmission. October 2013. Department of clinical immunology and allergology, Faculty of Medicine, **Masaryk University and St. Anne´s University Hospital, Brno, Czech Republic**, (Invited lecture).

25) **Hel, Z.** Neutrophils and HIV-1 infection / Hormonal contraception and HIV-1 transmission. November 2013. **Kwazulu-Natal Research Institute for Tuberculosis and HIV, University of KwaZulu-Natal**. (Invited lecture.)

26) **Hel, Z.** Role of neutrophils in HIV-1 infection. December 2013**. National Institutes of Health, Bethesda, USA** (Invited lecture).

27) **Hel, Z.** Neutrophils and HIV-1. October 2014**. Emory University, Atlanta, USA** (Invited lecture).

28) **Hel, Z.** Immunoregulatory role of neutrophils in HIV-1 infection. December 2014**. Cancer Virology and HIV Think Tank, National Cancer Institute, Bethesda, USA.** Keynote lecture.

29) **Hel, Z.** Immunoregulatory role of neutrophils in chronic viral infections and cancer. February 2015**. Molecular and Cellular Pathology Seminar Series, UAB.** (Invited lecture.)

30) **Hel, Z.** Does neutrophil activation in chronic inflammatory conditions drive cardiovascular diseases? February 2015**. Vascular Biology and Hypertension Weekly Seminar Series, UAB.** (Invited lecture.)

31) **Hel, Z.** Your immune inner fish: The role of neutrophils in chronic viral diseases and other conditions. November 2015. **University of California, Irvine, USA.** (Invited lecture.)

32) **Hel, Z.** Hormonal contraception and HIV-1 infection. **World Health Organization, Geneva, Switzerland.** Dec 8 -11, 2015. WHO and Partners Stakeholders' Meeting on Hormonal contraception and HIV: A review of the science and research, and their implications for research, program and policy (Session chair).

31) **Hel, Z.** Dr. Jekyll vs. Mr. Hyde: Multifaceted role of neutrophil subsets in immune regulation and disease pathogenesis." May 2018. **Czech Academy of Sciences, Czech Immunology Society, Prague, CR.** (Invited lecture.)

32) **Hel, Z.** Multifaceted role of neutrophil subsets in cardiovascular disease in HIV-1-infected individuals." October 2018. **National Heart, Lung and Blood Institute (NHLBI), Bethesda, MD.**

TEACHING:

COURSE/MODULE DIRECTOR OF GRADUATE COURSES:

GBS 752 GI, Endocrine, and Immune System. Course Director. 2011 - present

This advanced graduate course examines the physiology and pathobiology of the gastrointestinal tract, followed by sub-modules focused on endocrinology and immunology. Students will learn how the

endocrine system integrates homeostasis of multiple organ systems through a comprehensive approach encompassing both the underlying molecular mechanisms of the disease and the results of recent clinical trials. The mechanisms and consequences of abnormal GI function (e.g., Crohn's disease, cirrhosis, pancreatitis), endocrine dysregulation (type II diabetes mellitus, gigantism, hyperthyroidism, Cushing's syndrome), and immune dysfunction (HIV, rheumatoid arthritis, type I diabetes mellitus) are discussed. The responsibilities of course director include overseeing the entire course, developing lecture topics, identifying lecturers, coordination of faculty module leaders, evaluation of student presentations and exams, monitoring student participations, and collection and analysis of student evaluations of the lecturers.

GBS 752 GI, Endocrine, and Immune System. Director of Block 2: Immune System. 2011 - present
The Immune System module serves as an introduction to the function of the immune system under normal and pathological conditions. Lecture topics include hematopoietic cells and anatomy of immune system, biology of T and B cells, antibodies, major histocompatibility complex, antigen processing and presentation, basic mechanisms of inflammation, autoimmune diseases and immunodeficiency, dendritic cells, regulatory T cells, immunophysiology of skin, interaction of immune system with pathogens and cancer, vaccines, and HIV-1 infection/AIDS. Responsibilities of block director include overseeing the module, identifying lecturers, developing lecture topics, lecture coordination, and organization and evaluation of student exams.

PAT 701 Molecular basis of disease. Director of Module 2: Arthritis 2011 -2012
This advanced graduate course explores the molecular and cellular mechanisms underlying the causes, symptoms, and complications of various diseases. An integrated approach to the clinical, biochemical, and molecular perspectives of diseases is employed. The class meets for 1.5 hours twice a week. Arthritis model encompasses the overview of the pathogenesis of rheumatoid arthritis, current and future therapies for RA, molecular and immunological mechanisms of RA, and mechanisms of osteolytic bone loss. Responsibilities of module director include overseeing the module, identifying lecturers, developing lecture topics, lecture coordination, and evaluation of student presentations.

LECTURING GRADUATE STUDENTS IN GRADUATE COURSES:

Course:	**Lecture hours:**
Integrative Biomedical Sciences (IBS-700): Biological chemistry and cellular physiology. (2004, 2005, 2006, 2007, 2008, 2009)	4 hours
Cellular and Molecular Biology (CMB): Immunology. (2005, 2006, 2007)	2 hours
Cellular and Molecular Biology: Virology. HIV-1. (2005, 2006)	2 hours
Molecular and Cellular Pathology (PAT-701, GBSC 715): Molecular basis of disease. New approaches to cancer immunotherapy. (2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2015, 2016, 2017, 2018)	4 hours
Graduate Biomedical Sciences (GBS700): Basic Sciences - Biochemistry Module.	

Carbohydrate Chemistry; Glycolysis; Glycogen metabolism;
Pentose Phosphate Pathway; Gluconeogenesis.
(2010) 4 hours
(2011, 2012, 2013, 2014, 2015) 6 hours
(2016, 2017) 8 hours
(2018) 6 hours

Graduate Biomedical Sciences (GBS740): Intro to Immunology. Vaccines.
(2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019) 2 hours

Cancer and Microenvironment (GBSC 725)
(2017) 2 hours

GI, Endocrine, and Immune System (GBS 752), Immune system.
Introduction to Immunology; Anatomy of the immune system; Interaction of immune system with pathogens and cancer; Vaccines; HIV-1.
(2011, 2012, 2013, 2014, 2015) 4 hours
(2016) 6 hours
(2017) 8 hours
(2018) 10 hours
(2019) 10 hours

LECTURING MEDICAL STUDENTS:
Medical Microbiology: HIV-1 pathogenesis and immunology.
(2006, 2007, 2008) 1 hour

Fundamentals: Carbohydrate Chemistry and Glycobiology
(2011, 2012, 2013, 2014) 2 hours

Fundamentals of Dentistry and Optometry II: HIV and AIDS
(2018) 1 hour

EVALUATION OF GRADUATE STUDENT PRESENTATIONS IN COURSES AND SEMINAR SERIES:
Molecular and Cellular Pathology (PAT 704): Data presentation and analysis 1.5 hours
(2005, 2006, 2008, 2009)

LECTURING GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS IN SEMINAR SERIES:
Advances in Molecular and Cellular Pathology
(2005, 2009) 1 hour

T cell biology seminar series
(2003, 2004, 2005) 1 hour

Virology Discussion Group
(2005) 1 hour

LECTURING UNDERGRADUATE STUDENTS IN COURSES:

PUH 432: Global Health Cases
(2017) 1 hour

SERVICE ON UNIVERSITY-WIDE GRADUATE PROGRAM COMMITTEES:

2009/2010 **Admission Committee (ADCOM)** of the **Graduate Biomedical Sciences (GBS)** program, **Cancer Biology theme**. Responsibilities include a selection of applicants, interviews with visiting applicants and international candidates, and selection of final candidates.

2010 **GBS ADCOM Breakout Committee.** GBS graduate program encompasses all previously separate graduate programs in biological sciences. The purpose of this committee was to provide input into the optimization of the graduate admission process in the following years.

2014/2015 **Admission Committee (ADCOM)** of the **Graduate Biomedical Sciences (GBS)** program, **Immunology Theme**. Responsibilities include a selection of applicants, interviews with visiting applicants, internet-mediated interviews with international candidates, selection of final candidates.

SERVICE ON CURRICULUM COMMITTEES:

2010 - present **Pathobiology & Molecular Medicine Curriculum Committee, Graduate Biomedical Sciences program.** The purpose of this committee is to develop and organize the curriculum for the PBMM Theme and coordinate courses with other themes in the GBS program.

MENTOR IN THE FOLLOWING TRAINING GRANTS AND GRADUATE PROGRAMS:

2003 - 2009	Cellular and Molecular Biology (CMB)
2003 - 2009	Molecular and Cellular Pathology (MCP)
2003 - 2009	Integrated Biological Sciences (IBS)
2003 - present	Program for Research Experience in Pathology (PREP)
2006 - present	Medical Scientist Training Program (MSTP)
2007 - present	Howard Hughes Med-Grad Fellowship (HHMG)
2008 - present	Immunology Training Grant (T32, PI: Schroeder)
2009 - present	Graduate Biomedical Sciences (GBS)
2016 - present	PREP Scholars research and educational training program for underrepresented minority students

MENTOR IN THE FOLLOWING THEMES OF THE GRADUATE BIOMEDICAL SCIENCES PROGRAM:

2009 - present	Cancer Biology Theme
2009 - present	Immunology Theme
2009 - present	Pathobiology & Molecular Medicine Theme

2016 - present Microbiology Theme

PAST GRADUATE STUDENTS IN LABORATORY:

Name: **Warren Denning**
Graduate program: Cellular and Molecular Biology (CMB) program.
Training period: 9/2005 – 8/2011
Research topic: Depletion of myeloid-derived suppressor cells in HIV-1-infected individuals.

Awards:
Nov 2008 **John R. Durant Award for Excellence in Cancer Research**, first place in the graduate Student Category, UAB Comprehensive Cancer Center Retreat.
Oct 2008 **Hiromoto Travel Award,** 2008 meeting of American Association for Cancer Research in San Diego.
Jul 2009 **CMB Training Grant Fellowship**.

Current position: Postdoctoral Fellow, University of Kansas, Kansas City, KS.

Name: **Katherine G. Michel**
Graduate program: Graduate Biomedical Sciences program, Immunology theme.
Training period: 9/2010 – 6/2014
Research topic: Hormonal regulation of immune responses in HIV-1-infected women and the protective effect of estrogen against HIV-1 transmission in the female lower genital tract.

Awards:
2013 Basic Mechanisms of AIDS Pathogenesis Training Grant T32 fellowship.
2014 Outstanding Immunology Student Award.

Name: **Nathan L. Bowers**
Graduate program: Graduate Biomedical Sciences program, Immunology theme.
Training period: 1/2011 – 6/2014
Research topic: The multifaceted role of neutrophils in HIV-1 infection.

Awards:
2012 Graduate in Biomedical Sciences Research Retreat, 3rd-place poster presentation, University of Alabama at Birmingham.
2012 Selected for oral presentation, Pathology Trainee Research Day, University of Alabama at Birmingham.
2012 Certificate of Merit for abstract submission, Spring Immunology Symposium, University of Alabama at Birmingham.
2013 Recipient of Immunology Training Grant T32 fellowship.
2014 Selection as an inaugural speaker at the Robert Stroud Advanced Immunology Trainee Seminar.
2014 Outstanding Immunology Student Award.

CURRENT GRADUATE STUDENTS IN LABORATORY:

Name: **Ashley N. Connelly**
Graduate program: Graduate Biomedical Sciences program, Microbiology theme.
Training period: 3/2016 - present
Research topic: Innate immune regulatory activity in HIV-1 infection.

Awards:
2016 Recipient of the Translational and Molecular Sciences (TMS) Fellowship.
2017 Recipient of the Department of Immunology Travel Award.
2018 Recipient of the 2018 Exceptional Student Award by the Awards Committee of the International Society for Advancement of Cytometry (ISAC); recipient of the travel award to participate in the 33td Congress of the International Society for Advancement of Cytometry, Prague, Czech Republic.
2018 Winner, 2018 Exceptional Student Competition, 33td Congress of the International Society for Advancement of Cytometry, Prague, Czech Republic.

Name: **Marcus D. Davis**
Graduate program: UAB Graduate Biomedical Sciences program, Immunology theme.
Training period: 5/2017 - present
Research topic: Identification and characterization of neutrophil subpopulations in health and disease.

2018 Winner, 2018 Society for Leukocyte Biology Trainee Award at the Southeastern Immunology Symposium, Birmingham, Alabama, June 2018.

2018 Winner, 2018 Society for Leukocyte Biology Mentoring Diversity Travel Award to attend SLB annual meeting in Chandler, Arizona, Oct 2018.

Name: **Krystle L. Ong**
Graduate program: UAB Graduate Biomedical Sciences program, Cancer theme.
Training period: 5/2017 - present
Research topic: Neutrophils & cancer: immune regulation and disease pathogenesis.

2018 Recipient of UAB Department of Pathology Travel Award to attend Society for Leukocyte Biology annual meeting in Chandler, Arizona, Oct 2018.

MENTORING GRADUATE STUDENTS ON ROTATION IN THE LABORATORY:

2003 - Lise Gelatko
2004 - Vinay Sanyasi; Elizabeth Stanley; Deborah Mai; Robert Flynn
2005 - Shaoning Jiang
2006 - Tara Edmonds; Benjamin Beck
2007 - Angelina Orozco
2008 - Rebekah Wharton
2009 - Stephanie Easter; David Morris; Tyler T. Wright

2010-	Keke Pounds; Katherine G Michel; Matthew J Schultz; Tyrel Smith; Nathan Bowers
2011-	Maria C. Kuzynski; Tahseen H. Nasti
2013-	Sara Gibson; Binghao J. Peng
2014-	Sarah Dulson; Kenneth P Hough; Felicia Scalzetti
2015-	Ashley N. Connelly;
2016-	Jeffrey M. Grimes; Jessica D. Kepple;
2017-	Marcus D. Davis; Krystle L. Ong; Katherine Kruckow; Mingyong Liu
2018-	Nathalia Melo; Christian Fay; Peyton Elise Vanwinkle

MENTORING POSTDOCTORAL FELLOWS IN LABORATORY:

Name:	**Suvendu Das**
Position:	Postdoctoral fellow
Degree at entry:	PhD
Training period:	8/2004 – 7/2005
Prior institution:	Centre for cellular and molecular biology, Hyderabad, Jawaharlal Nehru University, India
Research topic:	**Immunization with genetically modified HSCs.**
Current position:	Staff Scientist, Mount Sinai School of Medicine, New York, NY

Name:	**Siqi Guo**
Position:	Postdoctoral Fellow
Degree at entry:	MD, PhD
Training period:	2/2005 – 3/2007
Prior institution:	National Center for Biomedical Analysis, Beijing, China
Research topic:	**Cancer immunotherapy with B cells.**
Current position:	Staff Scientist, Virginia Commonwealth University, Richmond, VA

Name:	**Ashish Dhyani**
Position:	Postdoctoral Fellow
Degree at entry:	PhD
Training period:	12/2017 – present
Prior institution:	University of Alabama at Birmingham
Research topic:	**The role of neutrophils in disease pathogenesis.**

MENTORING GRADUATE STUDENTS / GRADUATE THESIS COMMITTEES:

2004 -	2006	Alana Cozier	Molecular & Cellular Pathology
2004 -	2006	Carlos Garcia	Cellular and Molecular Biology
2006 -	2014	Anand C. Annan	Integrated Biological Sciences
2005-	2011	Warren Denning	Cellular and Molecular Biology (Mentor)
2007 -	2009	Benjamin Beck	Molecular & Cellular Pathology

2008 -	2011	Tara Edmonds	Molecular & Cellular Pathology
2008 -	2011	Jonathan Hensel	Integrated Biological Sciences
2008 -	2011	Matt Beatty	Integrated Biological Sciences
2008 -	2013	Joshua Baalwa	Molecular & Cellular Pathology
2009 -	2013	Latonya D. Williams	Cellular and Molecular Biology
2009 -	2011	Michael O. Alberti	Integrated Biological Sciences (Committee Chair)
2010-	2014	Anne Bet	Cellular and Molecular Biology
2010-	2014	Yanna Ding	Molecular&Cellular Pathology (Committee Chair)
2011-	2016	Victor Y. Du	Graduate Biomedical Sciences
2011-	2014	Nathan Bowers	Graduate Biomedical Sciences (Mentor)
2011-	2014	Katherine Michel	Graduate Biomedical Sciences (Mentor)
2011-	2015	Juan B Rodriguez Barrantes	Graduate Biomedical Sciences
2012-	2018	Binghao J. Peng	Graduate Biomedical Sciences
2016-	present	Sushma Boppana	Medical Scientist Training Program (MSTP)
2016-	present	Ashley N Conelly	Graduate Biomedical Sciences (Mentor)
2017-	present	Hayden Pecl	Medical Scientist Training Program (Com. Chair)
2017-	present	Marcus D. Davis	Graduate Biomedical Sciences (Mentor)
2017-	present	Krystle L. Ong	Graduate Biomedical Sciences (Mentor)

MENTORING GRADUATE STUDENTS / PhD. QUALIFICATION EXAM COMMITTEES:

2007	Olusimidele Akinsiku	Cellular and Molecular Biology
2008	Rebecca Rudicell	Cellular and Molecular Biology
2009	Anne M. Bett	Cellular and Molecular Biology
2009	Mike Lopker	Cellular and Molecular Biology

MENTORING UNDERGRADUATE STUDENTS / PROGRAM FOR RESEARCH EXPERIENCE IN PATHOLOGY (PREP):

2003	Nathan Owens

JUDGE / STUDENT RESEARCH COMPETITIONS:

2006 -	Judge, Poster Session; Annual Pathology Graduate Student Research Day
2006 -	Judge, Poster Session; CMB program
2007 -	Judge, Poster Session; Annual Pathology Graduate Student Research Day
2007 -	Judge, Poster Session; Comprehensive Cancer Center Retreat
2007 -	Judge, Poster Session; CMB program
2008 -	Judge, Poster Session; Comprehensive Cancer Center Retreat
2008 -	Judge, Poster Session; CMB program
2009 -	Judge, Poster Session; Betty Spencer Pritchett Award, Annual Pathology Graduate Student Research Day
2009 -	Judge, Poster Session; Comprehensive Cancer Center Retreat
2010 -	Evaluator, Poster Session; Annual Pathology Graduate Student Research Day
2010, 2011, 2013, 2016	Judge, Poster Session; GBS Program.

2012, 2013, 2014 , 2016 Judge, Poster Session, Pathology Trainee Research Day.

EVALUATOR / STUDENT SCHOLARSHIP PROGRAMS:

2010 **Howard Hughes Medical Institute international scholarship.** The HHMI International Student Research Fellowships are designed to facilitate the research training of outstanding international predoctoral students in the biomedical or related sciences, including physical and mathematical sciences. Served as an evaluator for the UAB institutional nomination.

2017 **Member, Trainee Selection Committee** for the Translational and Molecular Medicine (T32).

MENTORING MEDICAL RESIDENTS IN RESEARCH PAHWAY PROGRAMS:

2012-present Nathaniel Erdmann, American Board of Internal Medicine (ABIM) Research Pathway program.

MENTORING FACULTY:

2016-present **Center for Clinical and Translational Science** grant review panels (**PDQs**). The purpose is to review the grant applications by faculty members and provide feedback and suggestions prior to the submission.

EVALUATOR / FACULTY DEVELOPMENT PROGRAMS:

2010, 2011, 2012, 2013, 2016 – **Evaluator, Faculty Development Grant Program, UAB.** Reviewed and evaluated grants submitted by junior faculty focusing on the development of independent research program and grants submitted by senior faculty focusing on a change in the direction of research.

INTERNATIONAL TEACHING-RELATED COUNCILS AND COMMITTEES:

2005 **Graduation Committee, School of Medicine, Universidad de Antioquia, Medellin, Colombia**. Served as an external member of the dissertation committee for The Corporacion Academica Ciencias Basicas Biomedicas (CCBB) Ph.D. program. The program is the flagship of biomedical Ph.D. programs in Colombia intending to educate the future scientific elite.

2007 **External Evaluator of Student Research, School of Medicine, Charles University, Prague, Czech Republic**. Served as an international external judge evaluating students' research projects, selecting presentations for award competition and providing feedback for future research.

2019 **External Evaluator, Postgraduate Program, University of KwaZulu-Natal, South Africa.** K.K.Naidoo, PhD candidate. "Impact of Duffy Antigen Receptor for Chemokines (DARC)-null linked Neutropenia on Neutrophil and Natural Killer cell Function in HIV-1 Infection".

MENTORING STUDENTS / McGILL UNIVERSITY, MONTREAL, CANADA:

1993 - 1997 Assisted in training 3 summer program students and 2 Ph.D. students (Wojciechowski, W., DiMarco, S.). Department of Experimental Medicine, McGill University, Montreal.

MENTORING STUDENTS / NATIONAL CANCER INSTITUTE, NIH, BETHESDA:

1997 - 2002 Assisted in training of two visiting students in the Summer Science Program and one 12-month Howard Hughes Medical Institute fellow at NCI, NIH (Monita Poudyal, MD).

TEACHING POSTGRADUATE COURSES ORGANIZED BY THE FOUNDATION FOR THE ADVANCED EDUCATION IN SCIENCES (FAES), NIH, BETHESDA:

Immunology (Module Director in 2001 and 2002) 12 hours
Innate and adaptive immune system, T cells, Antigen presentation, B cells and antibodies, Immune deficiencies, HIV Immunology, Vaccines. (1999, 2000, 2001, 2002)

Biochemistry 10 hours
Sugars, Polysaccharides, Proteoglycans, Glycolysis, Pentose Phosphate Cycle, Gluconeogenesis, Oxidative Phosphorylation, Photosynthesis, Muscle Biochemistry, Molecular Motors. (2000, 2001, 2002)