BIOGRAPHICAL SKETCH

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NAME: **Swirski, Filip K.**

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

POSITION TITLE: **Associate Professor of Radiology**

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
McMaster University, Hamilton, Canada	B. Arts Sci.	05/1998	Biochemistry
McMaster University, Hamilton, Canada	Ph.D.	02/2004	Immunology
Harvard Medical School, Boston, MA		02/2007	Vascular Biology

A. Personal Statement

My research aims to understand how leukocytes shape and are shaped by inflammation. We use *in vivo* models of acute and chronic inflammation relevant to cardiovascular, infectious, and metabolic diseases, and focus on cell development, communication, and function. We think that the diversity of inflammatory conditions arises from the tension between conserved cell behaviors and specific tissue contexts. Leukocytes defend against danger, but also connect diseases and perpetuate the accrual of co-morbidities (ORCID: 0000-0002-3163-9152).

Swirski FK, Nahrendorf M. Leukocyte behavior in atherosclerosis, myocardial infarction, and heart failure. ***Science***. 2013;339:161-6. PMID: 23307733. PMCID: PMC3891792.

Swirski FK, Nahrendorf M. Cardioimmunology: The immune system in cardiac homeostasis and disease. ***Nat Rev Immunol***. 2018;18:733-744.

B. Positions and Honors

Positions and Employment

1993-1998 Undergraduate Student, McMaster University, Hamilton, Canada
1998-2004 Graduate Student, McMaster University, Hamilton, Canada (Mentor: Martin Stampfli)
2004-2007 Postdoctoral Fellow, Brigham and Women's Hospital and Harvard Medical School, Boston, MA (Mentor: Peter Libby)
2007-2010 Instructor in Immunology, Assistant in Radiology; Harvard Medical School and Massachusetts General Hospital, Boston, MA
2010-2014 Assistant Professor of Radiology, Harvard Medical School and Massachusetts General Hospital, Boston, MA
2014-present Faculty Member of the Harvard Immunology PhD Program
2014-present Associate Professor of Radiology, Harvard Medical School and Massachusetts General Hospital, Boston, MA

Other Experience and Professional Memberships

2005-present Reviewer for Journals*: Science; Nature; Nature Medicine; Nature Reviews Immunology; Immunity; Circulation; Journal of Experimental Medicine; Journal of Clinical Investigation; Cell Metabolism; Blood; Circulation Research; PNAS; Science Translational Medicine; Arteriosclerosis, Thrombosis and Vascular Biology; Journal of Immunology; Cell Reports; Journal of Leukocyte Biology; PLoS Pathogens; PLoS ONE*; and others

2005-present	Reviewer for Granting Agencies: AICS Study Section at the NIH (Ad hoc); NHLBI Special Emphasis Panel; American Heart Association; ATVB, NASA, Canadian Institutes of Health Research; Israel Science Foundation; others
2007-present	>145 invited talks at local, national, and international meetings, including Gordon, Keystone, American Heart Association, ATVB, American Association of Immunologists, Experimental Biology
2007-present	Mentor to >20 students and postdoctoral fellows
2012-present	Editorial Board: A*rteriosclerosis, Thrombosis, and Vascular Biology*; *Circulation Research*
2014-present	Tutor to Harvard Medical Students and Harvard PhD Immunology Graduate Students
2016-present	Director of IMM202:Immune and Inflammatory Diseases, Harvard Medical School
2016-2020	Standing Member of the AICS Study Section at the NIH
2018-2020	Chair of the AICS Study Section at the NIH

Honors and Awards

1998	Graduated *summa cum laude*
1998-2000	University Scholarship, McMaster University
2001-2004	Doctoral Research Award, Canadian Institutes of Health Research
2005-2007	Postdoctoral Fellowship, American Heart Association
2014-2016	Howard M. Goodman Fellowship, Massachusetts General Hospital
2016	Martin Prize for Fundamental Research, Massachusetts General Hospital
2016-2021	Patricia and Scott Eston MGH Research Scholar, Massachusetts General Hospital
2017-2022	Established Investigator Award, American Heart Association
2016-2023	Outstanding Investigator Award, National Institutes of Health
2016	National Postdoctoral Association Mentor Award Nominee
2017	Jeffrey M. Hoeg Award for Basic Science and Clinical Research, American Heart Association
2018	*Circulation Research* profile in “Leaders in Cardiovascular Science”
2018	Clarivate Analytics’ Highly Cited Researcher
2021	Chair of Gordon Research Conference on Atherosclerosis

C. Contributions to Science

1. A major long-standing focus is to understand how monocytes and macrophages participate in atherosclerosis and myocardial infarction. I showed that monocytes accumulate continuously in evolving atherosclerotic lesions. I linked atherosclerosis with blood monocytosis. I identified a biphasic monocyte-macrophage response that coordinates healing, and discovered a monocyte reservoir in the spleen. I showed that sleep protects against atherosclerosis by limiting monocyte production.

Swirski FK, Libby P, Aikawa E, Alcaide P, Luscinskas FW, Weissleder R, Pittet MJ. Ly-6C hi monocytes dominate hypercholesterolemia-associated monocytosis and give rise to macrophages in atheromata. ***J Clin Invest***. 2007;117:195-204. PMID: 17200719. PMCID: PMC1716211.

Nahrendorf M*, Swirski FK*, Aikawa E, Stangenberg L, Wurdinger T, Figueiredo J, Libby P, Weissleder RW, Pittet MJ. The healing myocardium sequentially mobilizes two monocyte subsets with divergent and complementary functions. ***J Exp Med.*** 2007;204:3037-3047. PMID: 18025128. PMCID: PMC2118517.*co-first authorship.

Swirski FK*, Nahrendorf M*, Etzrodt M, Wildgruber M, Cortez-Retamozo V, Panizzi P, Aikawa E, Mempel A, Libby P, Weissleder R, Pittet MJ. Identification of splenic reservoir monocytes and their deployment to inflammatory sites. ***Science.*** 2009;325 (5940): 612-16. PMID: 19644120. PMCID: PMC2803111.*co-first authorship.

McAlpine CS, Kiss MG, Rattik S, He S, Vassalli A, Valet C, Anzai A, Chan CT, Mindur JE, Kahles F, Poller WC, Frodermann V, Fenn AM, Gregory AF, Halle L, Iwamoto Y, Hoyer FF, Binder CJ, Libby P, Tafti M, Scammell TE, Nahrendorf M, Swirski FK. Sleep modulates hematopoiesis and protects against atherosclerosis. ***Nature***. 2019. In press.

2. Systemic inflammatory networks connect various cardiovascular and metabolic processes. I showed that the spleen produces monocytes by extramedullary hematopoiesis. I provided evidence for the relative contribution of monocyte recruitment and macrophage proliferation atherosclerosis. I identified an on-demand mechanism by which transient monocyte-derived macrophages dispose of erythrocytes and recycle iron. I identified a population of intraepithelial T cells that modulate dietary metabolism and contribute to cardiovascular disease.

Robbins CS, Chudnovskiy A, Rauch PJ, Figueiredo JL, Iwamoto Y, Gorbatov R, Etzrodt M, Weber GF, Ueno T, van Rooijen N, Mulligan-Kehoe MJ, Libby P, Nahrendorf M, Pittet MJ, Weissleder R, Swirski FK. Extramedullary hematopoiesis generates Ly-6C high monocytes that infiltrate atherosclerotic lesions. ***Circulation.*** 2012;125:364-74. PMID: 22144566. PMCID: PMC3263762.

Robbins CS, Hilgendorf I, Weber G, Theurl I, Iwamoto Y, Figueiredo JL, Gorbatov R, Sukhova GK, Gerhardt LMS, Smyth D, Zavitz CJ, Shikatani EA, Parsons M, Rooijen N, Lin HY, Husain M, Libby P, Nahrendorf M, Weissleder R, Swirski FK. Local proliferation dominates lesional macrophage accumulation in atherosclerosis. ***Nat Med***. 2013;19:1166-72. PMID: 23933982. PMCID: PMC3769444.

Theurl I, Hilgendorf I, Nairz M, Tymoszuk P, Haschka D, Asshoff M, He S, Gerhardt LMS, Holderried TAW, Seifert M, Sopper S, Fenn AM, Anzai A, Rattik S, McAlpine C, Theurl M, Wieghofer P, Iwamoto Y, Weber GF, Harder NK, Chousterman BG, Arvedson TL, McKee M, Wang F, Lutz OMD, Rezoagli E, Babitt JL, Berra L, Prinz M, Nahrendorf M, Weiss G, Weissleder R, Lin HY, Swirski FK. On-demand erythrocyte disposal and iron recycling requires monocyte-derived transient macrophages in the liver. ***Nat Med***. 2016;22:945-951. PMID: 27428900. PMCID: PMC4957133

He S, Kahles F, Rattik S, Nairz M, McAlpine C, Anzai A, Selgrade D, Fenn AM, Chan CT, Mindur JE, Valet C, Poller WC, Halle L, Rotllan N, Iwamoto Y, Wojtkiewicz GR, Weissleder R, Libby P, Fernandez-Hernando C, Drucker DJ, Nahrendorf M, Swirski FK. Gut intraepithelial T cells calibrate metabolism and accelerate cardiovascular disease. ***Nature***. 2019;566:115-119. PMID: 30700910 PMCID: PMC6367023.

3. Growth factors contribute to the survival, proliferation, and differentiation of hematopoietic cells. I discovered a GM-CSF-producing B cell that protect against sepsis and pneumonia. I identified a role for GM-CSF-producing cells in atherosclerosis. I showed that the growth factor IL-3 aggravates sepsis by eliciting the cytokine storm. I defined a critical role for IL-3 in myocarditis.

Rauch PJ, Chudnovskiy A, Robbins CS, Weber GF, Etzrodt M, Hilgendorf I, Tiglao E, Figueiredo JL, Iwamoto Y, Theurl I, Gorbatov R, Waring MT, Chicoine AT, Mouded M, Pittet MJ, Nahrendorf M, Weissleder R, Swirski FK. 2012. Innate response activator B cells protect against microbial sepsis. ***Science***. 2012;335 (6068): 597-601. PMID: 22245738. PMCID: PMC3279743.

Hilgendorf I, Theurl I, Gerhardt LM, Robbins CS, Weber GF, Gonen A, Iwamoto Y, Degousee N, Holderried TA, Winter C, Zirlik A, Lin HY, Sukhova GK, Butany J, Rubbin BB, Witztum JL, Libby P, Nahrendorf M, Weissleder R, Swirski FK. Innate response activator B cells aggravate atherosclerosis by stimulating T helper 1 adaptive immunity. ***Circulation***. 2014;129:1677-1677 PMID: 24435095. PMCID: PMC3997655.

Weber GF, Chousterman BG, He S, Fenn AM, Nairz M, Anzai A, Brenner T, Uhle F, Iwamoto Y, Robbins CS, Noiret N, Maier SL, Zönnchen T, Rahbari NH, Schölch S, Klotzsche-von Ameln A, Chavakis T, Weitz J, Hofer S, Weigand MA, Nahrendorf M, Weissleder R, Swirski FK. Interleukin-3 amplifies acute inflammation and is a potential therapeutic target in sepsis. ***Science***. 2015;347:1260-1265. PMID: 25766237. PMCID: PMC4376966.

Anzai A, Mindur JE, Halle L, Sano S, Choi JL, He S, McAlpine CS, Chat CT, Kahles F, Valet C, Fenn AM, Nairz M, Rattik S, Iwamoto Y, Fairweather D, Walsh K, Libby P, Nahrendorf M, Swirski FK. Self-reactive $CD4^{+}IL\text{-}3^{+}$ T cells amplify autoimmune inflammation in myocarditis by inciting monocyte chemotaxis. ***J Exp Med***. 2019;216:369-383.

Complete List of Published Work in my Bibliography (>150 publications; h factor 66; >18,000 citations): http://www.ncbi.nlm.nih.gov/pubmed/?term=Swirski+fk

D. Research Support

Ongoing Research Support

R35HL135752 03/01/2017-02/28/2024
Macrophages in homeostasis and cardiovascular disease
The goal of this study is to test the role of tissue and bone marrow-derived macrophages in atherosclerosis and its complications.
Role: PI

P01HL131478 03/17/2017-02/28/2022
Stress and atherosclerotic plaque macrophages — A systems biology approach.
The goal of this study is to test how stress influences atherosclerosis.
Role: PI on Project 1

1R01 HL128264 09/01/2015-05/31/2019
Lifestyle effects on hematopoiesis and atherosclerosis
The goal of this study is to determine how lifestyle such as exercise, diet, sleep, and stress affect hematopoiesis and atherosclerosis.
Role: MPI (Contact PI)

AHA Established Investigator Award 01/01/2017-12/31/2021
Colony-stimulating factors in cardiovascular disease
The goal of this study is to determine the role of CSF such as GM-CSF and IL-3 in cardiovascular disease including myocardial infarction and aortic abdominal aneurysm.
Role: PI

MGH Research Scholar 04/01/2016-03/31/2021
Macrophages in Inflammation, Physiology, and Metabolism
The goal of this project is to profile the developmental and functional pathways by which tissue and monocyte-derived macrophages shape processes related to inflammation, metabolism, and physiology.
Role: PI

Cure Alzheimer's Fund 01/01/2019-12/31/2021
Interleukin-3 in Alzheimer's Disease
The overall goal of this project is to elucidate the role of the growth factor IL-3 in Alzheimer's Disease.
Role: PI