

# Karen Bedard, Ph.D.

Associate Professor, Department of Pathology, Dalhousie University, Box 15000, Halifax, Nova Scotia, B3H 4R7  
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## Academic Appointments

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**Associate Professor** 2015 - present  
**Assistant Professor** 2008 - 2015

Department of Pathology, Dalhousie University, Halifax, Canada  
Division of Hematopathology (affiliated scientist) Nova Scotia Health Authority  
Department of Pediatrics (cross appointment), Isaak Walton Killam Children's Hospital

Discovery of disease-causing gene mutations and cell culture based functional studies of the effect of genetic variation and mutation.

## Education

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**Postdoctoral Fellow** 2005-2008  
Department of Pathology and Immunology, Université de Genève, Switzerland.  
Analysis of the genetic basis for functional differences observed in reactive oxygen species production by the NADPH oxidase (NOX) family of proteins using a population based genetics study and cell-model functional analysis of genetic variations  
Mentor: Dr Karl-Heinz Krause, MD, PhD

**Postdoctoral Fellow** 2002-2005  
Department of Biochemistry, University of Alberta, Edmonton, Alberta, Canada.  
Functional Characterization of the Endoplasmic Reticulum Chaperone Protein Calnexin using a Calnexin-knockout Mouse Model  
Mentor: Dr Marek Michalak, PhD

**Ph.D. Pharmacology** 1997-2002  
Atlantic Veterinary College, Department of Biomedical Sciences, Charlottetown, Prince Edwards Island, Canada  
Title: "Endoplasmic Reticulum Stress Proteins in Chemically Mediated Cytotoxicity"  
Mentor: Dr. Alastair Cribb, DVM, PhD

**M.Sc. Pharmacology** 1995-2007  
Dalhousie University, Department of Pharmacology, Halifax, Nova Scotia, Canada  
"Mediators of the Depression in CYP1A Activity Produced by Cytokines"  
Mentor: Dr. Ken Renton, PhD

**B.Sc. Joint Advanced Major Mathematics/Chemistry** 1990-1994  
Saint Francis Xavier University

## Teaching

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**Pathology 5035 Human Genetics:** 2016-present  
Developed and delivered 4 lectures covering gene action and genetics of cancer to 3<sup>rd</sup> and 4<sup>th</sup> year undergraduate as well as graduate level students.

**Med I Human Development:** 2016-present  
Developed and delivered 1 lecture on Genetic Testing for first year medical students.

**Pathology 3000 Basic Pathology.** 2015-present  
Co-Coordinator. As part of a new undergraduate program (Bachelor of Medical Sciences), we are establishing a new undergraduate (3<sup>rd</sup> year) course in general pathology.

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**Directed Readings in Cancer Signaling.**

**2014-present**

Developed and delivered a one term course focused on current topics in the area of Cancer Signaling. Each class was centered around an assigned reading of a recent article with presentations from students and special guest speakers. Topics included DNA damage and Repair, Oncogenes, Tumour Suppressors, Reactive Oxygen, Metastasis, Epigenetics and Stem Cells.

**Microbiology 2115 Organs and Tissues.**

**2014-present**

Co-Course Coordinator for a second-year course on human organs and tissues. Preparation and delivery of 4.5 hours of lecture, coordinating the instruction of the remaining course time and prepare, deliver, and grade examinations.

**Research in Medicine.**

**2013**

33 contact hours with first year undergraduate medical students to introduce them to the many ways in which clinicians can engage in medical research.

**Mediators of Inflammation.**

**2013-present**

Prepared and delivered lecture (1 hr) and paper discussion (2hr) on the subject of reactive oxygen species in inflammatory conditions.

**Pharmacology for Occupational Therapy:**

**2011-present**

Preparation and delivery of Introductory lectures in Basic Pharmacology, preparation of exam questions.

**Methods Club.**

**2012-2014**

Implemented a journal club style series where students and special guest speakers presented and discussed a variety of current research techniques. 2 hours per month.

**Directed Readings in Reactive Oxygen Species.**

**2011**

Developed and delivered a full year course focused on current topics in the area of Reactive Oxygen Species. Each class was centered around an assigned reading of a recent article with presentations from students and special guest speakers.

**Case Oriented Problem Solving:**

**2009**

Delivery of the Host Defense case based learning sessions to a group of 1<sup>st</sup> years Medical Students. 9 weeks, 6 hours/week

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## Awards

**Janigan Teaching Award**

**2014**

Award for excellence in teaching within the Dalhousie Department of Pathology

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## Academic Service

**University Committees**

Bachelor of Science in Medical Science Program Committee	Member	2014-present
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**Faculty Committees**

Faculty of Medicine Nominating Committee	Chair	2016-present
Faculty of Medicine Nominating Committee	Member	2014-2015
BSc MedSci Genetics Certificate	Coordinator	2015-2016
BSc MedSci Honours Committee	Member	2015-present
Dalhousie Medical School Admission Committee	Member	2009-2012
Hematopathology Search and Selection Committee	Member	2015
Tier II in Genetics Search and Selection Committee	Member	2012, 2013
Division of Microbiology Search and Survey Committee	Member	2012

**Department Committees**

Pathology Department Research Committee	Acting Chair	2015-2016
Pathology Department Research Committee	Member	2011-2015
Pathology Department Graduate Studies Committee	Co-Chair	2015-present
Pathology Department Graduate Studies Committee	Member	2009-2015
Pathology Undergraduate Medical Education Committee	Member	2011-present

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## Editorial and Review Activities

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### Editorial

Co-editor (with Dr Vincent Jaquet) of forum issue in the journal *Antioxidants & Redox Signaling* on "Nox-Directed Therapeutics" (2012-2015)

Co-editor (with Dr Karl-Heinz Krause) of forum issue in the journal *Seminars in Immunopathology* on "NOX Enzymes in Immuno-Inflammatory Pathologies" (2008)

### Manuscript review

Human Genetics; Drugs of the Future; PLoS One; Pediatric Blood and Cancer; American Journal of Physiology – Gastrointestinal and Liver Physiology; Human Genetics; American Journal of Physiology: Endocrinology and Metabolism; Free Radical Biology and Medicine; American Journal of Physiology -Heart and Circulatory Physiology; Experimental Dermatology; Biochimie; Drug News & Perspectives ; International Journal of Andrology; FASEB; Journal of Leukocyte Biology; Current Drug Metabolism

### Grant review

NSERC Collaborative Research and Development Grants	2016
CRTP trainee awards	2016
BHCRI New Investigator Grant Review	2015-2016
Canadian Breast Cancer Foundation Atlantic Region Grant Review	2015
BHCRI Operating Grant Review	2014
CIHR Fellowship review committee	2011-2013
BHCRI Studentship Review	2011
NSHRF Research Trainee Application review committee	2010
Canadian Breast Cancer Foundation Atlantic Region studentship committee	2009

## Publications

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### Peer Reviewed Publications

- 1 [Obaid NM](#), [Bedard K](#), Huang WY (2017) [Strategies for Overcoming Resistance in Tumours Harbouring BRAF Mutations](#). *International Journal of Molecular Sciences*. Int. J. Mol. Sci. 18, E585.
- 2 [Whitehouse S](#), Greensheilds A, [Chen PL](#), Nightingale M, Hoskin D, [Bedard K](#) (2016) [Resveratrol, piperine and apigenin differ in their NADPH-oxidase inhibitory and reactive oxygen species-scavenging properties](#). *Phytomedicine* 23: 1494-1503.
- 3 [Bedard K](#), [Whitehouse S](#), Jaquet V. (2015) [Challenges, Progresses, and Promises for Developing Future NADPH Oxidase Therapeutics](#). *Antioxid Redox Signal*. 23:355-7.
- 4 Bentley V, Veinotte CJ, Corkery DP, Pinder J, [Leblanc MA](#), [Bedard K](#), Weng AP, Berman JN \*, Delleire G \*. [Focused chemical genomics using zebrafish xenotransplantation as a pre-clinical therapeutic platform for T-cell acute lymphoblastic leukemia](#) *Haematologica* (2015) 100, 70-6 (IF 5.9)
- 5 [Gaston D](#) \*, Hansford S \*, Nightingale M, Macgillivray C, Kaurah P, Rideout A, Steele P, Huang WY, [Whitehouse S](#), [LeBlanc MA](#), Jiang H, Greer W, Samuels M, Orr A, Ludman M, Penney L, McMaster CR, Huntsman D, [Bedard K](#)<sup>‡</sup>. [Germline mutations in MAP3K6 are associated with familial diffuse gastric cancer](#) (2014) *PLoS Genetics* e1004669 (<sup>‡</sup>corresponding author, \* authors contributed equally) (IF 8.5)
- 6 [Robitaille JM](#); [Gillett RM](#), [LeBlanc MA](#), [Gaston D](#), Nightingale MN, [Mackley MP](#); Parkash K; Hathaway J, Thomas A, Ells A; Traboulsi EI, Héon E, Roy M, Shalev S, Fernandez CV, MacGillivray C, Wallace K, Fahiminiya S, Majewski J, McMaster CR,

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- Bedard K.** [Phenotypic Overlap Between Familial Exudative Vitreoretinopathy \(FEVR\) and Microcephaly Lymphedema Chorioretinal Dysplasia \(MLCRD\) Caused by KIF11 Mutations](#) (2014) 132; 1393-9. *JAMA Ophthalmology* (IF 3.8)
- 7 **LeBlanc MA\***, Penney LS\*, **Gaston D**, Shi Y, Aberg E, Nightingale M, Jiang H, **Gillett RM**, Fahiminiya S, Macgillivray C, Wood EP, Acott PD, Khan MN, Samuels ME, Majewski J, Orr, McMaster CR, **Bedard K**<sup>‡</sup> [A rearrangement in OCLN causes brain calcification and renal dysfunction](#) (2013) *Human Genetics* 132: 1222-34 (‡corresponding author, \* authors contributed equally) (IF 4.6)
- 8 Bogdanik L, Sleight J, Tian C, Samuels ME, **Bedard K**, Seburn K, and Burgess RW [Loss of Lrsam1, a Charcot-Marie-Tooth disease-associated E3 ubiquitin ligase, sensitizes peripheral axons to degeneration in mice](#) (2013) *Disease Models and Mechanisms* 6: 780-92 (IF 5.0)
- 9 Copeland E, Renault N, Renault M, Dyack S, Bulman DE, **Bedard K**, Otley A, Magee F, Acott P and Greer WL. [A Novel Splice-Site Mutation in ATP8B1 Results in Atypical Progressive Familial Intrahepatic Cholestasis Type 1](#) (2013) *Journal of Gastroenterology and Hepatology* 28:560-564 (IF 3.3)
- 10 **Bedard K**, Jaquet V (2012) [Cell-free Screening for NOX Inhibitors](#) *Chem Biol* 2012 19, 664-5 (IF 6.2)
- 11 Attar H; **Bedard K**; Migliavacca E; Gagnebin M; Dupré Y; Descombes P; Borel C; Deutsch S; Prokisch H; Meitinger T; Mehta D; Wichmann EH; Delabar JM; Dermitzakis ED; Krause KH; Antonarakis SE (2012) [Extensive natural variation for cellular hydrogen peroxide release is genetically controlled](#) *PLoS One* 7: e43566 (IF 3.7)
- 12 **Bedard K**, Jaquet V and Krause KH (2012) [Nox5: from basic biology to signaling and disease](#) *Free Radical Biology and Medicine* 52: 725-34 (IF 5.3)
- 13 Jaquet V, Leidal K, Perozzo R, Plastre O, Fioraso-Cartier L, Diebold B, Scapozza L, Nauseef WM, Krause KH\* and **Bedard K\*** (2011) [NADPH oxidase \(NOX\) isoforms are inhibited by celestrol with a dual mode of action](#) *British Journal of Pharmacology*, 164: 507-520 (\*these authors contributed equally) (IF 3.8)
- 14 Guernsey DL, Jiang H, **Bedard K**, Evans SC, Ferguson M, Matsuoka M, Macgillivray C, Nightingale M, Perry S, Rideout AL, Orr A, Ludman M, Skidmore DL, Benstead T, Samuels ME (2010) [Mutation in the gene encoding ubiquitin ligase LRSAM1 in patients with Charcot-Marie-Tooth Syndrome](#) *PLoS Genet*, 6, e1001081 (IF 8.5)
- 15 Kraus A, Jung J, Groenendyk J, **Bedard K**, Krause KH, Dubois-Dauphin M, Baldwin TA, Agellon LB, Dyke J, Gosgnach S, Rosenbaum E, Korngut L, Colley NJ, Zochodne D, Todd K, and Michalak M (2010) [Calnexin Deficiency Leads to Dysmyelination](#) *Journal of Biological Chemistry*, 285, 18928-38 (IF 4.6)
- 16 Li B, **Bedard K**, Sorce S, Dubois-Dauphin M, and Krause KH (2009) [NOX4-dependent ROS generation in a human microglial cell line](#) *Journal of Innate Immunity* 1, 570-581 (IF 4.6)
- 17 Jaquet V and **Bedard K** (2009) [Genetic Mapping - the path of discovery for novel functions of the NOX NADPH oxidases](#) *Journal of Leukocyte Biology* 86, 461-3 (IF 4.6)
- 18 **Bedard K**, Attar H, Bonnefont B, Jaquet V, Borel C, Plastre O, Stasia MJ, Antonarakis SE, Krause KH (2009) [Three common polymorphisms in the CYBA gene form a haplotype associated with decreased ROS generation](#) *Human Mutation* 30, 1123-1233 (IF 5.2)
- 19 Basset O, Deffert C, Foti M, **Bedard K**, Jaquet V, Ogier-Denis E and Krause KH (2009) [NADPH Oxidase 1 Deficiency alters caveolin phosphorylation and angiotensin II receptor localization in vascular smooth muscle](#) *Antioxidants and Redox Signaling* 11, 2371-2384 (IF 7.2)
- 20 Guernsey DL, Jiang H, Evans SC, Ferguson M, Matsuoka M, Nightingale M, Rideout A, Provost S, **Bedard K**, Orr A, Dubé MP, Ludman M, Samuels ME (2009) [Mutation in pyrroline 5-carboxylate reductase gene 1 in families with cutis laxa type 2](#) *American Journal of Human Genetics* 85, 120-129 (IF 11.2)

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- 21 Krause KH, **Bedard K** (2008) [NOX enzymes in immuno-inflammatory pathologies](#) Seminars in Immunopathol 30, 193-194 (IF 5.4)
- 22 Coe H, **Bedard K**, Groenendyk J, Jung J, Michalak M (2008) [Endoplasmic reticulum stress in the absence of calnexin](#) Cell Stress Chaperones 13, 497-507 (IF 2.5)
- 23 **Bedard K**, Lardy B, Krause KH (2007) [NOX Family NADPH Oxidases: Not Just in Mammals](#) Biochimie 89, 1107-1112 (IF 3.1)
- 24 **Bedard K**, Krause KH (2007) [The NOX family of ROS generating NADPH oxidases: physiology and pathophysiology](#) Physiological Reviews, 87, 245-313 (IF 30.1)
- 25 Serrander L, Jaquet V, **Bedard K**, Plastre O, Hartley O, Arnaudeau S, Demaurex N, Schlegel W, Krause KH (2007) [NOX5 is expressed at the plasma membrane and generates superoxide in response to protein kinase C activation](#) Biochimie 89, 1159-1167 (IF 3.1)
- 26 Serrander L, Cartier L, **Bedard K**, Banfi B, Lardy B, Plastre O, Sienkiewicz A, Fórró L, Schlegel W, Krause KH (2007) [NOX4 activity is determined by mRNA levels and reveals a unique pattern of ROS generation](#) Biochemical Journal 406, 105-114 (IF 4.6)
- 27 **Bedard K**, Eva Szabo, Michalak M, Opas M (2005) [Cellular Functions of ER Chaperones Calreticulin, Calnexin and Erp57](#) International Review of Cytology - A Survey of Cell Biology, 245, 91-121
- 28 Ryan P, **Bedard K**, Breining T, Cribb A (2005) [Disruption of the Endoplasmic Reticulum by Cytotoxins in LLC-PK1 Cells](#) Toxicology Letters, 159, 154-163
- 29 **Bedard K**, MacDonald N, Collins J and Cribb A (2004) [Cytoprotection following endoplasmic reticulum stress protein induction in continuous cell lines](#) Pharmacology and Toxicology, 94: 124-131
- 30 **Bedard K**, Fuentealba C and Cribb A (2000) [The Long Evans Cinnamon \(LEC\) rat develops hepatocellular damage in the absence of antimicrosomal antibodies](#) Toxicology, 146: 101-109
- 31 **Bedard K**, Smith SR and Cribb AE (2000) [Sequential assessment of an anti-drug antibody response in a patient with a systemic delayed onset sulfonamide hypersensitivity reaction](#) The British Journal of Dermatology, 142: 253-258

#### Other Publications

- 1 **Bedard K**, [Whitehouse S](#), Jaquet V. (2015) [Challenges, Progresses, and Promises for Developing Future NADPH Oxidase Therapeutics](#). Antioxid Redox Signal. 23: 355-357. (IF 7.4)