

Shelagh Diane Campbell
Professor Emerita, Department of Biological Sciences
University of Alberta, Edmonton, AB, Canada

EDUCATION

Postdoctoral: University of California, San Francisco (Biochemistry and Biophysics)

1991-1997: “Developmental regulation of the cell cycle” Supervisor: Dr Patrick O’Farrell

PhD: University of Connecticut, Storrs, CT (Molecular and Cell Biology)

1990: “Molecular Genetic Analysis of the *scalloped* gene” Supervisor: Dr Arthur Chovnick

MSc: University of Guelph, Guelph, ON, Canada (Molecular Biology and Genetics)

1984: “Cytogenetic analysis of superoxide dismutase” Supervisors: Dr John Phillips & Arthur Hilliker

Bachelor of Independent Studies (Specialization: Cell Biophysics) University of Waterloo,

1980: Senior Undergraduate Research Supervisors: Dr Jim Lepock & Jack Kruuv

ACADEMIC EXPERIENCE

2018 - Professor Emerita, Department of Biological Sciences, University of Alberta

2013 - 2017 Professor, Department of Biological Sciences, University of Alberta

2010 (6 mo) Sabbatical with Michel Gho, University of Paris, UPMC

2004 - 2012 Associate Professor, Department of Biological Sciences, University of Alberta

2004 (6 mo) Sabbatical with William Sullivan, U. California, Santa Cruz

1997 – 2004 Assistant Professor, Department of Biological Sciences, University of Alberta

PROFESSIONAL HONORS and AWARDS

Fellow, Program of Excellence in Molecular Biology, UCSF (1996-1997)

MRC Centennial Postdoctoral Fellowship (1994-1996)

MRC Postdoctoral Fellowship with renewal (1991-1994)

Phi Beta Kappa, 1990

Student Fellowship, Cold Spring Harbor Laboratory: *Drosophila* Neurobiology, 1989

Graduate Student Research Scholarship, University of Connecticut (1988-1990)

NSERC Post-graduate Fellowship (1982-84; 1984-86)

SCIENTIFIC SOCIETY MEMBERSHIP

Canadian Genetics Society (1997- present)

American Genetics Society (1986- present)

American Society for Cell Biology (2000-present); ASCB Ambassador (2017-present)

Graduate Training (Primary Supervisor):

PhD students: Price (2002), Jin (2005), Ayeni (2014), Varadarajan (2016)

MSc students: Silva (2002), Pedersen (2005), Huang (2006), Lee (2008), Zhuo (2013), Willms (2019)

Undergraduate and Graduate Teaching (1998-2018)

BIOL207: 200+ students/yr, introduction to basic concepts of diploid genetics.

GENET304: 50+ students/yr, fundamental mechanisms of gene regulation.

GENET302: 50+ students/yr, chromosome biology and genetic manipulation.

GENET305: 60+ students/yr, analysis of gene function from a biomedical perspective.

GENET375: 30+ students/yr, molecular genetic laboratory techniques.

BIOL498/99: 5+ students/yr, individual senior undergraduate research projects.

GENET500: 10+ students/yr, advanced genetic analysis.

GENET605: 30+ students/yr, molecular and cellular genetics visiting seminar series.

Other Academic Service

MSc and PhD Graduate Supervisory and Examining Committees (63 total; 1997-present).

Molecular Genetics Undergraduate Program Advisor, 2010-2018 (~20+ students/yr).

Departmental Microscopy Facility Committee (2011-2016)

Undergraduate Awards Committee (2011-2013)

Research Supervisor for URI fellowship awardees (5 held; 4 months full time summer research).

Cancer Research Institute of Northern Alberta founding member and Steering Committee (2011-now)

Departmental Faculty Search Committee Member (2006; 2012; 2018; 2019)

External Reviewer - CIHR, NSERC Research Grant Applications (1998- ongoing: 46 reviews)

External Reviewer (1998-ongoing: 51 reviews): *Genome, Genetics, G3, PLOS GENETICS, PLOS BIOLOGY, Molecular Biology of the Cell, Current Biology, PNAS, Genes and Development, PLOS ONE, Development, J. Cell Science*

External Tenure Review (1998-current: 12 reviews)

Faculty Host for Invited Speakers

Dr Bruce Edgar, Hunter Cancer Research Ctr (2017);

Dr Terry Orr-Weaver, MIT (2015); Dr Claude Desplan, NYU (2015) Frontiers Lecture co-host

Dr Tim Megrav, U. Florida (2014); Dr Jordan Ward, UCSF (2014); Dr Gordon Chan, CCI (2014)

Dr Gilles Hickson, CHU, Montreal (2013); Dr Esther Verheyen, Simon Fraser U. (2013)

Dr Jordan Raff, Oxford University, UK (2012); Dr Roy Golsteyn, University of Lethbridge (2011)

Dr Eric Wieschaus, Princeton University, USA - Frontiers Lecture (2010)

Dr Michel Gho, University of Paris, FR (2010); Dr Andrew Swan, University of Windsor, ON (2008)

Dr Savraj Grewal, University of Calgary, AB (2008); Dr Jennifer Cobb, University of Calgary, (2008)

Dr Jordan Ward, London Research Institute, UK (2008); Dr Pierre Leopold, University of Nice, (2008)

Dr Gertrud Schupbach, Princeton University, NJ (2007); Dr Peter Jackson, Stanford University, (2006)

Dr William Sullivan, University of California, Santa Cruz, CA (2006)

Dr Daniel Eberl, University of Iowa, IO (2006)

Dr Patrick O'Farrell, University of California, San Francisco - Frontiers Lecture (2005)

Dr William Saxton, Indiana University, IN (2005); Dr Scott Hawley, Stowers Institute for Medical Research, MO (2005); Dr Kim McKim, Rutgers University, NJ (2005)

Dr Miodrag Grbic, University of Western Ontario, ON (2004); Dr Billie Swalla, University of Washington, WA (2004); Dr Michel Roberge, University of British Columbia, BC (2003)

Dr Susan Lees-Miller, University of Calgary (2003); Dr Jacalyn Vogel, McGill University, QC (2003)

Dr David Morgan, University of California, San Francisco, CA (2002); Dr. Robert Duronio, University of North Carolina, NC (2002); Dr. David Stuart, University of Alberta, Biochemistry, AB, (2001)

Dr. Erin O'Shea, University of California, San Francisco (2000); Dr. John Newport, University of California, San Diego, CA (2000); Dr. Tin Tin Su, University of Colorado, CO (2000)
Dr. Richard Roy, McGill University, QE (1999); Dr. Eric Baehrecke, University of Maryland, MD (1999); Dr. Bruce Edgar, Fred Hutchison Cancer Research Center, WA (1998); Dr. Mariana Wolfner, Cornell University, NY (1998); 1998: Bruce Edgar (Fred Hutchison Cancer Research Center)

RESEARCH PUBLICATIONS (as Principal Investigator: 1997-present)

Myt1 kinase promotes mitotic cell cycle exit in *Drosophila* intestinal progenitor cells. Willms, R., Zeng, J, Campbell, SD. *BioRxiv* pre-print, doi: <https://doi.org/10.1101/785949>

Upregulation of Myt1 promotes acquired resistance of cancer cells to Wee1 inhibition. Lewis CW, Bukhari AB, Xiao EJ, Choi WS, Smith JD, Homola E, Mackey JR, Campbell SD, Gamper AM, Chan, GK. *Cancer Research* (2019) doi: 10.1158/0008-5472.CAN-19-1961. [Epub ahead of print]

Myt1 inhibition of Cyclin A/Cdk1 is essential for fusome integrity and premeiotic centriole engagement in *Drosophila* spermatocytes. Varadarajan R, Ayeni J, Jin Z, Homola E, Campbell SD. *MBoC*. 2016 Jul 1;27(13):2051-63. doi: 10.1091/mbc.E16-02-0104. Epub 2016 May 11.

G2 phase arrest prevents bristle progenitor self-renewal and synchronizes cell division with cell fate differentiation. Ayeni JO, Audibert A, Fichelson P, Srayko M, Gho M, Campbell SD. *Development*. 2016 Apr 1;143(7):1160-9. doi: 10.1242/dev.134270. Epub 2016 Feb 18. PMID: 26893341

Glucose modulates *Drosophila* longevity and immunity independent of the microbiota. Galenza A, Hutchinson J, Campbell SD, Hazes B, Foley E., *Biol Open*. 2016 Jan 21;5(2):165-73. doi: 10.1242/bio.015016. PMID: 26794610

Dual phosphorylation of cdk1 coordinates cell proliferation with key developmental processes in *Drosophila*. Ayeni JO, Varadarajan R, Mukherjee O, Stuart DT, Sprenger F, Srayko M, Campbell SD. *Genetics*. 2014 Jan;196(1):197-210. doi: 10.1534/genetics.113.156281. Epub 2013 Nov 8.

"Ready, set, go": checkpoint regulation by Cdk1 inhibitory phosphorylation.

Ayeni JO, Campbell SD. *Fly*. 2014;8(3):140-7. doi: 10.4161/19336934.2014.969147. PMID:25483135

The Smc5/Smc6/MAGE complex confers resistance to caffeine and genotoxic stress in *Drosophila melanogaster*. Li X, Zhuo R, Tiong S, Di Cara F, King-Jones K, Hughes SC, Campbell SD, Wevrick R. *PLoS One*. 2013;8(3):e59866. doi: 10.1371/journal.pone.0059866. Epub 2013 Mar 28.

A neuroprotective role for the DNA damage checkpoint in tauopathy. Khurana V, Merlo P, DuBoff B, Fulga TA, Sharp KA, Campbell SD, Götz J, Feany MB. *Aging Cell*. 2012 Apr;11(2):360-2. doi: 10.1111/j.1474-9726.2011.00778.x. Epub 2012 Feb 1. PMID: 22181010

Chk1 and Wee1 kinases coordinate DNA replication, chromosome condensation, and anaphase entry. Fasulo B, Koyama C, Yu KR, Homola EM, Hsieh TS, Campbell SD, Sullivan W. *MBoC*. 2012 Mar;23(6):1047-57. doi: 10.1091/mbc.E11-10-0832. Epub 2012 Jan 19. PMID: 22262459

CycA is involved in the control of endoreplication dynamics in the *Drosophila* bristle lineage. Sallé J, Campbell SD, Gho M, Audibert A. *Development*. 2012 Feb;139(3):547-57. doi: 10.1242/dev.069823.

Drosophila ATM and ATR have distinct activities in the regulation of meiotic DNA damage and repair. Joyce EF, Pedersen M, Tiong S, White-Brown SK, Paul A, Campbell SD, McKim KS. *J. Cell Biol*. 2011 Oct 31;195(3):359-67. doi: 10.1083/jcb.201104121. Epub 2011 Oct 24. PMID:22024169

Myosin VI contributes to synaptic transmission and development at the *Drosophila* neuromuscular junction. Kisiel M, Majumdar D, Campbell S, Stewart BA. *BMC Neurosci*. 2011 Jul 11;12:65.

Molecular genetic characterization of *Drosophila* ATM conserved functional domains. Pedersen M, Tiong S, Campbell SD. *Genome*. 2010 Oct;53(10):778-86. doi: 10.1139/g10-067. PMID:20962884

Drosophila Myt1 is the major Cdk1 inhibitory kinase for wing imaginal disc development. Jin Z, Homola E, Tiong S, Campbell SD. *Genetics*. 2008 Dec;180(4):2123-33.

A novel strategy for identifying mutations that sensitize *Drosophila* eye development to caffeine and hydroxyurea. Silva EA, Lee BJ, Caceres LS, Renouf D, Vilay BR, Yu O, Bradley JA, Campbell SD. *Genome*. 2006 Nov;49(11):1416-27. PMID:17426757

Drosophila Myt1 is a Cdk1 inhibitory kinase that regulates multiple aspects of cell cycle behavior during gametogenesis. Jin Z, Homola EM, Goldbach P, Choi Y, Brill JA, Campbell SD. *Development*. 2005 Sep;132(18):4075-85. Epub 2005 Aug 17. PMID:16107480

ATM is required for telomere maintenance and chromosome stability during *Drosophila* development. Silva E, Tiong S, Pedersen M, Homola E, Royou A, Fasulo B, Siriaco G, Campbell SD. *Curr Biol*. 2004 Aug 10;14(15):1341-7. PMID:15296750

Drosophila Wee1 kinase regulates Cdk1 and mitotic entry during embryogenesis. Stumpff J, Duncan T, Homola E, Campbell SD, Su TT. *Curr Biol*. 2004 Dec 14;14(23):2143-8. PMID:15589158

Molecular and functional analysis of scalloped recessive lethal alleles in *Drosophila melanogaster*. Srivastava A, Simmonds AJ, Garg A, Campbell SD, Bell JB. *Genetics*. 2004 Apr;166(4):1833-43.

A method for assaying the sensitivity of *Drosophila* replication checkpoint mutants to anti-cancer and DNA-damaging drugs. Radcliffe CM, Silva EA, Campbell SD. *Genome*. 2002 Oct;45(5):881-9. PMID:12416620

Ectopic expression of the *Drosophila* Cdk1 inhibitory kinases, Wee1 and Myt1, interferes with the second mitotic wave and disrupts pattern formation during eye development. Price DM, Jin Z, Rabinovitch S, Campbell SD. *Genetics*. 2002 Jun;161(2):721-31. PMID:12072468

Drosophila wee1 has an essential role in the nuclear divisions of early embryogenesis. Price D, Rabinovitch S, O'Farrell PH, Campbell SD. *Genetics*. 2000 May;155(1):159-66. PMID:10790391

PUBLICATIONS (During graduate and postdoctoral training)

Drosophila grapes/CHK1 mutants are defective in cyclin proteolysis and coordination of mitotic events. Su TT, Campbell SD, O'Farrell PH. *Curr Biol*. 1999 Aug 26;9(16):919-22.

Exit from mitosis in *Drosophila* syncytial embryos requires proteolysis and cyclin degradation, and is associated with localized dephosphorylation. Su TT, Sprenger F, DiGregorio PJ, Campbell SD, O'Farrell PH. *Genes Dev*. 1998 May 15;12(10):1495-503. PMID: 9585509

The cell cycle program in germ cells of the *Drosophila* embryo. Su TT, Campbell SD, O'Farrell PH. *Dev Biol*. 1998 Apr 15;196(2):160-70. PMID:9576829

The *Drosophila* grapes gene is related to checkpoint gene chk1/rad27 and is required for late syncytial division fidelity. Fogarty P, Campbell SD, Abu-Shumays R, Phalle BS, Yu KR, Uy GL, Goldberg ML, Sullivan W. *Curr Biol*. 1997 Jun 1;7(6):418-26. PMID:9197245

Control of G1 in the developing *Drosophila* eye: rca1 regulates Cyclin A. Dong X, Zavitz KH, Thomas BJ, Lin M, Campbell S, Zipursky SL. *Genes Dev*. 1997 Jan 1;11(1):94-105. PMID:9000053

Drosophila Wee1 kinase rescues fission yeast from mitotic catastrophe and phosphorylates *Drosophila* Cdc2 in vitro. Campbell SD, Sprenger F, Edgar BA, O'Farrell PH. *MBoC*. 1995 Oct;6(10):1333-47. PMID:8573790

The *scalloped* gene encodes a novel, evolutionarily conserved transcription factor required for sensory organ differentiation in *Drosophila*. Campbell S, Inamdar M, Rodrigues V, Raghavan V, Palazzolo M, Chovnick A. *Genes Dev.* 1992 Mar;6(3):367-79. PMID:1547938

Cloning and characterization of the scalloped region of *Drosophila melanogaster*. Campbell SD, Duttaroy A, Katzen AL, Chovnick A. *Genetics.* 1991 Feb;127(2):367-80. PMID:1706292

Null mutation of copper/zinc superoxide dismutase in *Drosophila* confers hypersensitivity to paraquat and reduced longevity. Phillips JP, Campbell SD, Michaud D, Charbonneau M, Hilliker AJ. *Proc Natl Acad Sci U S A.* 1989 Apr;86(8):2761-5. PMID:2539600

Cytogenetic analysis of the cSOD microregion in *Drosophila melanogaster*. Campbell SD, Hilliker AJ, Phillips JP. *Genetics.* 1986 Feb;112(2):205-15. PMID:11933981

LepockJR, Cheng KH, Campbell SD and Kruuv J. (1983) Rotational diffusion of TEMPONE in the cytoplasm of Chinese hamster lung cells. *Biophysics Journal* 1983 Dec **44**: 405-412.

Campbell SD, Kruuv J and Lepock JR. (1983) "Characterization and radiation response of a heat resistant variant of V79 cells. *Radiation Research* **93**: 51-61

OTHER PROFESSIONAL ACTIVITIES

Invited Research Seminars:

- (2019) Pat O'Farrell's 70th Birthday Symposium, University of San Francisco, CA
- (2017) Cancer Research Institute of Northern Alberta Symposium, University of Alberta, AB
- (2016) Oncology Department, University of Alberta, Edmonton, AB
- (2014) Department of Medical Genetics, University of Alberta, Edmonton, AB
- (2013). EMBO *Drosophila* Cell Division Workshop, Totnes, UK
- (2013) Canadian *Drosophila* Research Conference, Montreal, QC
- (2012) Department of Cell Biology, University of Alberta, Edmonton, AB
- (2011) Platform talk, Alberta Genome Instability and Aging Conference, Calgary, AB
- (2009) Developmental Regulation of the Cell Cycle Symposium, UCSF, San Francisco, CA
- (2008) Alberta Genome Instability and Aging Conference, Calgary, AB
- (2008) Alberta Vision Sciences Symposium, Calgary, AB
- (2007) Canadian *Drosophila* Research Conference, Montreal, QC
- (2006) 3RDInternational *Drosophila* Cell Division Workshop, Porto, Portugal
- (2005) Canadian *Drosophila* Research Conference, Vancouver, BC
- (2004) NIH: "Development of Biological Assays for the Loss of ATM Function", Bethesda, MD
- (2004) Cell Cycle Checkpoint Workshop, Annual *Drosophila* Research Conference, Washington, DC
- (2003) European *Drosophila* Research Conference, Goettingen, Germany
- (2003) International Symposium on the role of ATM in DNA damage, Fraser Island, Australia
- (2003) Genetics Society of Canada Annual Meeting, Halifax, NS
- (2003) Canadian *Drosophila* Research Conference, Halifax, NS
- (2002) International Symposium on Ataxia-telangiectasia and ATM, Boston, MA
- (2002) Annual *Drosophila* Research Conference, San Diego, CA
- (2001) Cell Cycle mini-symposium: Differentiation and Development, American Society for Cell Biology Annual Meeting Washington, DC
- (2000) Checkpoint Regulatory Proteins Mini-Symposium, American Society for Cell Biology Annual Meeting, San Francisco, CA
- (2000) EMBO Workshop on Regulation of Cell Division in *Drosophila*, Cortona, Italy
- (2000) Canadian Developmental Biology Symposium 2000, Banff, AB

Invited Departmental Seminars:

(2011), Department of Biology, University of Windsor ON
(2011), University of Heidelberg/ZMBH Heidelberg, Germany
(2010), University of Zurich, Zurich, Switzerland
(2010), University of Paris, Pierre et Marie Curie (Paris VI), Paris, France
(2007) Biology Department, McMaster University, Hamilton, ON
(2005) Best Institute, University of Toronto, ON
(2005) Biology Department, McGill University, Montreal QC
(2005) Biochemistry Department, University of Alberta, Edmonton, AB
(2004) Department of Molecular, Cellular and Developmental Biology, U. California, Santa Cruz, CA
(2003) Institut fur Genetik, Universitat zur Koln, Cologne, Germany
(2002) Department of Cell Biology, Harvard Medical School, Boston, MA
(2001) Department of Biochemistry, University of Western Ontario, London, ON
(2000) Program in Developmental Biology, Hospital for Sick Children, Toronto, ON

Graduate Student Oral and Poster Presentations: (2001-present only):

Willms, RJ and Campbell, SD (2018) Annual *Drosophila* Research Conference, Philadelphia, PA
Willms, RJ and Campbell, SD (2017) Canadian *Drosophila* Research Conference, Banff, AB
Varadarajan, R., Ayeni, J., Jin, Z., Homola, EM and Campbell, SD. (2016) American Society for Cell Biology, San Francisco CA
Varadarajan, R. and Campbell, SD (2015) Canadian *Drosophila* Research Conference, Vancouver, BC
Ayeni J, Mukherjee O, **Varadarajan R,** Stuart D, Sprenger F and Campbell SD. (2012) Annual *Drosophila* Research Conference, Chicago, IL
Zhuo R, Li X, DiCara F, Wevrick R, Hughes S, Campbell SD and King-Jones K. (2011) European *Drosophila* Research Conferene, Lisbon, Portugal
Varadarajan R, Zin J, Homola EM, **Ayeni J** and Campbell SD. (2011) Canadian *Drosophila* Research Conference, St. Catharines, ON
Ayeni J, Mukherjee O and Campbell SD. (2010) Alberta Genome Instability Conference, Calgary,
Ayeni J, Mukherjee O and Campbell SD. (2009) Canadian *Drosophila* Research Conference, Jasper, A.
Zhuo R, Lee B, Silva E, Tiong S, King-Jones K and Campbell, SD. (2009) Canadian *Drosophila* Research Conference, Jasper, AB
Goldbach P, **Jin Z,** Campbell SD and Brill JA. (2006) Annual *Drosophila* Research Conference, Houston, TX
Jin Z, Homola E, Brill J and Campbell SD. (2004) Annual *Drosophila* Research Conference, Washington, DC
Campbell SD, **Silva E,** Tiong S, **Pedersen M** and Homola EM. (2004) *Drosophila* Research Conference, Washington, DC
Silva EA, Pedersen M, Tiong S, Homola E and Campbell SD (2003) European *Drosophila* Research Conference, Goettingen, Germany
Silva EA and Campbell SD. (2002) Ataxia-telangiectasia and ATM Symposium, Boston
Price DM, Jin Z, and Campbell SD. (2002) Annual *Drosophila* Research Conference, San Diego
Silva EA, Caceres LS, Patel R, Renouf D, Vilay BR, Yu O and Campbell SD. (2002) Annual *Drosophila* Research Conference, San Diego
Jin Z, Price D, Homola EM and Campbell SD. (2002) *Drosophila* Research Conference, San Diego, Homola EM, **Price D** and Campbell SD. (2001) American Society Cell Biology Meeting, Washington