Biographical Sketch (Template)

Name: Carla Finkielstein	Title: Associate Professor
Email: finkielc@vt.edu	Department: Biological Sciences

Education/Training:

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
University of Buenos Aires, Argentina	B.S.	1992	Cell and Molec. Biology
University of Buenos Aires, Argentina	Ph.D.	1998	Cell and Molec. Biology
HHMI-UCHSC, U.S.A	Research Associate	1998-2002	Cell and Molec. Biology
UCHSC, U.S.A.	PostDoctoral	2002-2005	Structural Biology

Personal Statement:

A common theme in my research career has been the study of mechanisms that influence cell cycle division and death processes from an interdisciplinary standpoint. Early in my independent research career at Virginia Tech, I founded the *Integrated Cellular Responses Laboratory* (ICRL) where my group works at the interface of various disciplines to investigate the basic processes controlling cell growth, division, and migration in areas spanning from atomic interactions to cell physiology. Our ICRL work has been recognized by the scientific community on various levels. Our first publication (*J. Biol Chem. 2006, 281(37):27317)* was selected as the Editor's choice by the journal *Science*, later work (*Mol. Cell Biol. 2008, 28(15):4697*) was honored with, among other recognitions, the keynote presentation at the Gordon Research Conference 2010 and the American Association for Cancer Research Minority Scholar Award to the PI, and our more recent publications (*PLoS ONE 2009, 4(11): e8007* and *Br. J. of Haematol. 2011, 154(1):122*) are of such potential therapeutic value that two patents were filed by our University. We have published other relevant work in areas that include mathematical modeling of cell death processes and biochemical analysis of cellular crosstalk mechanisms (*J. Theor. Biol. 2011, 271(1):114; J. Phys. Chem. B 2010, 114(41):13201; Mol. Cells 2010, 30(6):581; Biochemistry 2008, 47(51):13524*). Our publications show the breadth of our research program and the evolution in our approach to cancer research, with our initial work being more basic in nature, while our more recent work is shifting towards a therapeutic-oriented, multidisciplinary arena. Examples include our recent work in collaboration with Royce Zia that resulted in the first demonstration that radiation-triggered cell death is susceptible to the energy of the individual photons from an electromagnetic source rather than the sole total dose absorbed by the system, a conclusion that, as one reviewer stated, "*will most likely affect how radiation therapy will be administered to a patient*" (*PLoS ONE 2010, 5(1): e8970*). Another example is the unconventional approach we followed to study the functional significance of a novel protein-lipid motif for platelet aggregation. For this project, we teamed with engineers Rafael Davalos and Pavlos Vlachos and loaded nanoparticle size carriers with our protein domain to demonstrate its direct control on the platelet aggregation process using microfluidic devices (*Br. J. of Haematol. 2011, 154(1):122; J. Biol. Chem., 2012,* 287(45):37691-37702; *Peptide Sci.*, 2014 *In press*; *Biophys. J.*, 2014 *In press*), a method we are currently exploring to study platelet interactions with circulating tumor cells. More recently, with a focus on cancer prevention and in collaboration with chemists, we developed a method to identify and validate circadian-modulated biomarkers with prognosis value that would allow the targeting of populations at risk for preventative strategies (*J. Chromatogr. A. 2010, 1217(17):2862*).

Selected Publications:

1- Gotoh T., Kim J., Liu J.J., Vila-Caballer M, Stauffer P.E., Tyson J., Finkielstein C.V. A model-driven experimental approach reveals the complex regulatory distribution of p53 by the circadian factor Period 2. Under review.

2- Gotoh T., Vila-Caballer M., Liu J.J., Schiffhauer S., Finkielstein C.V. (2015) Association of the circadian factor Period 2 to p53 influences p53's function in DNA-damage signaling. ***Mol. Biol. Cell*** 26(2):359-372.

3- Lucas A.T., Fu X., Liu J.J., Brannon M.K., Yang J., Capelluto D.G.S., Finkielstein C.V. (2014) Ligand binding revels a role for heme in translationally-controlled tumor protein dimerization. ***PLoS ONE*** 9(11):e11823.

4- Gotoh T., Vila-Caballer M., Santos C.S., Liu J.J., Yang J., Finkielstein C.V. (2014) The circadian factor Period 2 modulates p53 stability and transcriptional activity in unstressed cells. ***Mol. Biol. Cell*** 25(19):3081-3093.

5- Capelluto D.G.S., Zhao X., Lucas A., Lemkul J., Xiao S., Fu X., Sun F., Bevan D. and Finkielstein C.V. (2014) Biophysical and molecular simulations studies of phosphatidic acid binding by the Dishevelled-2 DEP domain. ***Biophys. J.*** 106(5):1101-1111.

9- Larion S., Caballes F.R., Hwang, S-I, Lee J-G, Ellefson-Rossman W., Parsons J., Steuerwald N., Li T., Maddukuri V., Groseclose G., Finkielstein C.V., Bonkovsky H. (2013) Circadian rhythms in acute intermittent porphyria – a pilot study. ***Eur. J. of Clin. Investigation*** 43(7):727-739.

10- Welsh J.D., Charonko J.J., Salmanzadeh-Dozdabi A., Drahos K.E., Shafiee H., Stremler M.A., Davalos R.V., Vlachos P.P., Capelluto D.G.S., Finkielstein C.V. (2011) Disabled-2 modulates homotypic and heterotypic platelet aggregation by binding to sulfatides. ***Br. J. of Haematol.*** 154(1):122-133.

11- Howells, C.C., Baumann, W.T., Samuels, D.C., Finkielstein C.V. (2010). The Bcl-2-Associated Death Promoter (BAD) lowers the threshold at which the Bcl-2-Interacting Domain Death Agonist (BID) triggers mitochondria disintegration. ***J. Theor. Biol.*** 271(1):114-123.

Current and/or Recently Completed Research Grants: (as applicable)

Ongoing Research Support

Name of Principal Investigator: Carla Finkielstein (PI)

Project Title: A combined mathematical and bioengineering approach to elucidate the contribution of circadian factors in the cellular response to genotoxic stress

Total Costs: $750,000

Period of Award Support: 06/15/2015 – 06/14/2018

Source of Funding: National Science Foundation, Molecular Cell Biology Division (NSF-MCB)

Project description: We propose to use multidisciplinary and complementary methods to *establish signature events that modulate the effect of genotoxic stress in both cell division and circadian phase resetting across length scales from molecular to cellular systems.*

Name of Principal Investigator: Carla Finkielstein

Project Title: Multi-disciplinary engineering platforms to study cell microenvironment

Annual Direct Costs: $40,000

Period of Award Support: 07/01/2014 – 06/30/2016

Source of Funding: Institute for Critical Technology and Applied Science (ICTAS)

Project description: The objectives of this proposal are to i) Design, develop, and characterize a physiologically representative in vitro platform for cellular microenvironment studies, ii) characterize the influence of mechanotransduction forces for cell migration.

Name of Principal Investigator: Carla Finkielstein and Daniel Capelluto (PIs)

Project Title: Insights on sulfatide modulation of Disabled-2 function

Annual Direct Costs: $75,000 ($15,000 for Finkielstein)

Period of Award Support: 07/01/2015 – 06/30/2016

Source of Funding: Institute for Critical Technology and Applied Science (ICTAS-VT)

Percent effort: 0.25 academic months

Project description: In this proposal, we aim to characterize the mechanism of sulfatide binding and bilayer insertion by the Dab2 N-PTB region in sufficient structural and functional detail to be able to rationally manipulate surface membrane targeting of host proteins. Then, we will further study how sulfatides exert their role in platelet aggregation and in heterotypic interactions.