Carrie A. Franzen

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**Summary**

Laboratory-trained translational scientist offering over 19 years working on cancer research (both solid tumor and hematological malignancies), with an emphasis on tumor-microenvironment interactions. Focused and enthusiastic, with exceptional skills in translational research, cell imaging, flow cytometry, and cell-ECM and cell-cell interactions.

**Skills**

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| * Basic molecular biology and biochemistry techniques for protein, RNA, and DNA analysis
* PCR, including RT-PCR and qRT-PCR
* Gene manipulation, including knockdown and expression of a constitutively active form of the targetExperience culturing and investigating signal transduction pathways in solid tumors (prostate and bladder) and in hematological malignancies (CLL, MCL, FL, DLBCL) using *in vitro* and *ex vivo* assays
* Tissue culture, including primary and tumor derived cells and cell lines
* Ex vivo co-culture of CLL and MCL cells with bone marrow stromal cells
* Apoptosis assays, including DAPI staining, TUNEL, PI staining, M30 Apoptosense ELISA, and caspase cleavage
 | * Fixed and live cell imaging analysis using Image J, Metamorph, and Imaris software packages
* Fixed wide-field (immunofluorescent, DIC and phase), confocal, deconvolution, and electron microscopy
* Staining and analysis of patient tissue sections
* Immuno-fluorescent staining of 2-D tissue cultures
* Time-lapse confocal microscopy
* Cell surface labeling for flow cytometryB-cell characterization using flow cytometry (CD19, CD5, CD3, and CD20 staining)CFSE cell proliferation assay, for flow cytometryPI staining
* Mentor for graduate students, medical students, and medical residents
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**Relevant Experience**

Research Professional I 01/2017 to Current

University of Chicago Chicago, Illinois, IL

* **Major project:**  Investigated the effect of FDA-approved drugs (e.g., ibrutinib and venetoclax - monotherapy as well as combination therapy) on the tumor-stroma interaction using an *ex vivo* co-culture model (CLL/bone marrow stroma) and time lapse microscopy.
* **Secondary project:** Studied discrete sub-populations of CLL cells that are selectively responsive to individual FDA-approved drugs and assessed the efficacy of combinatorial therapy on resistant cells
* **Achievements and Leadership:**
* One manuscript in revision and two manuscripts in preparation.
* Three abstract submissions, and one oral scientific presentation at a national meeting for the Lymphoma Research Foundation, 2018.
* Assisted in the preparation of NIH funding applications.
* Presented fieldwork results to fellow research staff annually.
* Maintained close partnerships with the clinical laboratories and cell imaging facility.
* **Mentorship:**
* Provided mentoring to technicians and postdoctoral fellows on the processes and procedures relevant to the research projects in the laboratory, including designing and executing experiments, data analysis, and manuscript writing.

Postdoctoral Fellow 07/2012 to 07/2015

Loyola University Maywood, IL

* **Major project:**  Elucidated tumor-promoting effects, including induction of epithelial-mesenchymal transition, of bladder cancer urinary exomsomes on primary urothelial cells.
* Designed protocols to isolate, analyze and utilize both cell line and patient-derived exosomes.
* **Secondary project:** Developed a novel method to characterize the uptake of bladder cancer exosomes by bladder cancer cells.
* **Achievements and Leadership:**
* Eight peer-reviewed publications, including two first author research papers and one first author review article.
* Four abstracts and one poster presentation at a national meeting for extracellular vesicles (2013).
* Assisted in the preparation for funding applications.
* Maintained close partnership with the flow cytometry core.
* **Mentorship:**
* Provided mentoring to medical students and medical residents on the processes and procedures relevant to the research projects in the laboratory, including designing and executing experiments, data analysis, and manuscript writing.
* **Laboratory Management:**
* Managed laboratory ordering
* Established vendor relations

Postdoctoral Research Fellow 09/2006 to 06/2012

Northwestern University Chicago, IL

* **Major project:** Discovered and analyzed the ability of the bioflavonoid, apigenin, to impair prostate cancer cell attachment, migration, and invasion.
* **Secondary project**: Determined a novel role for the desmosomal protein Plakoglobin in the regulation of prostate cancer cell adhesion and motility.
* **Achievements and Leadership:**
* Four peer-reviewed publications, including two first author publications.
* Three abstracts and three poster presentations at national meetings (Cytoskeleton Signaling in Cancer (2007), AACR annual meeting (2012), and Aspen Cancer Conference (2012))
* Presented fieldwork results to fellow research staff annually.
* American Cancer Society Postdoctoral Fellowship, 2010-2012
* Award for best oral presentation at the Northwestern University Department of Pathology retreat, 2010
* Institutional Ruth L. Kirschstein National Research Service Award, 2006-2007
* Maintained close partnerships with cell imaging facility, Dr. Kathleen Green's and Dr. Bartosz Grzybowsky's laboratories
* **Mentorship:**
* Provided mentoring to graduate students on the processes and procedures relevant to the research projects in the laboratory, including designing and executing experiments, data analysis, and manuscript writing.

Graduate Research Assistant 07/1999 to 08/2006

University of Illinois Chicago, Illinois, IL

* Obtained and utilized extensive technical knowledge in the field of molecular biology/oncology experimental design and execution, with specific emphasis on cell-ECM interactions; learned to develop research protocols and grant proposals.
* **Major Project:** Investigated the ability of the ECM protein, CCN1, to enhance the tumor-killing properties of TRAIL through the engagement of integrin receptors on prostate cancer cells.
* Designed experiments to quantitate cell apoptosis, study cell-ECM adhesion, genetically manipulate CCN1 expression, examine the surface expression of integrin and TRAIL receptors, and use chemical inhibitors to ascertain the signaling cascade involved in this effect.
* **Achievements and Leadership:**
* One first author publication
* One abstract and one poster presentation at the AACR annual meeting, 2006
* Honorable Mention at Sigma Xi research competition, UIC, 2006
* First place winner of the UIC College of Medicine student research forum, 2006
* Presented fieldwork results to fellow research staff annually.

**Education and Training**

Ph.D.: Molecular Genetics 2006

University of Illinois at Chicago Chicago, IL, US

Thesis: CCN1(CYR61)-TRAIL mediated apoptosis in prostate carcinoma cells

Bachelor of Arts: Biological Sciences 1999

Augustana College Rock Island, IL, US

• Member of the Aristeia Honor Society at Augustana College, 1997
• Award for academic excellence at Augustana, 1997

* Magna cum laude graduate

**Public Service/Institutional Service**

* American Cancer Society Postdoctoral Fellowship, 2010-2012
* Award for best oral presentation at the Northwestern University Department of Pathology retreat, 2010
* Co-director of Northwestern Calandra Forum, 2007-2008
* Judge at the UIC College of Medicine student research forum, 2007
* Institutional Ruth L. Kirschstein National Research Service Award, 2006-2007
* Honorable Mention at Sigma Xi competition, UIC, 2006
* First place winner of the UIC College of Medicine student research forum
* Member of the Aristeia Honor Society at Augustana College, 1997

**List of Abstracts**

1. W. Wang, **C.A. Franzen**, M. Sukhanova, G. Venkataraman, M. Ming, A. Guo, P. Lu, D. Sheng, A. Gao, C. Xia, J. Li, X. Zhou, and Y. L. Wang. RAC2 mediates the link between B-Cell Receptor signaling and cell adhesion in mantle cell lymphoma. Lymphoma Research Foundation Mantle Cell Lymphoma Workshop, Atlanta, 2018, *Oral Presentation*.

2. W. Wang, **C.A. Franzen**, M. Sukhanova, G. Venkataraman, M. Ming, A. Guo, P. Lu, D. Sheng, A. Gao, C. Xia, J. Li, X. Zhou, and Y. L. Wang. RAC2 links B-cell receptor signaling and cell adhesion in mantle cell lymphoma. American Society for Hematology, Atlanta, 2017, *Poster presentation*.

3. **C.A. Franzen**, K.A. Greco, R.H. Blackwell, K.E. Foreman, G.N. Gupta. Urothelial cells undergo epithelial to mesenchymal transition after exposure to muscle invasive bladder cancer exosomes. American Urological Association annual meeting, New Orleans, 2015, *Poster presentation.*

4. A.F. Van Huis, **C.A. Franzen**, and G.N. Gupta. Exosome-Mediated Regulation of PTEN Expression in Bladder Cancer. American Urological Association annual meeting, Orlando, 2014, *Poster presentation.*

5. K.A. Greco, **C.A. Franzen**, P.C. Kuo, R.C. Flanigan, and G.N. Gupta. PLK1 Silencing in Bladder Cancer by siRNA Delivered with Exosomes. American Urological Association annual meeting, Orlando, 2014, *Poster presentation*.

6. **C.A. Franzen**, P. Simms, K.E. Foreman, and G.N. Gupta. Novel Method Of Exosome Quantification And Cellular Uptake Using The Amnis ImageStreamX. International Society for Extracellular Vesicles meeting, Boston, 2013, *Poster presentation*.

7. **C.A. Franzen**, V. Todorović, J.C. Pelling, R.C. Bergan. Apigenin regulates prostate cancer matrix composition, cell attachment, and cell motility through an integrin alpha 1 dependent pathway. Aspen Cancer Conference, Aspen, 2012, *Poster presentation*.

8. **C.A. Franzen**, V. Todorović, J.C. Pelling, R.C. Bergan. Apigenin regulates prostate cancer matrix composition, cell attachment, and cell motility through an integrin alpha 1 dependent pathway. American Association for Cancer Research, Chicago, 2012, *Poster presentation.*

9. **C.A. Franzen**, S. Mirzoeva, R.C. Bergan, K.J. Green, and J.C. Pelling. Apigenin inhibits PC3-M cell motility through the FAK/Src signaling pathway. Cytoskeleton Signaling in Cancer meeting, San Diego, 2008, *Poster presentation*.

10. **C.A. Franzen**, R.I. Monzon, and L.F. Lau. The extracellular matrix protein CCN1 (CYR61) sensitizes prostate carcinoma cells to TRAIL-induced apoptosis. American Association for Cancer Research, Washington D.C., 2006, *Poster presentation.*

**List of Publications**

1. K.A. Greco, **C.A. Franzen**, K.E. Foreman, R.C. Flanigan, P.C. Kuo, G.N. Gupta. PLK-1 Silencing in Bladder Cancer by siRNA Delivered with Exosomes. Urology 2016 May: 91(241), e 1-7.
2. **C.A. Franzen**, R. H. Blackwell, K.E. Foreman, P.C. Kuo, G.N. Gupta. Urinary Exosomes: The Potential for Biomarker Utility, Intercellular Signaling, and Therapeutics in Urologic Malignancy.
Invited Review for Journal of Urology 2016 May; 195(5): 1331-9. .
3. **C.A. Franzen,** R.H. Blackwell, V. Todorovic, K.A. Greco, K. E. Foreman, R.C. Flanigan, P.C. Kuo, and G.N. Gupta. Urothelial Cells Undergo Epithelial to Mesenchymal Transition After Exposure to Muscle Invasive Bladder Cancer Exosomes. Oncogenesis 2015 Aug 17.
4. J. Driver, C.E. Weber, J.J. Callaci, A. Kothari, M.A. Zapf, P.K. Roper, D. Borys, **C.A. Franzen**, G.N. Gupta, P.Y. Wai, J. Zhang, P.C. Kuo, Z. Mi. Alcohol Inhibits Osteopontin Dependent Transforming Growth Factor-β1 Expression in Human Mesenchymal Stem Cells. Journal of Biological Chemistry 2015 Apr 17; 290(16).
5. R.H. Blackwell, **C.A. Franze**n, R.C. Flanigan, P.C. Kuo and G.N. Gupta. The untapped potential of urine shed bladder cancer exosomes: biomarkers, signaling, and therapeutics. Bladder 2014; 1(1)
6. Z. Mi , C.Weber, P. Wai, N. Li, J. Driver, **C.A. Franzen**, G.N. Gupta, J. Zhang, and P.C. Kuo. Osteopontin Mediates TGF-β1 Dependent Transformation Of Mesenchymal Stem Cells Into Cancer Associated Fibroblasts In Breast Cancer Oncogene 2014 Dec 22
7. C.E. Weber, J. Driver, **C.A. Franzen,** J.B. Mascarenhas, Z. Mi, G.N. Gupta, P.Y. Wai, and P.C. Kuo. The Constituents and Potential Targets of the Extracellular Matrix: Implications for Carcinogenesis and Cancer Treatment. Carcinogenesis and Mutagenesis 2013.
8. **C.A. Franzen**, P.E. Simms, A.F. Van Huis, K.E. Foreman, P.C. Kuo, and G.N. Gupta. Characterization of Uptake and Internalization of Exosomes by Bladder Cancer Cells. BioMed Research International 2014.
9. S. Mirzoeva, **C. A. Franzen**, and J. C. Pelling.  Apigenin inhibits VEGF expression in human prostate carcinoma cells via a Smad- and Src-dependent mechanism. Molecular Carcinogenesis 2013.
10. **C.A. Franzen**, V. Todorović, B.V. Desai, K.J. Green, and J.C. Pelling. The desmosomal armadillo protein plakoglogin regulates prostate cancer cell adhesion and motility through vitronectin-dependent Src signaling PLoS One 2012 July; 7(7)
11. **C.A. Franzen**, E. Amargo, V. Todorovic, B.V. Desai, S. Huda, S. Mirzoeva, K. Chiu, B.A.  Grzybowski, T-L Chew, K.J. Green, and J.C. Pelling. The chemopreventive bioflavonoid
apigenin inhibits PC3-M cell motility through the focal adhesion kinase (FAK)/Src signaling pathway. Cancer Prev Res. 2009 Sep;2(9):830-41.
12. Mirzoeva S., N.D. Kim, K. Chiu, **C.A. Franzen**, R.C. Bergan, and J.C. Pelling. Inhibition of HIF-1 alpha and VEGF Expression by the Chemopreventive Bioflavonoid Apigenin is Accompanied by Akt Inhibition in Human Prostate Carcinoma PC3-M Cells. Mol Carcinog. 2008 Sep;47(9):686-700.
13. **Franzen, C.A.**, C.C. Chen, V. Todorović, V. Jurić, R.I. Monzon, and L.F. Lau. Integrin-Mediated Matrix Signaling Regulates TRAIL-Induced Apoptosis in Prostate Carcinoma Cells. Mol. Cancer Res. 2009 Jul; 7(7):1045-55

**MANUSCRIPTS IN REVISION**1. W. Wang, **C.A. Franzen**, M. Sukhanova, G. Venkataraman, M. Ming, A. Guo, P. Lu, D. Sheng, A. Gao, C. Xia, J. Li, X. Zhou, and Y. L. Wang. Inhibition of B-Cell Receptor signaling disrupts cell adhesion in mantle cell lymphoma via RAC2.

**MANUSCRIPTS IN PREPARATION**1. P. Lu, **C.A. Franzen**, G. Venkataraman, V. Bindokas, L. Li, N. Niu, M. Sukhanova, W. Wu, R. Larson, M. Thirman, Y. Tu and Y. L. Wang. Cellular subpopulations of CLL with distinct proliferative capacity are resistant to either ibr or venetoclax: Rationale for combination and implication for minimal residual disease.
2. **C.A. Franzen**, P.Lu, V. Bindokas, L. Li, W. Wu, S. Patil, N. Niu, M. Sukhanova, M. Thirman, and Y. L. Wang. Defining the functional interaction between chronic lymphocytic leukemia cells and stromal fibroblasts.

**Presentations**

* Lymphoma Research Foundation Mantle Cell Lymphoma Workshop “RAC2 mediates the link between B-Cell Receptor signaling and cell adhesion in mantle cell lymphoma.” Oral Presentation, Atlanta, GA, 2018.
* Loyola University St. Albert's Day Research Forum, Maywood, IL 2014.
* Aspen Cancer Conference “Apigenin regulates prostate cancer matrix composition, cell attachment, and motility through an integrin alpha 1 dependent pathway.” Poster Presentation, Aspen, CO, 2012.
* American Association for Cancer Research Annual Meeting “Apigenin regulates prostate cancer matrix composition, cell attachment, and motility through an integrin alpha 1 dependent pathway,” Poster presentation, Chicago, IL, 2012.
* Northwestern University, Department of Pathology Annual Retreat “The chemopreventive bioflavonoid apigenin inhibits PC3-M cell motility through the focal adhesion kinase (FAK)/Src signaling pathway,” Oral Presentation, Oak Brook, IL, 2010.
* Northwestern University Posters and Wine, Poster presentation, 2008.
* Northwestern University Lewis Landsburg Research Day, Poster presentation, 2008.
* UIC student Research Forum, poster presentation, 2006.