JUDY A. MIKOVITS, PH.D.

137 Maple Ave, #1 Carlsbad, CA 92008 marcinc0224@gmail.com

Innovative Cellular and Molecular Biologist with over 34 years of scientific expertise as a PhD in life sciences, including planning, directing and implementing programs in HIV, Cancer, Epigenetics, Neuro-immune disease with a focus on development of novel drug and diagnostic technologies. Demonstrated leadership in introducing and establishing new programs and technologies, efficiently organizing and standardizing processes, and effectively managing multiple projects and personnel. Solution-oriented team-player with strong supervisory, project management, and problem solving skills. Ability to build solid multicultural teams within start-up and changing environments and demonstrated ability to foster strong relationships with strategic partners, collaborators, cross-functional teams, and scientific advisors.

PROFESSIONAL EXPERIENCE

M.A.R.C. INC. **2013 – present**
Founder/Consultant

Mission Statement

M.A.R.C. INC. (Originally MAR Consulting Inc.), led by Drs. Frank Ruscetti and Judy Mikovits, seeks to understand complex and innovative biological issues to yield unbiased integrated, cutting-edge information for patients and physicians impacted by some of the most challenging chronic diseases. Utilizing their combined 75 years' experience in tumor biology, immunobiology of retroviral-associated inflammatory diseases, cancer, stem cell biology, hematopoiesis, and drug development, MAR focuses on research projects, consulting (to patients doctors, academia, and industry) and lecturing without the restrictive authority of vested interest groups, following Thomas Jefferson's dictum: "Here we are not afraid to follow the truth wherever it may lead, nor to tolerate error so long as freedom is left free to combat it."

YORKBRIDGE CAPITAL **2012 – present**
Advisor

York Bridge Capital is a Toronto-based private equity firm focused on early stage Canadian technology companies. My role is in management advisory services for the medical devices and diagnostics sector.

GENYOUS BIOMED **2006 - 2012**
Senior Scientist/Consultant

As a senior scientist I developed multivalent drugs for inflammation, immune modulation and virology targets. Genyous' Multifunctional Multi-targeted (MFMT™) drug development platform is based on systems biology considerations that recognize the complex nature of chronic diseases and addresses the crosstalk between cells, their microenvironment (stroma) and the immune response system. Genyous' drug candidates are formulated with well-tolerated doses of actives derived from natural products that have a long history of safe consumption and which are orally bioavailable. MFMT™ drug design also minimizes disruption of homeostasis, thus reducing risk of toxicity and development of drug resistance. Genyous' multivalent drugs are designed to address the heterogeneous nature of chronic diseases by possessing multiple therapeutic functions and acting on multiple biological targets. As a consultant, I interacted with academic collaborators world-wide to establish milestones for MFMT research in prostate cancer, autoimmune and neuroimmune disease.

Whittemore Peterson Institute For Neuroimmune Disease (WPI) **2006 – 2011**
Research Director, (11/2006- 10/2011)

I joined the Whittemore Peterson Institute for Neuro-immune Disease (WPI) in November of 2006 as the WPI's first Research Director. Responsible for establishing a translational research program aimed at identifying biomarkers and underlying causes of Chronic Fatigue Syndrome (CFS) and other debilitating neuro-immune diseases with overlapping symptoms such as Fibromyalgia (FM), Chronic Lyme Disease, Atypical Multiple Sclerosis and Autism Spectrum Disorder (ASD). As Research Director, I was responsible

for planning, establishing and directing the Institute's scientific research program, including the selection, training and supervision of staff, writing, obtaining and managing grants and collaborating with other scientific organizations. The WPI under my direction grew from a small foundation to an internationally recognized center for the study of neuro-immune diseases in which I obtained investigator initiated grant money of more than 3 million dollars.from the NIH and Department of Defense and brought international attention to ME/CFS as a physiological disease. Proven ability to recognize and recruit important collaborators and partners developing strong relationships within multiple scientific disciplines.

EPIGENX BIOSCIENCES, SANTA BARBARA, CA **2005 - 2006**
A holding company for technologies developed in EpiGenX Biosciences
Chief Scientific Officer,

This company was formed to market intellectual properties and technologies developed in EpiGenX pharmaceuticals in order to get treatments to patients faster. As Chief Scientific officer, my job was to identify suitable business partners for product commercialization. We achieved this goal in less than two years and succeeded by having the lead compound acquired by a major pharmaceutical company and into clinical trials and our diagnostic platform licensed to a platform company.

EPIGENX PHARMACEUTICALS, SANTA BARBARA, CA **2001 – 2004**
A startup biotech company whose mission was to develop and commercialize cancer therapeutics and Diagnostics targeting aberrant DNA methylation in Cancer.
Director of Cancer Biology,

Established, directed and managed a team charged with discovering and developing small molecule therapeutics targeting aberrant DNA methylation. In order to achieve this mission we needed first to develop multiplexed, higher throughput assays for determining methylation status of cellular genes.

BIOSOURCE INTERNATIONAL, Camarillo, CA (Now part of **LIFE TECHNOLOGIES**) **2002 – 2004**
A biotechnology company, which manufactures, markets, and distributes assays and biological reagents for drug discovery, functional proteomics, and biomedical research.
Group Leader, Luminex Platform Research & Development.

Organized and directed a team for new product development on the Luminex platform technology for multiplex proteomics assays. Coordinated development and manufacturing of over 50 distinct Luminex assays including the first 30plex assay for human cytokines and chemokines. Responsibilities also included evaluation of external multiplex proteomic technologies and applications for corporate partnership, OEM opportunity and licensing, which led to a contract to commercialize a technology for development of a fully automated platform technology for both multiplex gene expression and proteomic assays on a single platform.

LABORATORY OF ANTIVIRAL DRUG MECHANISMS **1999 – 2001**
Screening Technologies Branch, a division of the Developmental Therapeutics Branch of the National Cancer Institute, Frederick MD
Lab Director,

Established and managed a new laboratory to develop drugs targeting AIDS-associated malignancies, the first of which was Kaposi's Sarcoma, which had been recently associated with a new herpes virus. I hired a multidisciplinary team with expertise in high throughput screening, retroviruses, herpes viruses and medicinal chemists. This laboratory became internationally recognized as the first of its kind in cancer drug development developing multi-functional drugs to target pathogens as well as inflammation to fight cancer.

NATIONAL CANCER INSTITUTE, LAB OF LEUKOCYTE BIOLOGY **1994 - 1998**
Staff Scientist

- Established and managed an independent research laboratory involved mechanisms by which retroviruses disrupt the delicate balance of the immune system to contribute to disease.
- Pioneered the field of epigenetic dysregulation of cellular genes by human retroviruses

NATIONAL CANCER INSTITUTE, LAB OF GENOMIC DIVERSITY **1992 - 1994**
Post-Doctoral Fellow, Molecular Virology

· Constructed and characterized the first infectious molecular clone of HTLV1
· Investigated the role of defective provirus in HTLV-1 associated myelopathy (HAM/TSP)

NATIONAL CANCER INSTITUTE, LAB OF LEUKOCYTE BIOLOGY **1983 - 1991**
Research Technician II-III, Research Associate,

conducted biological and molecular experimentation in HIV AIDs and cancer as a part of the Biological Response Modifiers Program the NCI's first translational research program.

NATIONAL CANCER INSTITUTE, FERMENTATION CHEMISTRY PROGRAM **1980 - 1982**
Research Technician I, purification of Interferon alpha, Interleukin 2, and numerous chemotherapeutics for human clinical trials

EDUCATION

Postdoctoral Scholar: Molecular Virology
Laboratory of Genomic Diversity, National Cancer Institute with David Derse, Ph.D.

Ph.D., Biochemistry and Molecular Biology, *George Washington University*, Washington, DC Doctoral Thesis: HIV Latency and mechanisms of Immune activation In Monocytes

B.A., Biology with specialization in Biochemistry•• *University of Virginia,* Charlottesville, VA

PROFESSIONAL SOCIETIES AND AWARDS

- 2012 HHS Special recognition award
- AACR
- DNA Methylation Society
- AAI
- 1991 George Washington Graduate student of the year

PUBLICATIONS (SELECTED OF 54)

Farrar, W. L., and Ortaldo, J. R.: Analysis of effector mechanisms against HTLV-I and HTLV-III/LAV infected lymphoid cells. J.Immunol. 136: 3619-3624, 1986.

Ruscetti, F. W. and Mikovits, J. A.: Differential regulation of the two IL 2 binding proteins. In Cruise, J. and Lewis, R. (Eds.): Year in Immunology, 1988. Basel, Karger, 1989, pp. 38-45.

Mikovits, J. A., Raziuddin, Gonda, M., Ruta, M., Lohrey, N., Kung, H-F. and Ruscetti, F.: Negative regulation of HIV replication in monocytes: Distinctions between restricted and latent expression in THP-1 cells. J. Exp. Med. 171: 1705-1720, 1990.

Raziuddin, Mikovits, J., Clavert, I., Ghosh, S., Kung, H-F. and Ruscetti, F.: Negative regulation of HIV-1 expression in monocytes: Role of the 65+50 kD NF kB heterotetramer. Proc. Natl. Acad. Sci. 88: 9426-9430, 1991.

Mikovits, J. A., Lohrey, N. C., Schuloff, R., Courtless, J. and Ruscetti, F. W.: Immune activation of HIV expression from latently infected monocytes from asymptomatic seropositive patients. J. Clin. Invest. 90: 1486-1491, 1992.

Hoffman, P. M., Dhib-Jalbut, S., Mikovits, J. A., Robbins, D. S., Wolf, A. L., Bergey, G. K., Lohrey,N., Weislow, O. S. and Ruscetti, F. W.: HTLV-1 infection of monocytes and microglial cells in primary human cultures. Proc. Natl. Acad. Sci. 89: 11784-11788, 1992.

West, M. Mikovits, J., Princler, G., Liu, Y-L., Ruscetti, F., Kung, H-F. and Raziuddin.: Characterization and purification of a novel transcriptional repressor from Hela cell nuclear extracts recognizing the negative regulatory element of HIV-1 long terminal repeat. J. Biol. Chem. 267: 24948-24952, 1993.

Li, C-C., Ruscetti, F., Rice, N., Chen, E., Mikovits, J., Yang, N-S. and Longo, D. L.: Differential expression of Rel family members in HTLV-1 infected cells: Transcriptional activation of c-rel by tax protein. J. Virol. 4205-4213, 1993.

Mikovits, J. A., Meyers, A. M., Ortaldo, J. R. and Ruscetti, F. W.: IL-4 and IL-13 have overlapping but distinct effects on HIV production in monocytes. J. Leukocyte Biol. 56: 340-346, 1994.

Mayers, D. L., Mikovits, J. A., Joshi, B., Hewlett, I. K., Pankaskie, M. C., Estrada, H. S., Wolfe, A. D., Garcia, G. E., Buyke, D. S., Gordon, R. K., Lane, J. R. and Chiang, P. K.: Novel anti-HIV-1 activities of 3-deaza adenosine analogs: Increased potency against AZT-resistant HIV-1 strains. Proc. Natl. Acad. Sci. 92: 215-219, 1995.

Derse, D., Mikovits, J., Polianova, M., Felber, B. K., and Ruscetti, F. W.: Virions released from cells transfected with a molecular clone of HTLV-1 give rise to primary and secondary infections of T-cells. J. Virol. 69: 1907-1912, 1995.

Fong, S. E., Pallansch, L. A., Mikovits, J. A., Lackman-Smith, C. S., Ruscetti, F. W. and Gonda, M. A.: cis-Acting regulatory elements in the bovine immunodeficiency virus long terminal repeat. Virol. 209: 604-614, 1995.

Rothblum, C. J., Jackman, J., Mikovits, J., Shukla, R. R., and Kumar, A.: Interaction of nuclear protein p140 with human immunodeficiency virus type I TAR RNA in mitogen-activated primary human T lymphocytes. J. Virol. 69: 5156-5163, 1995.

Ouaaz, F., Ruscetti, F., Dugas, B., Mikovits, J., Agut, H., Debré, P., and Mossalayi M. D.: Effects of IgE immune complexes in the regulation of HIV-1 replication and increased cell death of infected U1 monocytes: Involvement of CD23/FceRII mediated nitric oxide and cyclic AMP pathways. Mol. Medicine. 2:1076-1551, 1996.

Mikovits, J. A., Hoffman, P. M., Rethwilm, A., and Ruscetti, F. W.: In vitro infection of primary and retrovirus-infected human leukocytes by human foamy virus. J. Virol. 70: 2774-2780, 1996.

Hoover, T., Mikovits, J., Court, D., Liu, Y. L., Kung, H. F., and Raziuddin: A Nuclear Matrix-specific Factor that Binds a Specific Segment of the Negative Regulatory Element (NRE) of HIV-1 LTR and Inhibits NF-kappaB Activity. Nucleic Acids Res. 24: 1895-1900, 1996.

Derse, D., Mikovits, J., Waters, D., Brining, S., and Ruscetti, F.: Examining the molecular genetics of HTLV-1 with an infectious molecular clone and permissive cell culture systems. J. AIDS and Human Retrovirology. 12: 1-5, 1996.

Turley, J. M., Fu, T., Ruscetti, F. W., Mikovits, J. A., Bertolette III, D. C., and Birchenall-Roberts, M. C.: Vitamin E succinate induces Fas-mediated apoptosis in estrogen receptor-negative human breast cancer cells. Cancer Res. 57: 881-890, 1997.

Derse, D., Mikovits, J.A., and Ruscetti, F.W. X-I and X-II open reading frames of HTLV-I are not required for virus replication or for immortalization of primart T cells in vitro. Virology 237:2675-2688, 1997

Mikovits, J. A., Taub, D. D., Turcovski-Corrales, S. M., and Ruscetti, F. W.: Similar levels of HIV replication in Th1 and Th2 clones. J. Virol. 72:5231-5238 1998.

Mikovits, J. A., Young, H. A., Vertino, P., Issa, J. P. J., Pitha, P. M., Turcoski-Corrales, S., Taub, D. D., Petrow, C. L., Baylin, S. B., and Ruscetti, F. W.: HIV-1 infection upregulates DNA methyltransferase resulting in de novo methylation of the IFN-gamma promoter and subsequent downregulation of IFN-gamma production. Mol. Cell. Biol.,18:5166-5177, 1998.

Nilsson, G., J. A. Mikovits, D. D. Metcalf and D.D.Taub.: Mast cell Migratory Response To interleukin-8 Is Mediated Through Interaction With Chemokine Receptor CXCR2/Interleukin-8RB. Blood, 93:2791-2797, 1999.

Li, B-Q, Fu T., Dongyan Y., Mikovits JA. Ruscetti FW., Wang JM. Flavonoid Baicalin inhibits HIV-1 infection at the level of viral entry. Biochem Biophys Res Commun. 24: 276(2): 534-8, 2000

B.-Q Li, M.A. Wetzel, J.A. Mikovits, E.E. Henderson, T.J. Rogers, W. Gong, N.M. Dunlop, Y. Le, F.W. Ruscetti and J.M. Wang. The synthetic peptide WKYMVM attenuates the function of the chemokine receptors CCR5 and CXCR4 through activation of the formyl peptide receptor-like 1. Blood 2001 May 15; 97(10): 2941-2947.

M.R. Ruff, L.M. Melendez-Guerrero, Q-E Yang, W-Z Ho, J.A. Mikovits, C.B. Pert and F.W. Ruscetti. Peptide T Inhibits Chemokine Receptor-5 (CCR5) Mediated HIV-1 Infection. Antiviral Research 2001 52: 63-75.

J. Mikovits , F. Ruscetti, W. Zhu, R. Bagni, D. Dorjsuren and R. Shoemaker. Potential Cellular Signatures of Viral Infections in Human Hematopoietic Cells. Disease Markers. 2001;17(3):173-8.

J-Y Fang, JA Mikovits, R Bagni, CL Petrow-Sadowski and FW Ruscetti. Infection of Lymphoid Cells by Integration-Defective HIV-1 increases De Novo Methylation. J Virol. 2001. 75: 9753-9761.

Song Y, Goel A, Basrur V, Roberts PE, Mikovits JA, Inman JK, Turpin JA, Rice WG, Appella E. Synthesis and biological properties of amino acid amide ligand-based pyridinioalkanoyl thioesters as anti-HIV agents. Bioorg Med Chem. 2002 May;10(5):1263-73 .

Yang QE, Li KG, Mikovits JA. Eradication of human immunodeficiency virus type 1-infected cells by a combination of antimetabolic cytotoxic chemotherapy and antiviral chemotherapy in vitro: a pilot study. J Infect Dis. 2002 Sep 1; 186(5):706-9.

Stephen AG, Worthy KM, Towler E, Mikovits JA, Sei S, Roberts P, Yang QE, Akee RK, Klausmeyer P, McCloud TG, Henderson L, Rein A, Covell DG, Currens M, Shoemaker RH, Fisher RJ. Identification of HIV-1 nucleocapsid protein: nucleic acid antagonists with cellular anti-HIV activity. Biochem Biophys Res Commun. 2002 Sep 6; 296(5):1228-37.

Flynn J, Fang JY, Mikovits JA, Reich NO. A potent cell-active allosteric inhibitor of murine DNA cytosine C5 methyltransferase. J Biol Chem. 2003 Mar 7;278(10):8238-43. Epub 2002 Dec 10.

Muegge K, Young H, Ruscetti F, Mikovits J Epigenetic control during lymphoid development and immune responses: aberrant regulation, viruses, and cancer. Ann N Y Acad Sci. 2003 Mar; 983:55-70. Review

Puri A, Rawat SS, Lin HM, Finnegan CM, Mikovits J, Ruscetti FW, Blumenthal R. An inhibitor of glycosphingolipid metabolism blocks HIV-1 infection of primary T-cells.AIDS. 2004 Apr 9;18(6):849-58.

Taub DD, Mikovits JA, Nilsson G, Schaffer EM, Key ML, Petrow-Sadowski C, Ruscetti FW. Alterations in mast cell function and survival following in vitro infection with human immunodeficiency viruses-1 through CXCR4. Cell Immunol. 2004 Aug;230(2):65-80.

Fang JY, Lu R, Mikovits JA, Cheng ZH, Zhu HY, Chen YX. Regulation of hMSH2 and hMLH1 expression in the human colon cancer cell line SW1116 by DNA methyltransferase 1. Cancer Lett. 2006 Feb 20; 233(1):124-30.

Whitby D, Marshall VA, Bagni RK, Miley WJ, McCloud TG, Hines-Boykin R, Goedert JJ, Conde BA, Nagashima K, Mikovits J, Dittmer DP, Newman DJ. Reactivation of Kaposi's sarcoma-associated herpesvirus by natural products from Kaposi's sarcoma endemic regions. Int. J Cancer. 2007 Jan 15;120(2):321-8.

Lombardi, V.C., Ruscetti, F. W., Das Gupta, J., Pfost, M.A., Hagen, K.S., Peterson, D.L., Ruscetti, S.K., Bagni, R.K., Petrow-Sadowski, C.L., Gold, B., Dean, M., Silverman, R.H. and J. A Mikovits. Detection of an

Infectious Retrovirus, XMRV, in Blood Cells of Patients with Chronic Fatigue Syndrome. Science. 326:585-589, 2009 *retracted by editorial decision 11/2011

Mikovits, JA and FW Ruscetti 2010. Response to Comments on “Detection of an Infectious Retrovirus, XMRV in Blood cells of Patients with Chronic Fatigue Syndrome. Science 328, 825-d (2010)

Mikovits, JA, Lombardi, VC and FW Ruscetti. Xenotropic Murine Leukemia Virus Related Virus (XMRV): Current Research, Disease Associations, Therapeutic Opportunities (Future Medicine, Therapy, Sept 2010)

Mikovits JA, VC Lombardi, MA Pfost, KS Hagen and FW Ruscetti. Addenda to: Detection of an infectious retrovirus, XMRV, in blood cells of patients with chronic fatigue syndrome. Virulence. 2010 Sep-Oct;1(5):386-90.

Mikovits JA Huang Y, Pfost MA, Lombardi VC, Bertolette DC, Hagen KS, and Ruscetti FW. Complementary Methods are needed to reveal the extent of distribution of XMRV Infection in Chronic Fatigue Syndrome and Prostate Cancer. AIDS Rev. 2010 Jul-Sep;12(3):149-52. Review.

Carruthers BM, van de Sande MI, De Meirleir KL, Klimas NG, Broderick G, Mitchell T, Staines D, Powles AC, Speight N, Vallings R, Bateman L, Baumgarten-Austrheim B, Bell DS, Carlo-Stella N, Chia J, Darragh A, Jo D, Lewis D, Light AR, Marshall-Gradisbik S, Mena I, Mikovits JA, Miwa K, Murovska M, Pall ML, Stevens S. Myalgic encephalomyelitis: International Consensus Criteria. J Intern Med. 2011 Oct;270(4):327-38.

Lombardi VC, Hagen KS, Hunter KW, Diamond JW, Smith-Gagen J, Yang W, Mikovits JA. Xenotropic murine leukemia virus-related virus-associated chronic fatigue syndrome reveals a distinct inflammatory signature. In Vivo. 2011 May-Jun;25(3):307-14.

Simmons G, Glynn SA, Komaroff AL, Mikovits JA, Tobler LH, Hackett J Jr, Tang N, Switzer WM, Heneine W, Hewlett IK, Zhao J, Lo SC, Alter HJ, Linnen JM, Gao K, Coffin JM, Kearney MF, Ruscetti FW, Pfost MA, Bethel J, Kleinman S, Holmberg JA, Busch MP; Blood XMRV Scientific Research Working Group (SRWG). Failure to confirm XMRV/MLVs in the blood of patients with chronic fatigue syndrome: a multi-laboratory study. Science. 2011 Nov 11;334(6057):814-7.

Silverman RH, Das Gupta J, Lombardi VC, Ruscetti FW, Pfost MA, Hagen KS, Peterson DL, Ruscetti SK, Bagni RK, Petrow-Sadowski C, Gold B, Dean M, Mikovits JA. Partial retraction. Detection of an infectious retrovirus, XMRV, in blood cells of patients with chronic fatigue syndrome. Science. 2011 Oct 14;334(6053):176

Alter HJ, Mikovits JA, Switzer WM, Ruscetti FW, Lo SC, Klimas N, Komaroff AL, Montoya JG, Bateman L, Levine S, Peterson D, Levin B, Hanson MR, Genfi A, Bhat M, Zheng H, Wang R, Li B, Hung GC, Lee LL, Sameroff S, Heneine W, Coffin J, Hornig M, Lipkin WI. A multicenter blinded analysis indicates no association between chronic fatigue syndrome/myalgic encephalomyelitis and either xenotropic murine leukemia virus-related virus or polytropic murine leukemia virus. MBio. 2012 Sep 18;3(5).

Goetz D.L.S., Mikovits J.A., Deckoff-Jones J. And F.W. Ruscetti. Innate Immune Changes in Peripheral Blood of Chronic Fatigue Syndrome Patients: Risk Factors for Disease and Management. Chapter 6 In book: Chronic Fatigue Syndrome. 2014 Nova Science Publishers. Editor: Connor Hudson ISBN 978-1-63321-961-8.