

BIOGRAPHICAL SKETCH
DO NOT EXCEED FIVE PAGES.

NAME: Hardman, Wanda Elaine

eRA COMMONS USER NAME (credential, e.g., agency login): hardman

POSITION TITLE: Professor, Department of Biomedical Sciences

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Auburn Univ. at Montgomery, AL	B.S.	06/1978	Biology
Auburn Univ. at Montgomery, AL	Internship	12/1978	Med. Technology
Univ. Texas Health Science Center at S.A., TX	Ph.D.	12/1992	Cell Biology

A. Personal Statement

I currently supervise an active research laboratory at the Marshall University School of Medicine (MUSOM) and have the established clinical connections and basic science experience to help ensure the completion of this COBRE, focused on cellular transport of obesity related conditions, which will enable development of clinically relevant future directions for research. I will also serve as Chair of the Mentoring Committee. I have almost 25 years of experience in studies on dietary interventions against cancer. About 20 years ago, my research evolved into studies of the effects of dietary fat, especially omega 3 fats on cancer growth and response to chemotherapy using xenograft models. My research remains focused on omega 3 fats and cancer using various models (including xenograft, carcinogen treated and transgenic models) and experimental designs to answer different experimental questions. I have completed and reported a small clinical trial to assess the effects of omega 3 fatty acids on NFkB activation in the lymphocytes of patients with chronic lymphocytic leukemia. This study clearly demonstrated the ability of omega 3 supplementation to significantly reduce NFkB activation and to induce histone modification in the cancerous cells. In another just closed pilot clinical trial, it was demonstrated that including walnut in the diet of subjects with breast cancer significantly modified gene expression in a manner expected to suppress proliferation, metastasis and inflammation and to increase cell death in the tumor (abstract for AICR annual meeting, 2016). I have served, and/or still serve, on Grant Study Sections for the NIH (NCI, Subcommittees G and J for 6 years and currently CDP, *ad hoc*), the Susan Komen Breast Cancer Foundation, the Department of Defense CDMRP: Breast Cancer and the American Institute for Cancer Research, giving me an understanding of the expectations of granting agencies and the requirement for prompt publication of results. My record of continuous research funding since I was a graduate student indicates that I have the skills needed to obtain significant grant support. I have mentored post-doc, graduate and undergraduate students, several of whom have established successful research careers. I am the senior faculty mentor for three junior faculty members (Piyali Dasgupta, Travis Salisbury, Maria Serrat) who are making good progress towards establishing independence and have already received R15 grants. The West Virginia Cancer Genomics Network (WVCGN) has also been collecting cancer and paired normal tissues since its inception in 2012 and could be a valuable resource for future research. As a PI of the West Virginia Cancer Genomics network, I have connections with colleagues within the state to encourage collaborative interactions and the future research of the project investigators.

B. Positions and Honors

Positions and Employment

1982-1988 Medical Technologist, Hematology, Cancer Therapy and Research Center, San Antonio, TX
 1988-1990 Sr. Research Assistant, Cellular and Structural Biology, The University of Texas Health Science Center at San Antonio, TX
 1990-1993 Teaching Assistant, Cellular and Structural Biology, The University of Texas Health Science Center at San Antonio, TX
 1993-1997 Instructor, Cellular and Structural Biology, The University of Texas Health Science Center at San Antonio, TX
 1997-2001 Research Assistant Professor, Cellular and Structural Biology, The University of Texas Health Science Center at San Antonio, TX
 2001-2005 Assistant Professor, Pennington Biomedical Research Center, Louisiana State University, Baton Rouge, LA
 2005-2011 Associate Professor, Marshall University School of Medicine, Dept of Biochemistry and Microbiology, Huntington, WV
 2011-Present Professor, Marshall University School of Medicine, Dept of Biochemistry and Microbiology Huntington, WV

Other Experience and Professional Memberships

1998-2000 National Institutes of Health reviewer pool for RAID grant proposals
 1999-2001 Advisory Board for San Antonio Affiliate of Susan Komen Breast Cancer Foundation
 2003-2005 National Cancer Institute Scientific Review Group, Subcommittee G, Education
 2005-2009 National Cancer Institute Scientific Review Group, Subcommittee J, grant reviewer
 2009, 2012, 2014 National Cancer Institute Scientific Review Group, CDP, *ad-hoc* grant reviewer
 1999-2003, 2005 Susan G. Komen Breast Cancer Foundation, grant reviewer,
 2003-2012 American Institute for Cancer Research, grant reviewer

Honors

1997 Selected Junior Faculty, 'Methods in Clinical Cancer Research, A Workshop', American Society of Clinical Oncology, American Association for Cancer Research, National Cancer Institute
 1997-Present Consultant Scientist, InCell Corporation
 1991-1992 National Institutes of Health Training Fellowship
 1995 Barbara H. Bowman Postgraduate Scholarship, First annual award
 1993 Selected participant - American Association for Cancer Research, Histopathobiology of Neoplasia Workshop
 2002-2010 Treasurer, International Federation for Cell Biology
 2004-Present Scientific Advisory Board, California Walnut Council
 2001 to present Editorial Advisor; *Cancer Cell International*
 1997 to present Reviewer, *British Journal of Cancer, International Journal of Cancer, Cancer Epidemiology, Biomarkers and Prevention, Histochemical Journal, Cancer, Nutrition and Cancer, Clinical Cancer Research, American Journal Clinical Nutrition, Life Sciences,*
 2003 to present Reviewer, *Clinical & Experimental Metastasis, Nutrition, Lipids, Oncogene*
 2005 to present Reviewer, *BMC Pharmacology*

C. Contribution to Science

1. My early research assessed the ability of dietary fiber or non-steroidal anti-inflammatory drugs to retard colon cancer progression. These were some of the early studies to show that cancer could be a preventable disease.
 - a. Heitman, DW, Hardman, WE and Cameron, IL. Dietary supplementation with pectin and guar gum on 1,2-dimethylhydrazine-induced colon carcinogenesis in rats. *Carcinogenesis* 13: 815-818, 1992.
 - b. Barnes, C., Hardman, WE, Cameron, IL, Lee, M. Cell proliferation parameters in rat colonic crypts: influence of aspirin, age, and proximity to lymphoid nodules. *Cell Prolif.* 28: 59-71, 1995.
 - c. Hardman, WE and Cameron, IL. Site specific reduction in colon cancer incidence without a concomitant reduction in cryptal cell proliferation in 1,2-dimethylhydrazine treated rats by diets containing 10% pectin and either 5% or 20% corn oil. *Carcinogenesis* 16: 1425-1431, 1995.

- d. Barnes,CJ, Lee,M, Hardman,WE, and Cameron, IL. NSAID modulation of colonic epithelial cell proliferation and apoptosis as intermediate biomarkers of induced rat colon cancer. *Br. J. Cancer*, 77:573-580, 1997
2. My research is currently focused on studies of the effects of dietary fat, especially omega 3 fats on cancer growth and response to chemotherapy using various models (including xenograft, carcinogen treated and transgenic models) and experimental designs to answer different experimental questions. I have demonstrated that consumption of fish oil can sensitize cancers to various chemotherapies or to radiation.
 - a. Hardman, WE, Moyer, MP and Cameron, IL Dietary fish oil sensitizes A549 lung xenografts to doxorubicin chemotherapy. *Cancer Letters*, 151: 145-151, 2000
 - b. Hardman, WE and Cameron, IL. Fish oil supplementation enhances CPT-11 (irinotecan) efficacy against MCF7 breast carcinoma xenografts and ameliorates intestinal side effects. *Br. J. Cancer*, 81: 440-448, 1999.
 - c. Hardman, WE, Avula, CPR, Fernandes, G. and Cameron, IL. Three percent dietary fish oil concentrate increased efficacy of doxorubicin against MDA-MB 231 breast cancer xenografts. *Clin. Cancer Res.* 7: 2041-2049, 2001.
 - d. Hardman, WE, Sun, L.Z., Short, N. and Cameron, IL. Dietary omega-3 fatty acids and ionizing irradiation on human breast cancer xenograft growth and angiogenesis. *Cancer Cell Int.* 2005 Apr 28;5(1):12.
 3. A limitation for the use of fish oil by people may be that it would usually be taken as a supplement. The expense could limit regular use by many people as well as the limitation of fish stocks. Canola oil is readily available, can be used in cooking, baking or salads and usually costs the same as corn or soybean oil. I have demonstrated that canola oil also has beneficial effects against cancer.
 - a. Hardman, WE. Dietary canola oil suppressed growth of implanted MDA-MB 231 human breast tumors in nude mice. *Nutr and Cancer*, 2007, 57(2), 177-183.
 - b. Ion, G., Akinsete, J.A. and Hardman, W.E. Maternal consumption of canola oil suppressed mammary gland tumorigenesis in C3(1) TAg mice. *BMC Cancer*. 2010 Mar 6;10(1):81. [Epub ahead of print].
 - c. Ion, G, Fazio, K, Akinsete, JA and Hardman, WE. Effects of canola and corn oil mimetic on Jurkat cells. *Lipids in Health and Disease*, 2011 Jun 1;10:90.
 4. Epidemiology studies have shown that regular consumption of nuts and seeds may reduce the risk for multiple cancers, including colon cancer. Work with walnuts incorporated into the diet of mice shows that these nuts can indeed reduce development and growth of colon, prostate and breast cancers.
 - a. Hardman WE and Ion, G. Walnut consumption for growth suppression of human MDA-MB 231 xenografts. *Nutr and Cancer*. 2008, 60(5), 666-674.
 - b. Hardman, WE, Ion, G, Akinsete, JA, Witte, TR. Dietary walnut suppressed mammary gland tumorigenesis in the C(3)1 TAg mouse. *Nutrition and Cancer*, online: 20 Jul 2011
 - c. Reiter RJ, Tan DX, Manchester LC, Korkmaz A, Fuentes-Broto L, Hardman WE, Rosales-Corral SA, Qi W. A Walnut-Enriched Diet Reduces the Growth of LNCaP Human Prostate Cancer Xenografts in Nude Mice. *Cancer Invest*. 2013 Jun 11. [Epub ahead of print] PMID: 23758186.
 - d. Tsoukas MA^{1,2}, Ko B-J¹, Witte TR³, Dincer F¹, Hardman WE³, Mantzoros CS¹. Dietary Walnut Suppression of Colorectal Cancer in mice: mediation by miRNA patterns and fatty acid incorporation. *Journal of Nutritional Biochemistry* 2015 Jul;26(7):776-83 PMID: 25882694.
 5. We have completed and published the results of a clinical trial that demonstrates that omega 3 fatty acids can show the same benefit in patients that they do in the pre-clinical studies.
 - a. Varney, ME, Hardman, WE and Sollars, VE. Omega 3 fatty acids reduce myeloid progenitor cell frequency in the bone marrow of mice and promote progenitor cell differentiation. *Lipids in Health and Disease*. 2009, 8:9.
 - b. Fahrman, JF and Hardman, WE. Omega 3 fatty acids increase the chemo-sensitivity of B-CLL-derived cell lines EHEB and MEC-2 and of B-PLL-derived cell line JVM-2 to anti-cancer drugs doxorubicin, vincristine and fludarabine. *Lipids Health Dis*. 2013 Mar 16;12:36. doi: 10.1186/1476-511X-12-36.

- c. Witte, TR, Salazar, AJ, Ballester, OF and Hardman, WE. RBC and WBC fatty acid composition following consumption of an omega 3 supplement: Lessons for future clinical trials. *Lipids Health Dis.* 2010 Mar 22;9:31.
- d. Fahrman, JF, Ballester, OM, Ballester G, Witte, TR, Salazar, AJ, Ion, G, Primerano, DA, Boskovic, G, Denvir, J, Hardman, WE. Inhibition of Nuclear Factor Kappa B activation in early stage chronic lymphocytic leukemia by omega 3 fatty acids. *Cancer Invest.* 2013 Jan 31(1) 24-38.

Complete List of Published Work in MyBibliography:

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1NUta7osqn5c/bibliography/48879093/public/?sort=date&direction=ascending>

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

No Number (Calif. Walnut Commission) Hardman (PI) 01/01/2013 – 06/30/2017
 Dietary Walnut to reduce risk factors for breast cancer (clinical trial)
 The goal of this study is to determine if walnut added to the usual diet will alter gene expression in a direction that would indicate reduced risk for cancer recurrence.
 Role: PI

No number (WV Higher Education Policy Commission) Hardman (PI) 06/1/2012 – 05/30/2017
 WEST VIRGINIA CANCER GENOMICS NETWORK
 The goal of this project is to develop a network of collaboration within the academic and medical institutions of the state of West Virginia for collaboration on tissue collections toward understanding the unique, cancer genomic profile of underserved West Virginian patients for improved therapeutic outcomes.
 Role: PI

No number (WVU-Marshall Collaborative grants) Hardman (co-PI) 02/01/2016 – 01/31/2017
 Adaptive metabolic rewiring in precision therapy lung cancer drug resistance
 The goal of this project is to under the genomic changes that alter metabolism that are made as lung cancer cells develop chemotherapy resistance.
 Role: co-PI

Completed Research Support

1R01CA114018-01A2 Hardman (PI) 09/14/2007 – 8/3`/2013
 Omega-3 fat to reduce risk for breast cancer
 An animal study to determine whether incorporating omega 3 fatty acids (long chain from fish oil) in the diet of either mother mice or the offspring would reduce risk for developing breast cancer.
 Role: PI

BC096996 Dept of Defense, Breast Cancer Research Program Hardman (PI) 09/01/2013
 Maternal consumption of omega 3 fatty acids to reduce breast cancer risk in offspring
 An animal study to determine whether the shorter chain fatty acids of canola oil would be effective to reduce breast cancer risk.
 Role: PI

WV-NASA Hardman (PI-mentor) 08/1/2012 – 07/31/2013
 Pre-doctoral award for Johannes Fahrman
 Pre- doctoral award to Johannes Fahrman for his project to determine the gene expression changes due to treatment with omega 3 fatty acids in CLL cells.
 Role: PI -Mentor

WV-INBRE Hardman (PI) 10/1/2012-09/30/2013
 Omega 3 induced epigenetic change in CLL (clinical trial)
 The goal of this study was to determine if gene expression changes due to omega 3 consumption in patients with CLL are due to epigenetic changes.
 Role: PI

Marshall Health Translational Pilot grant Hardman (PI) 01/15/2013 – 01/14/2015
Pilot Trial: Feasibility and Safety of Nutritional Supplementation with Omega-3 Fatty Acids to Reduce Prostate Specific Antigen Rise in Men with Biochemical Failure after Prostatectomy or External-Beam radiation.
The goal of this project was to determine if omega 3 fatty acids could modify or reverse biochemical failure in men who have prostate cancer treatment.
Role: PI