

CRAIG D. WOODWORTH

Emeritus Professor, Biology
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EDUCATION

1978-1983 **Ph.D., Cell Biology**, University of Vermont, College of Medicine, Burlington, VT
1975-1978 **M.S., Zoology**, North Carolina State University, Raleigh, NC
1970-1974 **B.A., Zoology**, University of Vermont, Burlington, VT

PROFESSIONAL APPOINTMENTS

2018-present **Emeritus Professor**, Department of Biology, Clarkson University
2006-2018 **Professor**, Department of Biology, Clarkson University
2010-2014 **Professor and Chair**, Department of Biology, Clarkson University
2000-2006 **Associate Professor**, Department of Biology, Clarkson University
1999-2000 **Faculty**, FAES Graduate School at the National Institutes of Health
1990-2000 **Investigator**, Laboratory of Biology (1990-1997) and Laboratory of Cellular Carcinogenesis and Tumor Promotion (1997-2000), National Cancer Institute, National Institutes of Health, Bethesda, MD
1987-1990 **Senior Staff Fellow**, Somatic Cell Genetics Section, Laboratory of Biology, National Cancer Institute, NIH, Bethesda, MD
1983-1987 **Postdoctoral Fellow**, Department of Microbiology, Pennsylvania State University College of Medicine, Hershey, PA

RESEARCH SUPPORT

2016-2018 Research Award from US Biomax, Inc. for \$100,000.00
2013-2016 1R15CA173703-01, NIH, \$435,728, Woodworth C.D. (PI) Interaction of HPV with Cells of the Transformation Zone.
2007- 2011 1R15CA126855-01, NIH, \$238,500, Woodworth C.D. (PI) Regulation of Papillomavirus-Induced Immortalization by EGF-Receptor Inhibition.
2007-2011 1R15CA150962-01S2, NIH ARRA Supplement, \$75,000, purchase flow cytometer.
2007-2010 3R15CA126855-01S1, NIH Minority Supplement, \$43,153 for Clarkson undergraduate
2004-2007 1R15CA101873-01, NIH, \$235,500, Woodworth C.D. (PI) Activation of NF-kB by Human Papillomaviruses.
2004-2007 3R15CA101873-01S2, NIH Minority Supplement, \$43,787 for Clarkson undergraduate
2004-2007 3R15CA101873-01S1, NIH Research Supplement, \$15,000 for real time thermocycler
1987-2000 Intramural Investigator / Senior Staff Fellow at the National Institutes of Health, funded by the National Cancer Institute

HONORS AND SCIENTIFIC RECOGNITION

- Clarkson Faculty Teaching Excellence Endowed Fund - in Honor of Dr. Robert John McGill and Dr. Nye Smith, 2016
- Clarkson Office of Student Success, Diversity and Inclusion - Faculty Ambassador Award, 2016
- Million Dollar Club, Clarkson University, 2013

- Kirsten Craig Memorial Faculty Recognition Award for fostering research development of students in the Clarkson University Honors Program, 2006
- Outstanding Teacher Award for Clarkson University presented by the Clarkson University Student Association, 2006-2007
- Invited platform presentation on Immune Response to HPV Infection, International Papillomavirus Conference, Mexico City, 2004
- Invited speaker, Fifth International Conference on Cytokines, Max Planck Institute, Martinsreid, Germany, 1998
- Cochairman and Organizer of Workshops on (1) Cytokines and Human Papillomavirus, International Papillomavirus Conference, Amsterdam, Netherlands, 1994, (2) Host-Viral Interactions, International Papillomavirus Conference, Siena, Italy, 1997
- Alumni Lecture, Dept of Microbiology, Penn. State University, College of Medicine, 1993

PROFESSIONAL SERVICE

- **Grant Reviews** – NIH Special Emphasis Panel/Scientific Review Group (2006), U.S. Civilian Research & Development Foundation (2006), Medical Research Council of South Africa (2005), Scottish Hospital Endowments Research Trust (2003), The Wellcome Trust (2001), The Dutch Cancer Society (1999), CONRAD Program for Contraceptive Research (1998 and 2003), NIH General Medicine Study Section A, Ad Hoc Reviewer (1993)
- **Advisory Boards** – Member, Scientific Advisory Board, Trudeau Institute (2013 – 2015) and Board Member for GlaxoSmithKline, Immune Modulator Session (2004)
- **Manuscript Reviews** – Invited reviewer for multiple journals. Reviewed textbooks for Prentice Hall, McGraw Hill, and Blackwell Publishers

UNIVERSITY SERVICE

- **Clarkson University Pre-Medical Advisor and Chair, Clarkson University Health Professions Committee**, 2006-2010 and 2017-2018
- **Radiation Safety Officer for Clarkson University**, 2001-2006
- **Membership on University Committees**
 - Chair, School of Arts and Sciences Faculty Mentoring Committee, 2014-2017
 - University Biosafety Committee, 2009-2018
 - Honors Council, provide advice and governance for the Honors Program, 2006-2018
 - University Tenure Committee member, 2007-2009 (Chair 2009)
 - University Promotion Committee, 2009-2010, 2014-2018
 - University Radiation Safety Committee, 2006-2018
 - University Health Professions Advising Committee, 2010-2017
 - Committee for Women In Science Engineering, 2007-2010
- **Membership on Departmental Committees**
 - Director, Interdisciplinary Bioscience and Biotechnology Graduate Program, 2014-2017
 - Search Committee Membership – total of 18 committees in multiple departments
 - Organize and Coordinate the Department of Biology Seminar Program, 2002-2006
 - Director of the Undergraduate Thesis Program for the Biology Department, 2003-2010

COURSES TAUGHT

2017-2018	HS200 and HS210 Health Coaches (2 and 3 credits)
2015-2018	BY448/548 Medical Microbiology (3 credits)
2014-2015	BY415/515 Recent Advances in Immunology Research (1 credit)
2014	BY419/519 Immunobiology (3 credits)
2001-2018	BY312/480 Advanced Cell Biology (3 credits)
2002-2013	BY422 Undergraduate Seminar (1 credit)
2003-2018	BY214 Genetics (3 credits)
2006-2018	BY455 Molecular and Cellular Biology of Cancer (3 credits)
2006	HP300 Cancer and the Human Experience (3 credits)
2002-2006	BY300 Recent Advances in Biological Research (1 credit)
2001-2010	BY412 Molecular Biology Laboratory (4 credits)
2001-2005	BY310 Developmental Biology (3 credits)
2000	BY360 Human Physiology and BY362 Physiology Lab (4 credits),
1999-2000	MEDI 426, Cell and Molecular Biology of Cancer , FAES at NIH

MENTORING STUDENTS AND POSTDOCTORAL FELLOWS

- **Postdoctoral Fellows** (3) from 1991 – 2000
- **Graduate Students** – 8 Ph.D. and 4 M.S. students from 2003 – 2018
- **Post-Baccalaureate Fellows at NIH** (fellowships for college graduates who plan to attend medical or graduate school within 1 to 2 years) – 6 different students from 1987 – 2000
- **Undergraduate Students** – mentored 69 students from 2000 – 2018 including 19 who entered Ph.D programs, 5 in M.D. / Ph.D programs and 9 in M.D. or D.O. programs

RESEARCH INTERESTS

Mechanisms by which papillomavirus oncoproteins perturb cell regulation and contribute to cervical cancer. Signal transduction pathways activated by the epidermal growth factor receptor, and importance in cervical carcinogenesis.

PEER-REVIEWED PUBLICATIONS (77 total – most highly cited listed below)

- Papillomavirus type 16 oncogenes downregulate expression of interferon-responsive genes and upregulate proliferation-associated and NF- κ B-responsive genes in cervical keratinocytes. M Nees, JM Geoghegan, T Hyman, S Frank, L Miller, CD Woodworth. *Journal of virology* 75 (9), 4283-4296
- Fundamental differences in cell cycle deregulation in human papillomavirus–positive and human papillomavirus–negative head/neck and cervical cancers. D Pyeon, MA Newton, PF Lambert, JA Den Boon, S Sengupta, CJ Marsit, CD Woodworth, JP Connor, TH Haugen, EM Smith, KT Kelsey, LP Turek, P Ahlquist. *Cancer research* 67 (10), 4605-4619
- Maintenance of differentiated rat hepatocytes in primary culture. HC Isom, T Secott, I Georgoff, C Woodworth, J Mummaw. *Proceedings of the National Academy of Sciences* 82 (10), 3252-3256
- Atomic force microscopy detects differences in the surface brush of normal and cancerous cells. S Iyer, RM Gaikwad, V Subba-Rao, CD Woodworth, I Sokolov. *Nature nanotechnology* 4 (6), 389-393
- Immortalization of human foreskin keratinocytes by various human papillomavirus DNAs corresponds to their association with cervical carcinoma. CD Woodworth, J Doniger, JA DiPaolo. *Journal of Virology* 63 (1), 159-164

- Induction of human cervical squamous cell carcinoma by sequential transfection with human papillomavirus 16 DNA and viral Harvey ras. JA DiPaolo, CD Woodworth, NC Popescu, V Notario, J Doniger. *Oncogene* 4 (4), 395-399
- Characterization of Normal Human Exocervical Epithelial Cells Immortalized in Vitro by Papillomavirus Types 16 and 18 DNA. CD Woodworth, PE Bowden, J Doniger, L Pirisi, W Barnes, WD Lancaster, JA DiPaolo. *Cancer research* 48 (16), 4620-4628
- Human epithelial cells increase their rigidity with ageing in vitro: direct measurements. TK Berdyeva, CD Woodworth, I Sokolov. *Physics in Medicine & Biology* 50 (1), 81
- Interleukin 1 alpha and tumor necrosis factor alpha stimulate autocrine amphiregulin expression and proliferation of human papillomavirus-immortalized and carcinoma-derived cervical epithelial cells. CD Woodworth, E McMullin, M Iglesias, GD Plowman. *Proceedings of the National Academy of Sciences* 92 (7), 2840-2844
- Comparative lymphokine secretion by cultured normal human cervical keratinocytes, papillomavirus-immortalized, and carcinoma cell lines. CD Woodworth, S Simpson. *The American journal of pathology* 142 (5), 1544
- Transforming growth factors beta 1 and 2 transcriptionally regulate human papillomavirus (HPV) type 16 early gene expression in HPV-immortalized human genital epithelial cells. CD Woodworth, V Notario, JA DiPaolo. *Journal of virology* 64 (10), 4767-4775
- HPV innate immunity. CD Woodworth. *Frontiers in Bioscience-Landmark* 7 (4), 2058-2071
- Human Cervical and Foreskin Epithelial Cells Immortalized by Human Papillomavirus DNAs Exhibit Dysplastic Differentiation in Vivo. CD Woodworth, S Waggoner, W Barnes, MH Stoler, JA DiPaolo. *Cancer research* 50 (12), 3709-3715
- The interaction between HPV infection and estrogen metabolism in cervical carcinogenesis. KJ Auburn, C Woodworth, JA Dipaolo, HL Bradlow. *International journal of cancer* 49 (6), 867-869
- Inhibition of the epidermal growth factor receptor increases expression of genes that stimulate inflammation, apoptosis, and cell attachment. CD Woodworth, E Michael, D Marker, S Allen, L Smith, M Nees. *Molecular cancer therapeutics* 4 (4), 650-658
- Overexpression of the insulin-like growth factor-1 receptor and autocrine stimulation in human cervical cancer cells. MA Steller, CH Delgado, CJ Bartels, CD Woodworth, Z Zou. *Cancer research* 56 (8), 1761-1765
- Human papillomavirus type 16 E6 and E7 proteins inhibit differentiation-dependent expression of transforming growth factor- β 2 in cervical keratinocytes. M Nees, JM Geoghegan, P Munson, V Prabhu, Y Liu, E Androphy, CD Woodworth. *Cancer research* 60 (15), 4289-4298
- Human papillomavirus type 16 E6 and E7 proteins alter NF-kB in cultured cervical epithelial cells and inhibition of NF-kB promotes cell growth and immortalization. ER Vandermark, KA Deluca, CR Gardner, DF Marker, CN Schreiner, DA Strickland, KM Wilton, SMondal, CD Woodworth. *Virology* 425 (1), 53-60
- Interleukin-6 and interleukin-6 soluble receptor regulate proliferation of normal, human papillomavirus-immortalized, and carcinoma-derived cervical cells in vitro. M Iglesias, GD Plowman, CD Woodworth. *The American journal of pathology* 146 (4), 944
- Leukoregulin and γ -interferon inhibit human papillomavirus type 16 gene transcription in human papillomavirus-immortalized human cervical cells. CD Woodworth, U Lichti, S Simpson, CH Evans, JA DiPaolo. *Cancer research* 52 (2), 456-463
- Strain-dependent differences in malignant conversion of mouse skin tumors is an inherent property of the epidermal keratinocyte. CD Woodworth, E Michael, L Smith, K Vijayachandra, A Glick, H Hennings, SH Yuspa. *Carcinogenesis* 25 (9), 1771-1778