

**Doris M. Benbrook, Ph.D.**  
CURRICULUM VITAE

University of Oklahoma Health Sciences Center  
Department of Obstetrics and Gynecology  
Section of Gynecologic Oncology  
975 N.E. 10<sup>th</sup> St., Rm BRC2 1374  
Oklahoma City, OK 73104

**Phone:** (405) 271-5523  
**FAX:** (405) 271-3874  
**E-mail:** Doris-Benbrook@ouhsc.edu  
**Webpage:** W3.ouhsc.edu\Benbrooklab

**EDUCATION**

1977 to 1981            North Central College, Naperville, IL  
Bachelor of Arts, majors in Biology and Chemistry, minor in German.

1981 to 1985            Loyola University Medical Center  
2001 South First Ave., Maywood, IL 60101  
Ph.D. in Biochemistry, Mentor: Robert V. Miller, Ph.D.

**POSTDOCTORAL EXPERIENCE**

1985 to 1988            In the laboratory of Magnus Pfahl, Ph.D.  
La Jolla Cancer Research Foundation,  
10901 North Torrey Pines Road, La Jolla, CA 92037

1988 to 1991            In the laboratory of Nicholas C. Jones, Ph.D.  
Imperial Cancer Research Fund, P.O. Box 123,  
44 Lincolns Inn Fields, London WC2A. 3PX

**UNIVERSITY OF OKLAHOMA HEALTH SCIENCES CENTER APPOINTMENTS**

Department of Obstetrics and Gynecology, Gynecologic Oncology Section

2004 to present            Professor and Director of Research  
2009 to present            Endowed Chair in Gynecologic Oncology  
1997 to 2004                Associate Professor and Director of Research  
1991 to 1997                Assistant Professor  
1993 to present             Director of Research

Department of Biochemistry and Molecular Biology

2005 to present            Adjunct Professor  
1997 to 2005                Adjunct Associate Professor  
1993 to 1997                Adjunct Assistant Professor

Associate Member of the Graduate Faculty (1993 to present)

**AWARDS AND HONORS**

2009            First Place for best business plan in Oklahoma Governors Cup Competition. Submitted by a team of OU undergraduate interns, called Renephron, to commercialize Dr. Benbrook's Flex-Het drugs for polycystic kidney disease (PKD).

2009            Second Place for best businesss plan in the W. Reynolds Tri-State Collegiate Business Plan competition in May '09 in Las Vegas. Submitted by Renephron to commercialize Dr. Benbrook's Flex-Het drugs for polycystic kidney disease (PKD).

- 2005 Innovator of the Year On the Brink Award, *The Journal Record*  
2004 Oklahoma Scientist of the Year awarded by the Oklahoma Academy of Science  
2004 Woman of the Year Nominee awarded by the *Journal Record*.

### **Editor-in-Chief**

*Biologics: Targets & Therapy*, Dove Medical Press, 2008- present

### **EDITORIAL AND ADVISORY BOARDS**

External Advisory Board, New Mexico Cancer Center, 2009 - present

*Journal of Cell Death*, 2008- present

*Open Access Journal of Clinical Trials*, 2008-present

*Biochemical Journal and Biochemical Society Transactions*, 2007-present

*Open Medicinal Chemistry Journal*, 2007-present

*Bioinformatics and Biology Insights*, 2007-present

*Open Reproductive Science Journal*, 2007-present

*Current Medicinal Chemistry*, 2006-present

*Cancer Epidemiology, Biomarkers & Prevention*, 2002-2009

Native Americans in Biological Sciences Advisory Board (NABS), Oklahoma State University, 2005-2007.

Procter & Gamble Consultant, 1999-2002

Ad Hoc reviewer for *American Journal of Obstetrics and Gynecology*, *Analytica Chimica Acta*, *Anticancer Agents in Medicinal Chemistry*, *BBA - Molecular Cell Research*, *Bioinformatics and Biology*, *Biomed Central Cancer*, *Blood*, *Cancer*, *Cancer Biology*, *Targets and Therapy*, *Cancer Chemoprevention and Pharmacology*, *Cancer Cell*, *Cancer Epidemiology*, *Cancer Cytopathology*, *Biomarkers & Prevention*, *Cancer Letters*, *Cancer Investigation*, *Cancer Prevention Research*, *Cancer Research*, *Clinical Cancer Research*, *CRC Press*, *Experimental Cell Research*, *Current Cancer Therapy Reviews*, *Current Medicinal Chemistry*, *Fertility and Sterility*, *Gene*, *Gynecologic and Obstetrics Investigations*, *Gynecologic Oncology*, *International Journal of Cancer*, *Journal of Biochemistry*, *Journal of Cell Death*, *Journal of the National Cancer Institute*, *Journal of Neurochemistry*, *Journal of Reproductive Medicine*, *Journal of Surgical Oncology*, *Open Medicinal Chemistry Journal*, *Minireviews in Medicinal Chemistry*, *Molecular Cancer Therapeutics*, *Nutrition and Cancer*, *Oncogene*, and *Pharmaceutical Research*.

### **NATIONAL COMMITTEES AND SOCIETIES (2006 – PRESENT)**

Member, Drug Discovery and Molecular Pharmacology (DMP) Study Section, 2009 - 2012

NCI Oncology Fellowship and AREA grants, NIH CSR, VED, 2005 – present, Chair (06/08, 09/08)

Reviewer, Drug Discovery and Molecular Pharmacology (DMP) Study Section, 2008 - 2009

Member of NCI ZRG1 Cancer Biomarkers Study Section (CBSS), 2004 – 2008

Chair, Review Committee of NIH SBIR Topics 238, 239 and 270, 2009

Chair, Review Committee of NIH SBIR Topics 242 and 243, 2008

Chair, Review Committee of NIH SBIR Topics 238 and 239, 2007

Oak Ridge Associated Universities (ORAU) Center of Excellence Award Reviews, 2007 - present

Center for Disease Control (CDC), Improving Public Health Practice through Translation Research, (R18), 2007

Reviewer for U.S. Civilian Research & Development Foundation (CRDF) Cooperative Grants Program (CGP) competition, 2007

Reviewer for Phillip Morris External Research Program, 2003-2007

Drug Discovery and Molecular Pharmacology (DMP) Study Section, 2006

Session Chair: Retinoids and Cancer, FASEB Retinoid Meeting, 2006

Mock Study Section in Grant Writing Workshop for Clinicians, American Association for Cancer Research (AACR) Professional Advancement Series Section, 2006, 2009

Reviewer for NCI SBIR grants (ZCA1 SRRB-U (C1)), 2006

Co-Chair of Translational Research Session of the Ovarian Cancer State of the Art Meeting, sponsored by CTEP and GOG, 2005.

Chair of the National Cancer Institute (NCI) Chemoprevention Committee, Subcommittee E, Cancer Epidemiology, Prevention and Control, 2003-2005. Ad hoc review 2006.

Member of NCI Chemoprevention Committee, Subcommittee E, Cancer Epidemiology, Prevention and Control, 2000-2005.

Gynecological Oncology Group (GOG), Member of the Experimental Medicine Committee (CEM) (since 1992) and Member of Chemoprevention Committee (since 2000).

Chair, Developmental Therapeutics Subcommittee of the GOG CEM Committee, 2006 - present

Substitute Chair and Reviewer for SPORE in Ovarian-GYN Cancer, 2005

Substitute Chair and Reviewer for Early Detection Research Network, Clinical Epidemiology and Validation Centers, 2004

Reviewer, Eppley NCI-Designated Cancer Center Site Visit, January, 2004

Reviewer of Department of Defense Ovarian Cancer Grants, 2002 - 2004.

Department of Veterans Affairs' Medical Research Branch ad hoc grant reviewer since 1992 and nominated for their National Advisory Committee, 2002.

NCI Reviewer for "Clinical Nutrition Research Units", December 2001

Co-Chair of Chemoprevention Workshop for the Gynecologic Cancer Translational Research Retreat II, Chantilly, Virginia May 5-7, 2000.

NCI Scientific Review Group Subcommittee E, Cancer Epidemiology, Prevention and Control Temporary Member, April 2000.

NCI Reviewer for "Molecular Target Drug Discovery", 2000.

NCI Reviewer for "The Early Detection Research Network- Clinical and Epidemiologic Centers.

NCI Reviewer for "Chemoprevention in Genetically-Identified High-Risk Groups: Interactive Research and Development Projects".

NCI Chemoprevention Committee Site Visit Reviewer, June 1999 and January, 2000.

Consultant to Procter & Gamble, 1999-2002

American Association for Cancer Research, Chairman of State Legislative Committee.

American Society of Clinical Oncologists (ASCO), Cancer Genetics Trainer

### **NATIONAL WORKSHOPS**

NCI Phase 0 Trials in Oncologic Drug Development, September 5, 2007

NCI Clinical Development of Small Molecules Workshop January 15, 2008

### **INTERNATIONAL GRANT REVIEWS**

Reviewer for University Grants Committee, University of Hong Kong, 2006

Referee Biotechnology and Biological Sciences Research Council (BBSRC), 2006

Referee for the Italian Research Council, 2002 - 2005

Reviewer of grants for Cancer Research UK (United Kingdom), 2002

### **UNIVERSITY OF OKLAHOMA CANCER INSTITUTE (OUCI) APPOINTMENTS**

2006 to present      Co-Chair, Scientific Advisory Committee

2007 to present Director, Women's Cancer Program  
2001 to 2006 Co-Director, Gynecologic Cancer Program  
2002 to present Scientific Review Board Member  
2006 to present OUCI Biospecimen Core Operations Committee

### **UNIVERSITY OF OKLAHOMA CLINICAL AND TRANSLATIONAL SCIENCE AWARD (CTSA)**

2009 to Present Co-Director, "Med into Grad" PhD Specialization Program  
2006 to 2008 Member, CTSA Grant Planning Committee  
2007 to 2008 Chancellor, Clinical and Translational Science Society (CTSS)  
2007 to 2008 Member, Clinical and Translational Science MS Program Executive Committee

### **UNIVERSITY OF OKLAHOMA COMMITTEES**

Faculty Advisory Committee for the Core Laboratories, 2006 - present  
Chair, Research and Graduate Student Affairs Committee, 2006-2009  
Member, CTSA Executive Committee 2006-present.  
Search Committee of Deputy Directory of the Basic and Translational Cancer Research Center, 2007  
Recruitment Committee, College of Pharmacy, Pharmaceutical Sciences Department Chair, 2007  
Vice Chair of the Institutional Biosafety Committee (IBC), 1995-2006  
Chair, Internal Review Committee of the Epidemiology Graduate Program, 2006  
Clinical & Translational Science Awards (CTSA) Degree and Curriculum Committee, 2006  
Co-Chair, Translational Working Group, Clinical & Translational Science Awards (CTSA), 2005  
Search Committee for Cancer Genetics Endowed Chair, 2005-2006  
Search Committee for Children's Medical Research Institute Endowed Chair, 2005-2006  
Faculty Affair Liaison, 2002  
Outstanding Thesis/Dissertation Committee, 2000-2001

### **DEPARTMENTAL COMMITTEES**

Obstetrics and Gynecology  
Director of Research, 1995 – present  
Promotions Committee – 2003 - present  
Environmental Health and Safety Training Coordinator, 1995- 2003  
Tuberculosis Coordinator, 1996- 2003  
Research Administration Liaison – 1994 - 2003

Biochemistry Department  
Graduate Program Curriculum/Review Committee, 1995-97  
Adjunct Faculty Review and Evaluation Committee, 1997-2000  
Student Recruitment Committee, 2000-01  
General Examination Committee, 2001-02  
Student Advisory Committee, 2001-02  
Student Admissions and Advisory Committee, 2002-2003  
Dental/Pharmacy Course Curriculum Committee, 2003-2004  
Student Admissions and Recruitment Committee, 2004-2007  
Graduate Student Awards Committee, 2007-2010  
Faculty Search Committee, 2008-2010

### **TEACHING AND EDUCATIONAL ADMINISTRATION**

#### **Translational Research Certificate for PhD Degrees (Director)**

- Assisted Dean of the Graduate College to developed infrastructure and submit CTSA grant section to support this specialty.

### **Med into Science Initiative**

- Service on committee to develop a Medical Speciality Certificate for PhD students and submit a grant to the Howard Hughes Medical School to Support this initiative.
- Developed Course “Clinical Validation of Basic Science Results”

### **Medical School Curriculum**

- Molecular and Cellular Systems, Committee to Revise Curriculum for systems based learning approach 2007 – 2008

### **Clinical and Translational Science Award (CTSA) Summer Scholar Program 2007-present.**

- Clinical and Translational Science (2 hours)
- The University of Oklahoma Cancer Institute (1 hour)

### **Clinical Bioinformatics (RADI5403, RADI5413)**

Assisted in development of this new course in 2005 and lectured in:

- Structural Biology (1.5 hrs)
- Carcinogenesis, Chemoprevention and Cancer Genetics (1.5 hrs)
- Angiogenesis, molecular targets for treatment, diagnosis, monitoring & imaging (1.5 hrs)
- Cancer Metastasis and Immunity, treatment, diagnosis, monitoring & imaging (1.5 hrs)
- Lunch and Learn (2 hrs)

### **Integrated Graduate Student Curriculum.**

- CSI and CSII, Cellular Systems, Apoptosis (1.5 hours) 2007-present
- BMSC 5221 Cancer Journal Club (4 hours) 2002-2003, 2005-2007
- BMSB 6100 Laboratory Rotations (20 hours) 2 students per year.
- BMSB6121 Molecular Mechanisms of Disease
  - Carcinogenesis and Chemoprevention (2 hours), 2004-2006
  - Molecular Mechanisms of Cancer (1 hour), 2006
- CELL 6331 Cancer Genetics/Biomarkers (1.5 hours) 2004- present
- Regulation of Gene Expression (4.5 hours), 2002 - 2003
- Oncogenes and Tumor Suppressor Genes (4 hours), 2001- 2003
- Nucleic Acids: RNA Splicing Mechanisms (4 Hours), 2000
- Current issues in Biomedical Research: Clinical Trials (2 Hours), 2000 – 2003

### **Biochemistry and Molecular Biology Department (Current).**

- BIOC 6321 Glycobiology 1, Biomarkers (1.2 hours)
- BIOC 6221-002, Cellular and Molecular Biology Journal Club (1 hour)
- BIOC 6980 Research Project (Full time PhD thesis research of two students)

### **Biochemistry Curriculum prior to 2000.**

- Biochemistry 6234: DNA tumor viruses and Chemical Carcinogenesis (4 hours)
- Biochemistry 5224: DNA Sequencing and EMSA (2 hours)
- Biochemistry 6224: 7 week laboratory rotations for Graduate Students.
- Biochemistry 6980: Chair of Ph.D. thesis committee of Shennan Lu “Mechanism of Growth Inhibition by Retinoids”.
- Biochemistry 6980: Chair of Ph.D. thesis committee of Suresh Guruswamy.
- Biochemistry 6502: Advanced Topics in Human Molecular Genetics (2 hours)
- Biochemistry 5970: Student Research Seminar, 1 hour per week

### **Other Curriculum.**

- Dental Biochemistry: Carcinogenesis, 1 hour, 1999-2001

- Annual Lectures, Oncogenes and Tumor Suppressor Genes, Departments of Pathology and Radiological Sciences, 1993 - 2004.
- Ph.D. comprehensive qualifying written exams and qualifying oral examination committees
- Annual Obstetrics and Gynecology Grand Rounds Lectures with various topics.
- ASCO trainer in Cancer Genetics

### **GRADUATE STUDENTS MENTORED, CHAIR OF THESIS COMMITTEE**

Shennan Lu, PhD	Biochemistry and Molecular Biology Currently NIH Employee	Ph.D. 2001
Suresh Guruswamy, PhD	Biochemistry and Molecular Biology Currently Postdoc. Fellow	Ph.D. 2002
Shylet Chengedza	Biochemistry and Molecular Biology	Ph.D. in progress
Patience Masamha	Biochemistry and Molecular Biology	Ph.D. in progress

### **POSTDOCTORAL FELLOWS**

Tongzu Liu, MD, PhD	Currently in Dr. Benbrook's lab
Arindam Dhar, PhD	Postdoctoral Fellow in Dr. Benbrooks Lab, 1997-2000 Fellow, Interagency Oncology Task Force, (NCI/FDA) 2005-2008 Cancer Research Training Associate, (NCI) 2000-2005 GlaxoSmithKelin, Phase I Trial Director, 2008-present
Shennan Lu, PhD	Postdoctoral Fellow in Dr. Benbrooks Lab, 2001-2002 Currently NIH Employee

### **CLINICAL FELLOW RESEARCH MENTORED (40% Currently in Academia)**

Evelyn Rosas Nuñez, M.D.	Gynecologic Oncology	1994-1995
Rick Erikson MD	Otorhynolaryngology	1994-1995
Cole Flanagan, M.D.	Gynecologic Oncology	1995-1996
Janet Larsen, M.D.	Maternal Fetal Medicine	1995-1996
Tim Zacheis, M.D.	Otorhynolaryngology	1995-1996
Jane Shen-Gunther, M.D.	Gynecologic Oncology	1996-1997
Paul A DiSilvestro, M.D.	Gynecologic Oncology	1996-1997
Todd Ivey, M.D.	Gynecologic Oncology	1997-1998
Michael Gold, M.D.	Gynecologic Oncology	1998-1999
Scott Kamelle, M.D.	Gynecologic Oncology	1999-2000
Avi Khafif, MD,	Otorhynolaryngology	1999-2000
Dennis Scribner, M.D.	Gynecologic Oncology	2000-2001
Todd Tillmanns, M.D.	Gynecologic Oncology	2000-2001
Natalie Gould, M.D.	Gynecologic Oncology	2001-2002
Teresa Rutledge, M.D.	Gynecologic Oncology	2001-2002
Camille Falkner, M.D.	Gynecologic Oncology	2002-2004
Daynelle Dearnley, M.D.	Gynecologic Oncology	2004-2005
Johnny Hyde, M.D.	Gynecologic Oncology	2005-2006
Granger Lanneau, M.D.	Gynecologic Oncology	2005-2006
Tashana Myers, M.D.	Gynecologic Oncology	2006-2007
Erin Tuller, M.D.	Gynecologic Oncology	2007-2008
Kathleen Moxley	Gynecologic Oncology	2008-2009

**SERVICE ON OTHER DISERTATION/THESIS COMMITTEES**

Todd Corn	Biochemistry and Molecular Biology	Ph.D. 1995
Kim Kyker	Biochemistry and Molecular Biology	M.S. 1996
Shankar Sachithanandam	Radiological Sciences	Ph.D. 1997
Ahmed Mohamed Mahmoud Abou-Eisha,	Cairo University	Ph.D. 2000
Dustin Smith	Biochemistry and Molecular Biology	Ph.D. 2005
Richard Langeras	Biochemistry and Molecular Biology	Ph.D. transf.
Mathew S. Gibson	Cell Biology	Ph.D. 2007
Staphanie Si Liu	Biochemistry, University of Hong Kong	Ph.D. 2003
Chaitali Tophkhane	Pathology	Ph.D. 2007
Amy Knoll	Cell Biology	Ph.D.
Bin Zhang	Cell Biology	Ph.D.
Ann R. Howell	Pharmacy	PharmD/M.S. 2009
Krysten Farjo	Cell Biology	PhD, not completed
Feng Li	Biochemistry	PhD
Monica Draper	Cell Biology	PhD, transf.
Wei Wu	Cell Biology	PhD
Liao Xiaoyun	Pathology, University of Hong Kong	Ph.D. 2008
Madhu Unnikrishnan	Pathology	PhD.
Jason Kesinger	Pharmacy	PharmD/M.S.

**CLINICAL FACULTY MENTORED**

Raffit Hassan, MD	Hematology Oncology	Assistant Professor	1999-2002
Karl Hanson, MD	Reproductive Endocrinology	Assistant Professor	2003-present
Abbas Shoberi, MD	Urogynecology	Assistant Professor	2003-present
Mark F. Naylor, MD	Dermatology	Member, OMRF	2004-2005
Kathleen Moore, MD	Gynecologic Oncology	Assistant Professor	2007-present

**GRADUATE RESEARCH PROJECTS MENTORED**

Coy Heldermon	Biochemistry	1992
Kent Rodgers	Biochemistry	1993
Terry Kay Epperson	Biochemistry	1994
Hai Ying Qui	Biochemistry	1996
Shennan Lu	Biochemistry	1996
Suresh Guruswamy	Biochemistry	1997
Xiaohong Zhong	Biochemistry	1997
Bahara Ebadifar	Graduate Program in Biomedical Sciences (GPiBS) Research	Rotation 2003
Anne Murray	GPiBS Research Rotation	2003
Julie Scott	GPiBS Research Rotation	2003
Shylet Chenedza	GPiBS Research Rotation	2005
Patience Masamha	GPiBS Research Rotation	2006
William Berry	GPiBS Research Rotation	2006
Laura Russell	GPiBS Research Rotation	2006
Yanfang Pan	Biochemistry Research Rotation	2007
Alysha Ann Rauhauser	University of Central Oklahoma	2007
Feng He	Biochemistry Research Rotation	2007-8

**RESIDENT RESEARCH PROJECTS MENTORED**

Dana Stone, M.D.	Obstetrics and Gynecology Resident	1997-1998
Carla Spencer, M.D.	Obstetrics and Gynecology Resident	1998-1999
Nefertiti DuPont, M.D.	Obstetrics and Gynecology Resident	1999-2003

**MEDICAL STUDENT RESEARCH PROJECTS MENTORED**

Rod Rogers	Medical Student Research Project	1992
Cassandra Onofre	Medical Student Summer Research Project	1993
Virginia Fishburne	Medical Student Summer Research Project	1997
Marylin Webster	Medical Student Summer Research Project	1998
Margaret P. O'Connell	Medical Student Summer Research Project	2005
Lauren Ritterhouse	MD/PhD Program Research Rotation	2006
Larissa Hines	Clinical and Translational Summer Scholar	2008

**UNDERGRADUATE STUDENT RESEARCH PROJECTS MENTORED**

Amy Noll, B.S.	Summer Pre-graduate Student	2003
Ashley Hopkins	Summer Undergraduate Research Experience (SURE)	2003
Jen'nea Ose, B.S.	Biomedical Research Infrastructure Network (BRIN)	2003
Barbara Jeske	Summer Undergraduate Research Experience (SURE)	2004
Lance Gill	Oklahoma Biomedical Research Infrastructure Network	2004-5
Ann Nelson	Oklahoma Biomedical Research Infrastructure Network	2005-6
Chasity Jackson	Undergraduate Biomedical Education Program (UBEP)	2005
Oba Hughes	Oklahoma Biomedical Research Infrastructure Network	2007
Sheree McDaniel	Langston's Integrated Network College (LINC)	2008

**HIGH SCHOOL STUDENT/TEACHER RESEARCH PROJECTS MENTORED**

Anjan Shah	High School Student, Summer Academy	1992
Lulla Moore Wilson	Minority Program, High School Teacher, Summer	1992
Anjan Shah	School of Math and Science, Winter Semester	1992
Mary Ruth Boone	Minority Program, High School Student, Summer	1993
Kelly Jester	Summer Academy, Summer	1993
Regina Harper	Summer Academy, Summer	1994
Jacqueline Maliwat	Summer Minority Program,	1996
Ebony Allen	Summer Minority Program	1996
Kayla Brooks	Science Fair Project, Regional Winner	2001
Kelsie Brooks	Science Fair Project, Regional Winner	2003
Frank Han	Oklahoma School of Math and Science, Fall Semester	2008
Magaret Wang	Oklahoma School of Math and Science, Fall Semester	2008

**PATENTS**

Inventor: Doris Benbrook

Title: Treatment and Inhibition of Disease Conditions (Angiogenesis) Using Flexible Heteroarotinoids

Docket No. : 5864.042

Disclosure No.: 05HSC037

Inventor: Doris Benbrook

Title: Treatment and Inhibition of Disease Conditions (Polycystic Kidney Disease) Using Flexible Heteroarotinoids (Notice of Allowance Aug 14, 2009)

Docket No. : 5864.043

Disclosure No.: 05HSC037

Inventor: Doris Benbrook

Title: Method of Sensitizing Cells to Death Receptor Ligands

Docket No. : 5834.109

Disclosure No.: 09HSC017

Co-inventor: Heteroarotinoids containing urea or thiourea linker US Patent No. 6,586,480  
Co-inventor: Novel Orphan Receptor Interacting With Retinoid/Thyroid Hormone Receptor Subfamily  
(Ref. No. 1212.017)  
Co-inventor: Heteroarotinoids-Anticancer Agents with Receptor Specificity and TGase Activity.  
Provisional Patent Docket No: OKL053/96897

## **CURRENT FUNDING**

National Cancer Institute, National Institutes of Health (R01)  
Mechanism of SHetA2 in Ovarian Cancer  
Role: Principal Investigator  
06/01/2005 – 05/31/2010, \$987,500

Rapid Access to Preventive Intervention Development (RAPID)  
"Flexible Heteroarotinoids for Chemoprevention"  
Role: Principal Investigator  
2007 to completion, funding for preclinical development of SHetA2

University of Oklahoma Growth Fund  
"Flex-Het Treatment for Polycystic Kidney Disease"  
Role: Principal Investigator  
2009: \$50,000

Presbyterian Health Foundation - Equipment Grant  
"Bringing OU Research to New Dimensions with Multiplex Technologies"  
09/01/2008 – 08/31/2009, \$50,000.00  
Role: Principal Investigator

Gynecologic Oncology Group (GOG)  
"A Phase II Evaluation of Enzastaurin in the Treatment of Persistent or Recurrent Epithelial Ovarian  
or Primary Peritoneal Carcinoma"  
Role: Principal Investigator  
2007 to completion, \$17,279

Gynecologic Cancer Foundation  
The Role of Ribonucleotide Reductase Regulatory Subunit 1 (RRM1) and Excision Repair Cross  
Complementation Group 1 (ERCC1) in Determining Chemosensitivity for Advanced Ovarian Cancer  
Principal Investigator: Kathleen Moore, MD  
Role: Co-Investigator  
2007-2008, \$50,000

Oklahoma INBRE (IDeA Network of Biomedical Research Excellence) NIH/NCRR (P20RR016478)  
PI: Waxman, F  
Role: Mentor of Wei-Qun Ding's Junior Faculty Award,  
2009-2014, \$20,000 for percent effort over 4 years, (\$13,312,160 total direct cost)

American Cancer Society  
Search for the Potential Targets for the Prevention of Carcinogenesis  
Parent Grant: Marie Hanigan  
Principal Investigator: Igor Dozmorov  
Role: Collaborator  
07/01/08 – 06/30/09, \$25,000, no cost extension to 06/30/10

## **PAST FUNDING**

Oklahoma INBRE (IDeA Network of Biomedical Research Excellence)

“Investigations of SHetA2 mediated Mitochondrial changes”

Principal Investigator: William Kelly, Ph.D., Southwestern Oklahoma State University

Role: Collaborator

05/01/07 – 04/30/08, \$50,000, \$15,383 subcontract to Dr. Benbrook

University of Central Oklahoma Basic Research Grant to Faculty

“Effects of heteroarotinoids on PKC activation and apoptosis in ovarian carcinoma organotypic cultures”

Principal Investigator: Dana Rundel, PhD, University of Central Oklahoma

Role: Collaborator

06/01/2007 to 05/31/2008, \$10,000

National Cancer Institute, National Institutes of Health (R01)

“A Murine Model of Endometrial Tumorigenesis.”

Principal Investigator: Paul Goodfellow at Washington University in Saint Louis

Role: Co-Investigator

04/01/04 – 03/31/07, \$74,996 subcontract to Dr. Benbrook’s lab

National Cancer Institute Program Planning Grant for NCI Cancer Research Centers

“Cancer Center Planning Grant.” (P20)

Director: Robert S. Mannel, MD

Role: Co-Director of the Women’s Cancer Program

7/01/02-6/30/08 \$925,084, no cost extention

National Cancer Institute, National Institutes of Health

“Gene Regulation of Glycan Antigen in Cancer Cells”

Principal Investigator: Richard Cummings, Ph.D.

Role: Collaborator

04/01/05 – 03/31/07, \$200,000

Gynecologic Oncology Group

“Lab Analysis for GOG0207 Phase II Trial of Celecoxib for CINIII”

Role: Principal Investigator

04/01/05 to 03/31/07, \$64,028

Rapid Access to Intervention Development (RAID)

“SHetA2 will Inhibit Cancer Recurrence Without Retinoid-Associated Toxicities.”

Role: Principal Investigator

\$2,083,000 for preclinical testing of SHetA2.

Oklahoma INBRE (IDeA Network of Biomedical Research Excellence)

“Investigations of SHetA2 mediated Mitochondrial changes”

Principal Investigator: William Kelly, Ph.D.

Role: Collaborator

06/01/06 – 12/31/06, \$50,000, \$15,383 subcontract to Dr. Benbrook

National Cancer Institute, National Institutes of Health (R03)

“Steroids and Stem Cells in Carcinogenesis.”

Role: Principal Investigator

09/30/04 – 08/31/06, \$100,000

Mary Kay Ash Charitable Foundation

“Mechanism of ER Activation in Thyroid Hormone Administration in Breast Cancer Survivors.”

Role: Principal Investigator

07/01/04 - 06/30/06, \$100,000

Oklahoma Center for the Advancement of Science and Technology (OCAST)

“Does HPV16 E5 affect EGF Receptor Endocytosis and Signaling?”

Principal Investigator: Brian Ceresa, Ph.D.

Role: Co-Investigator

07/01/03-06/30/05, \$100,000

Oklahoma INBRE (IDeA Network of Biomedical Research Excellence)

“Investigations of SHetA2 mediated Mitochondrial changes in Human Cancer Organotypic Cultures”

Principal Investigator: William Kelly, Ph.D., Southwestern Oklahoma State University

Role: Collaborator

06/01/05 – 12/31/05, \$50,000, \$15,383 subcontract to Dr. Benbrook

Gynecologic Oncology Group

“Analysis for GOG229-B, GOG230-B, GOG-231-B Stage I”

Role: Principal Investigator

07/01/02 to 06/30/04 \$25,290

Proxima Concepts LTD, London, England, UK

“Agreement Using Proxima Technology to Screen Libraries of Recombinant Probes”

Role: Principal Investigator

12/22/04 – 5/31/05, \$6,078

National Cancer Institute, National Institutes of Health (R01)

“Mechanism & Potential of Retinoid & DNA Damage Therapy.”

Role: Principal Investigator

07/01/99 – 06/30/04 \$310,555 direct

Oklahoma Biomedical Research Infrastructure Network (BRIN) Collaborative Grant

“Is Retinoid Induced Cell Apoptosis Mediated by Superoxide Radical Anion Production?”

Principal Investigator: William J. Kelly, Ph.D., Southwestern Oklahoma State University

Role: Collaborating Investigator

02/01/04-06/30/04, \$50,000, \$15,383 subcontract to Dr. Benbrook

Novartis Pharmaceutical through PRA International

Phase II Trial of Gleevec (Imatinib Mesylate Formerly Known as STI571) in Patients with CD1q17(+)

Gynecologic Malignancies

Principal Investigator: D. Scott McMeekin, M.D.

Role: Co-Investigator

November 1, 2002-October 31, 2004, \$65,882

Procter & Gamble

“Determination of Retinoid X Receptor Ligand Structure-Function Properties”

Role: Principal Investigator

02/01/02 – 06/15/02 \$48,000

Cancer Research Foundation of America (CRFA) Fellowship

"Human Papillomavirus and Epidermal Growth Factor Receptor as Biomarkers of Retinoid Cervix Cancer Chemoprevention"

Postdoctoral Fellow: Shennan Lu

Role: Principal Investigator

01/15/00 – 01/14/03 \$60,000

NeoPharm

"Develop and Perform ELISA's for Neo-MS-02 Clinical Trial"

Role: Principal Investigator

05/01/2000- 06/30/02, \$72,000

Procter & Gamble

"Determination of Retinoid Receptor Transactivation Properties"

Role: Principal Investigator

07/01/99 – 09/01/99, \$8890

Mary Kay Ash Charitable Foundation

"Development of Retinoids and Response Biomarkers for Ovarian Cancer."

Role: Principal Investigator

07/01/98 - 06/30/00 \$90,864 direct, \$9,136 indirect

American Institute for Cancer Research (AICR)

"Ligand Activation of Peroxisome Proliferator-Activated Receptors in Rodent Mammary Tumor Models.",

Principal Investigator: Stephen Glore, Ph.D.

Role: Collaborator

01/01/98-12/01/00 \$100,000

National Cancer Institute, National Institutes of Health (R01)

"Biological Activity of Heteroarotinoids."

08/01/96 - 11/30/99 \$981,456 direct, \$170,000 indirect

Principal Investigator: Eldon C. Nelson, Ph.D., Oklahoma State University

Role: Co-investigator

08/01/96 – 12/01/99 \$269,761 direct, \$124,190 indirect

American Institute of Cancer Research, 94A63

"Carotenoid Effects on Transcription and Growth in Tumors."

Role: Principal Investigator

07/01/94 - 06/30/96 \$100,000 direct, \$10,000 indirect.

The Presbyterian Health Foundation,

"Radiation and Retinoid Effects on Cervical Cancer."

Role: Principal Investigator

01/01/94 - 01/01/95 \$25,000 direct

National Science Foundation, MCB-9209479,

"DNA Binding Specificities of cJun Dimers."

Role: Principal Investigator

08/01/92 - 01/31/94 \$16,200, \$1,800 indirect.

Milheim Foundation for Cancer Research, 92-14  
"Retinoids, cJun and Cervical Cancer."  
Role: Principal Investigator  
07/01/92 - 06/30/93 \$14,000 direct

Oklahoma Medical Alumni Association,  
"Retinoids, cJun and Cervical Cancer."  
Role: Principal Investigator  
09/01/92 - 08/31/93 \$20,000 awarded, \$11,000 accepted due to overlap with other funding.

Presbyterian Health Foundation, Research Equipment Repair Fund,  
Role: Principal Investigator  
1992, \$5,000 for repair of an ultracentrifuge.

### **ONGOING CLINICAL TRIALS AND TRANSLATIONAL RESEARCH**

Molecular Assessment of Early Stage Ovarian Cancer  
Gynecologic Oncology Group (GOG) Protocol #0208  
Study Chair: Doris M. Benbrook, Ph.D.  
Study Co-Chairs: Kathleen Darcy, Ph.D., Michael Birrer, M.D., Ph.D., Sam Mok, Ph.D., Michael Cibull, M.D., Ginger Gardner, M.D.

A phase II evaluation of thalidomide in the treatment of recurrent or persistent carcinosarcoma of the uterus.

Gynecologic Oncology Group (GOG) Protocol #0230-B  
Study Chair: Scott McMeekin, M.D.  
Translational Research Chair: Doris M. Benbrook, Ph.D.

A Phase II evaluation of Brivanib (BMS582664), an oral, multitargeted growth factor tyrosine kinase inhibitor in the treatment of recurrent or persistent endometrial carcinoma.

Gynecologic Oncology Group (GOG) Protocol #0229  
Study Chair: Matthew Powell, MD  
Scientific Collaborator: Doris M. Benbrook, Ph.D.

Comparison of Glycoprotein Expression and T-Synthase Function in Primary versus Metastatic Tumors.

Gynecologic Oncology Group (GOG) Protocol #0221  
Study Chair: Michael Gold, M.D.  
Study Co-Chairs: Doris M. Benbrook, Ph.D., Richard Cummings, Ph.D., William Rodgers, M.D.

A Randomized Double-Blind Phase II Trial of Celecoxib, a Cox 2 Inhibitor, in the Treatment of Patients with Cervical Intraepithelial Neoplasia 3 (CIN3).

Gynecologic Oncology Group (GOG) Protocol #0207  
Study Chair: Janet Rader, M.D.  
Translational Research Chair: Doris M. Benbrook, Ph.D.

A Phase II Evaluation of Enzastaurin in the Treatment of Persistent or Recurrent Epithelial Ovarian or Primary Peritoneal Carcinoma, Gynecologic Oncology Group (GOG) Protocol #170J

Study Chair: Lydia Usha, M.D., Scientific Collaborator: Doris M. Benbrook,

A Randomized, Controlled Phase II Evaluation of Megestrol in Different Dose and Sequence in the Treatment of Endometrial Intraepithelial Neoplasia (EIN) From A Referred Cohort of Atypical Endometrial Hyperplasia (AEH) or EIN

Gynecologic Oncology Group (GOG) Protocol #0224

Study Chair: Michael Method, MD

Collaborating Scientist: Doris M. Benbrook, PhD

A Phase II Evaluation of Brivanib (BMS582664), an Oral, Multitargeted Growth Factor Tyrosine Kinase Inhibitor in the Treatment of Recurrent or Persistent Endometrial Carcinoma

Gynecologic Oncology Group (GOG) Protocol #0229

Study Chair: Matthew Powell, MD

Scientific Collaborator: Doris M. Benbrook, PhD

A Randomized Phase III trial of maintenance chemotherapy comparing 12 monthly cycles of single agent paclitaxel or Xyotax (CT-2103) (IND#70177) versus no treatment until documented relapse in women with advanced ovarian or primary peritoneal cancer who achieve a complete clinical response to primary platinum/Taxane chemotherapy. Gynecologic Oncology Group (GOG) Protocol #0212

Study Chair: Maurie Markman, M.D.

Scientific Collaborator: Doris M. Benbrook, Ph.D.

Phase II Trial of Gleevec (Imatinib Mesylate Formerly Known as STI571) in Patients with CD1q17(+) Gynecologic Malignancies

Principal Investigator: D. Scott McMeekin, M.D.

Translational Research Scientist Doris M. Benbrook, Ph.D.

## **COMPLETED CLINICAL TRIALS AND TRANSLATIONAL RESEARCH**

A phase II evaluation of thalidomide in the treatment of recurrent or persistent endometrial carcinoma.

Gynecologic Oncology Group (GOG) Protocol #0229-B

Study Chair: Scott McMeekin, M.D.

Translational Research Chair: Doris M. Benbrook, Ph.D.

A phase II evaluation of thalidomide in the treatment of recurrent or persistent leiomyosarcoma of the uterus.

Gynecologic Oncology Group (GOG) Protocol #0231-B

Study Chair: Scott McMeekin, M.D.

Translational Research Chair: Doris M. Benbrook, Ph.D.

A randomized study of tamoxifen versus thalidomide in patients with biochemical-recurrence-only epithelial ovarian cancer, cancer of the fallopian tube, and primary peritoneal cancer after first line chemotherapy.

Gynecologic Oncology Group (GOG) Protocol # 0198

Study Chair: Jean A. Hurteau, M.D.

Translational Research Chair: Doris M. Benbrook, Ph.D.

## **DATA SAFETY AND MONITORING BOARDS**

2005-2009 Chair, "Laser and TLR-Agonist Immunotherapy: A Novel Autologous Melanoma Vaccine Strategy" Principal Investigator: Mark F. Naylor, MD, Co-Investigators: Kent Teague, Ph.D, Wei Chen, Ph.D. Meets every 6 months.

**PUBLICATIONS**

1. Benbrook, D.M. and Miller, R.V. (1986) Effects of Norfloxacin on DNA metabolism in pseudomonas aeruginosa. *Antimicrobial Agents and Chemotherapy*, **29**: 1-6.
2. Benbrook, D. & Pfahl, M. (1987) A Novel Thyroid Hormone Receptor Encoded by a cDNA Clone from a Human Testis Library. *Science*, **238**: 788-791.
3. Pfahl, M. & Benbrook, D. (1987) Nucleotide Sequence of cDNA Encoding a Novel Thyroid Hormone Receptor. *Nucleic Acids Research*, **15**: 9613.
4. Benbrook, D., Lernhardt, E. & Pfahl, M. (1988) A New Retinoic Acid Receptor Identified from a Hepatocellular Carcinoma. *Nature*, **333**: 669-672.
5. Benbrook, D.M. & Jones, N.C. (1990) The Heterodimerization of Creb and Jun. *Oncogene*, **5**: 295-302.
6. Benbrook, D.M. & Jones, N.C. (1994) Different Binding Specificities and Transactivation of Variant CRE's by CREB complexes. *Nucleic Acids Research*, **22**: 1463-1469.
7. Apfel, R., Benbrook, D., Lernhardt, E., Ortiz, M.A., and Pfahl, M. (1994) A novel orphan receptor specific for a subset of thyroid hormone-response elements and its interaction with the retinoid/thyroid hormone receptor subfamily. *Molecular and Cellular Biology*, **14**: 7015-7035.
8. Benbrook, D., Rogers, R., Medlin, M., and Dunn, S.T. (1995) Immunohistochemical analysis of differentiation and proliferation in organotypic cultures of cervical tumor cell lines. *Tissue and Cell*, **27**(3): 269-274.
9. Benbrook, D. M., Shen-Gunther, J., Nuñez, E.R., Dynlacht, J.R. (1997) Differential retinoic acid radiosensitization of cervical carcinoma cell lines. *Clinical Cancer Research*, **3**: 939-945.
10. Johnson, G.A., Mannel, R.S., Khalifa, M., Walker, J.L., Wren, M., Min, K.-W., Benbrook, D.M. (1997) Epidermal growth factor receptor in vulvar malignancies and its relationship to metastasis and patient survival. *Gynecological Oncology*, **65**: 425-429.
11. Benbrook, D.M., Lu, S., Flanagan, C., Shen-Gunther, J., Angros, L.H., Lightfoot, S.A. (1997) Biological assay for activity and molecular mechanism of retinoids in cervical tumor cells. *Gynecological Oncology*, **66**: 114-121.
12. Miller, A.M., Sahl, W.J., Brown, S.A., Young, S.K., Quinlan, C.M., Patel, P.R., Benbrook, D.M., Naylor, M.F. (1997) The role of human papillomavirus in the development of pyogenic granulomas. *International Journal of Dermatology*, **38**: 101-105.
13. Benbrook, D.M., Madler, M.M., Spruce, L.W., Birckbichler, P., Nelson, E.C., Subramanian, S., Weerasekare, G.M., Gale, J.B., Patterson, Jr., M.K., Wang, B., Wang, W., Lu, S., Rowland, T.C., DiSilvestro, P., Berlin, K.D., Lindamood, C., Hill, D.L. (1997) Biologically active heteroarotinoids exhibit anticancer activity and decreased toxicity. *Journal of Medicinal Chemistry*, **40**: 3567-3583.
14. Madler, M.M., Klucik, J., Soell, P.S., Brown, C.W., Liu, S., Berlin, K.D., Benbrook, D.M., Birckbichler, P.J., Nelson, E.C. (1998) Lithium hypochlorite-chlorox as a novel oxidative mixture for methyl ketones and methyl carbinols. *Organic Preparations & Procedures International*, **30**: 230-234.

15. Benbrook, D.M., Subramanian, S., Gale, J.B., Liu, S., Brown, C.W., Boehm, M.F., Berlin, K.D. (1998) Synthesis and characterization of heteroarotinoids demonstrates structure-specificity relationships. *Journal of Medicinal Chemistry*, **41**: 3753-3757.
16. DiSilvestro, P.A., Stanley, S.A., and Benbrook, D.M. (1999) Ki-67 expression in a cervical carcinoma organotypic model correlates with growth and EGF-R expression. *Journal of the Lower Genital Tract Disease*, **3**: 1-5.
17. Waliszewski, P. Waliszewski, M., Gordon, N., Hurst, R.E., Benbrook, D.M., Dhar, A., Hemstreet, G.P. (1999) Retinoid signaling in immortalized and carcinoma-derived human uroepithelial cells. *Molecular and Cellular Endocrinology*, **148**: 55-65.
18. Liu, S. Berlin, K.D., Simms-Kelley, M.D., Nelson, E.C., and Benbrook, D.M. (1999) Optimization and Synthesis of (*E*)-4-[2-(3,4-Dihydro-4,4-dimethyl-2*h*-1-benzopyran-6-yl)-1-propenyl]benzoic Acid-11-[<sup>14</sup>C]. *Journal of Labelled Compounds and Radiopharmaceuticals*, **42**: 789-796.
19. Dhar, A., Liu, S., Berlin, K.D., Madler, M.M., Ivey, R.T., Birckbichler, P.J., Lu, S., Zacheis, D., Brown, C.W., Klucik, J., Nelson, E.C., Benbrook, D.M. (1999) Synthesis and Structure-Activity Relationships of Nitrogen Heteroarotinoids. *Journal of Medicinal Chemistry*, **42**: 3602-3614.
20. Zacheis, D., Dhar, A., Lu, S., Madler, M.M., Klucik, J. Brown, C.w., Liu, S., Clement, F., Subramanian, S., Weerasekare, G.M., Berlin, K.D., Gold, M., Houck, J.R., Fountain, K.R., Benbrook, D.M. (1999) Heteroarotinoids inhibit the growth of head and neck cancer cell lines *in vitro* and *in vivo* through both RAR and RXR retinoic acid receptors. *Journal of Medicinal Chemistry*, **42**: 4434-4445.
21. Salsman, S., Lu, S., Benbrook, D.M. (1999) The mechanism of retinoid radiosensitization is independent of AP-1 repression in cervical carcinoma cells. *Gynecologic Oncology*, **73**: 253-256.
22. Simoni, D., Roberti, M., Invidiata, F.P., Rondanin, R., Baruchello, R., Malagutti, C., Mazzali, A., Rossi, M., Grimaudo, S., Dusonchet, L., Meli, M., Raimondi, M.V., Landino, M., D'Alessandro, N., Tolomeo, M., Dhar, A., Lu, S. Benbrook, D.M. (2001) Heterocycle-Containing Retinoids. Discovery of a Novel Isoxazole Arotinoid Possessing Potent Apoptotic Activity in Multidrug and Drug-Induced Apoptosis Resistant Cells. *Journal of Medicinal Chemistry*, **44**:2308-2318.
23. Guruswamy, S., Lightfoot, S., Gold, M., Hassan, R., K. Darrell Berlin, Ivey, T.R., Benbrook, D.M. (2001) Effects of Retinoids on the Cancer Phenotype and Apoptosis in Organotypic Cultures of Ovarian Carcinoma. *Journal of the National Cancer Institute*, **93**: 516-525.
24. Scribner, D., Benbrook, D.M. (2002) Retinoids Enhance Cisplatin-based Chemoradiation in Cervical Cancer Cells In Vitro. *Gynecologic Oncology*, **85**: 223-225.
25. Kamelle, S., Sienko, A., Benbrook, D.M. (2002) A Hormonally Responsive Model of Cycling Endometrium. *Fertility & Sterility*, **78** (3): 596-602.
26. Hassan, R., Lerner, M.R., Benbrook, D.M., Lightfoot, S.A., Brackett, D.J., Wang, Q.-C., Pastan, I. (2002) Anti-tumor activity of SS(dsFv)PE38 and SS1(dsFv)PE38, recombinant anti-mesothelin immunotoxins against human gynecologic cancers grown in organotypic culture in vitro. *Clinical Cancer Research*, **8**: 3520-3526.
27. Benbrook, D.M. (2003) An ELISA method for detection of human antibodies to an immunotoxin. *Journal of Pharmacological and Toxicological Methods*. **47**: 169-175.

28. Mic, F. A., Molotkov, A., Benbrook, D. M., and Duester, G. (2003) Retinoid activation of RAR but not RXR is sufficient for mouse embryonic development. *Proceedings of the National Academy of Sciences*. **100**: 7135-7140.
29. Chun, K.-H., Benbrook, D. M., Berlin, K. D., Hong, W. K., and Lotan, R. (2003) Induction of apoptosis in head and neck squamous cell carcinoma (HNSCC) cell lines by heteroarotinoids through a mitochondrial dependent pathway. *Cancer Research*, **63**: 3826-3832.
30. Liu, S., Brown, C.W., Berlin, K.D., Dhar, A., Guruswamy, S., Brown, D., Gardner, G.J., Birrer, M., J., & Benbrook, D.M. (2004) Synthesis of flexible sulfur-containing heteroarotinoids that induce apoptosis and reactive oxygen species with discrimination between malignant and benign cells. *Journal of Medicinal Chemistry*, **47**: 999-1007.
31. Brown, C.S., Liu, S, Klucik, J., Brown, C.W., Berlin, K. D., Brennan, P.J., Devinder, K., Benbrook, D.M. (2004) Novel heteroarotinoids as potential antagonists of *Mycobacterium Bovis* BCG. *J. Med. Chem*, **47**: 1008-1017.
32. Tillmans, T.D., Kamelle, S.A., Guruswamy, S., Gould, N.S., Rutledge, T.L., Benbrook, D.M. (2005) Sensitization of Cervical Cancer Cell Lines to Low Dose Radiation by Retinoic Acid Does Not Require Functional p53. *Gynecologic Oncology*, **97**: 142-150.
33. Benbrook, D.M., Kamelle, S.A., Guruswamy, S.B., Lightfoot, S.A., Rugledge, T.L., Gould, N.S., Hananafon, B.N., Dunn, S.T., Berlin, K.D. (2005) Flexible Heteroarotinoids (Flex-Hets) exhibit improved therapeutic ratios as anti-cancer agents over retinoic acid receptor agonists. *Investigational New Drugs*, **23**: 417-428.
34. Subramanian, S., Smith, C.M., Tabatabai, T., Bryan, C.D., Buettner, B., Hale, S., Wakefield, C.A., Benbrook, D.M., Berlin, K.D. (2005) Synthesis of novel heteroarotinoids with receptor activation capabilities and TGase activity. Single crystal analysis of (E)-4-[(2,3-dihydro-2,2,4,4-tetramethyl-2H-1benzo[b]thiopyran-6-YL)-1-propenyl]-2-methylbenzoic acid. *Phosphorus, Sulfur, and Silicon and the Related Elements*, **180**:67-77.
35. Zhang Y. Hua Y. Benbrook DM. Covey JM. Dai G. Liu Z. Chan KK. High performance liquid chromatographic analysis and preclinical pharmacokinetics of the heteroarotinoid antitumor agent, SHetA2. (2006) *Cancer Chemotherapy & Pharmacology*. 58(5):561-9, 2006.
36. Chiu, P.-M., Feng, H.-C., Benbrook, D.M., Ngan, H.Y.S., Khoo, U.-S., Xue, W.-S., Tsao, S.W., Chan, K.-W., Cheung, A.N.Y. (2006) Effect of all-trans retinoic acid on tissue dynamics of choriocarcinoma cell lines: an organotypic model. *Journal of Clinical Pathology*. **59**:845-850.
37. Matsuzaki, S. Hayes, J.M., Benbrook, D.M., Jankowiak, R. (2006) Nonphotochemical hole-burning study of selectively stained normal and cancerous human ovarian tissues. *J. Phys. Chem. B* **110**: 16124-16130.
38. Lu, Shennan, Benbrook, D.M. (2006) Role of AP-1 antagonism in growth inhibition of cervical cancer cell lines by retinoids. *American Journal of Pharmacology and Toxicology* 1(4): 45-53.
39. Guruswamy, S., Benbrook, D.M. (2006) Retinoids chemosensitize ovarian cancer cell lines to cisplatin independent of nuclear receptors and p53. *American Journal of Pharmacology and Toxicology* 1(4): 87-93.
40. Hyde, J., Benbrook, D.M. (2006) Sensitivities of uterine adenocarcinoma, mixed mullerian tumor (MMT) and sarcoma cell lines to chemotherapeutic agents and a Flex-Het drug. *American Journal of Pharmacology and Toxicology* 1 (4): 88-91. <http://www.scipub.org/fulltext/AJPT/AJPT1483-86.pdf>

41. Liu, T., Hannafon, B., Gill, L., Kelly, W., Benbrook, D.M. (2007) Flex-Hets differentially induce apoptosis in cancer over normal cells by directly targeting mitochondria. *Molecular Cancer Therapeutics*, 6: 1814-1822. <http://mct.aacrjournals.org/content/6/6/1814.full.pdf+html>
42. McMeekin, D.S., Sill, M.W., Darcy, K.M., Stearns-Kurosawa, D.J., Eaton, L., Yamada, J., Benbrook, D.M. (2007) A phase II trial of thalidomide in patients with persistent or recurrent endometrial cancer and correlation with angiogenesis biomarkers: A Gynecologic Oncology Group study. *Gynecologic Oncology*, 105: 508-516.
43. McMeekin, D.S., Sill, M. W., Darcy, K.M., Stearns-Kurosawa, D.J., Webster, K., Waggoner, S., Benbrook, D.M. (2007) A phase II trial of thalidomide in patients with refractory leiomyosarcoma of the uterus and correlation with biomarkers of angiogenesis: A Gynecologic Oncology Group study. *Gynecologic Oncology*, 106:596-603.
44. Le, T.C., Berlin, K.D., Benson, S.D., Eastman, M.A., Bell-Eunice, G., Nelson, A.C., Benbrook, D.M. (2007) Heteroarotinoids with anti-cancer activity against ovarian cancer cells. *Open Medicinal Chemistry Journal*, 1, 11-23. <http://www.bentham.org/open/tomcj/openaccess2.htm>
45. Le, T.C., Berlin, K.D., Benbrook, D.M. (2007) Modified heteroarotinoids as potential anticancer agents-improved syntheses of 2-nitrotetralin and 2-aminotetralin. *J. Saudi Chem Soc.*, 11: 351-360.
46. Benbrook, D.M., Lightfoot, S., Ranger-Moore, J., Liu, T., Berry, W., Dozmorov, I. (2008) Karyometric and Gene Expression Analysis in an Organotypic Model of Endometrial Carcinogenesis and Chemoprevention. *Gene Regulation and Systems Biology*, 2: 21-42. [http://la-press.com/article.php?article\\_id=549](http://la-press.com/article.php?article_id=549)
47. Lin, Y.-D, Chen, S., Yue, P., Zou, W., Benbrook, D.M., Liu, S., Le, T.C., Berlin, K.D., Khuri, F.R., Sun, S.-Y. (2008) CAAT/Enhancer Binding Protein Homologous Protein-Dependent Death Receptor 5 Induction Is a Major Component of SHetA2-Induced Apoptosis in Lung Cancer Cells. *Cancer Research*, 68 (13): 5335-5344.
48. Ju, T., Lanneau, G.S., Gautam, T., Wang, Y., Xia, B., Stowell, S.R., Willard, M.T., Wang, W., Xia, J.Y., Zuna, R.E., Laszik, Z., Benbrook, D.M., Hanigan, M.H., Cummings, R.D. (2008) Human tumor antigens Tn and sialyl Tn arise from mutations in Cosmc. *Cancer Research*. 68(6):1636-46.
49. Lin, Y., Liu, X., Yue, P., Benbrook, D.M., Berlin, K.D., Khuri, F.R., Sun S.-Y. (2008) Involvement of c-FLIP and survivin down-regulation in flexible heteroarotinoid-induced apoptosis and enhancement of TRAIL-initiated apoptosis in lung cancer cells. *Molecular Cancer Therapeutics*. 7: 3556-3565.
50. Myers, T., Chengedza, S., Lightfoot, S., Pan, Y., Dedmond, D., Cole, L., Tang, Y., Benbrook, D.M. (2008) Flexible Heteroarotinoid (Flex-Het) SHetA2 inhibits angiogenesis *in vitro* and *in vivo*. *Investigational New Drugs*, 27:304-318. <http://www.springerlink.com/content/aj864j6707w47513/fulltext.pdf>
51. Liu, Z., Zhang, Y.Hua, Y.F., Covey, J.M., Benbrook, D.M., Chan, K.K.(2008) Metabolism of A Sulfur-containing Heteroarotinoid Antitumor Agent, SHetA2 using Liquid Chromatography/tandem Mass Spectrometry. *Rapid Communications in Mass Spectrometry* 22: 3371-3381.
52. Liu, T., Masamha, P., Chengedza, P., Berlin, K.D., Lightfoot, S, He, Feng, Benbrook, D. M. Development of Flexible Heteroarotinoids (Flex-Hets) for Kidney Cancer. *Molecular Cancer Therapeutics*, 8 (5):1227-1238.

53. Tuller, E.R., Brock, A.L., Yu, H., Lou, J.r., Benbrook, D.M., Ding, W.-Q. (2009) PPAR $\alpha$  signaling mediates the synergistic cytotoxicity of clioquinol and docosahexaenoic acid in human cancer cells. *Biochemical Pharmacology*, 77(9): 1480-1486
54. Masamha, C. P., Benbrook, D. (2009) Cyclin D1 degradation is sufficient to induce G1 cell cycle arrest despite constitutive expression of cyclin E2 in SHetA2-treated ovarian cancer cells. *Cancer Research*, 69: 6565-6572. <http://cancerres.aacrjournals.org/cgi/content/abstract/69/16/6565>.
55. Tuller, E.R., Beavers, C.T., Lou, J.R., Ihnat, M.A., Benbrook, D.M., Ding, W.-Q. (2009) Docosahexaenoic acid inhibits superoxide dismutase 1 gene transcription in human cancer cells: the involvement of PPAR $\alpha$  and HIF-2 $\alpha$  signaling. *Molecular Pharmacology*, 78(3):588-595.
56. Palwai, N.R., Zang, X.-P., Harrison, R.G. Benbrook, D.M. Pento, J.T. (2009) Selective Growth Inhibition of Cancer Cells by L-Methioninase-Containing Fusion Protein Targeted to the Urokinase Receptor. *Pharmacology*, in press.
57. Moxley, K.M., Chenedza, S., Benbrook, D.M. (2009) Induction of death receptor ligand -mediated apoptosis in epithelial ovarian carcinoma: the search for sensitizing agents. *Gynecologic Oncology*, in press.

## **REVIEWS**

1. Benbrook, D.M. (2002) Refining Retinoids with Heteroatoms, *Minireviews in Medicinal Chemistry*, 2:277-283.
2. Benbrook, D.M., Wilkerson, J. C. (2003) Nature Reviews Cancer. *JAMA*. **289**(8):1049-1050.
3. Benbrook, D.M. Organotypic Cultures Represent Tumor Microenvironment for Drug Testing. (2006) *Drug Discovery Today, Disease Models*. 2:143-148.
4. Benbrook DM. Promise and problems of translational research. *Gynecologic Oncology*. 103(2 Suppl 1):S14-7, 2006 Nov. UI: 17027066

## **BOOK CHAPTERS**

1. Pfahl, M., Payne, J., Benbrook, D. & Wu, K.C. (1988) Differential Activation of a Hormone-Responsive Element in Various Cell Lines. *Steroid Hormone Action*, pp. 161-168.
2. Benbrook, D.M., Tonetti, D.A. & Miller, R.V. (1989) DNA Gyrase of *Pseudomonas Aeruginosa*: Inhibition by Quinolones. *Proceedings International Telesymposium on Quinolones*, Fernandez, P.B. (Ed.) J.R. Prous Science Publishers, pp.171-186.
3. Hurst,RE.; Waliszewski,P.; Waliszewska,M.; Bonner,RB.; Benbrook,DM.; Dhar,A.; Hemstreet,GP.: Complexity, retinoid-responsive gene networks, and bladder carcinogenesis. In: *Advances in Bladder Research*, edited by L. S. Baskin and S. W. Hayward, NY:Plenum Publishers, 1999, p. 449-467
4. Alberts, D.A., Barakat, R.R., Daly, M., Method, M.W., Benbrook, D.M., et al. (2004) Prevention of Gynecologic Malignancies. In Gershensen, D.M., McGGuire, W.P., Gore, M., Quinn, M.A., Thomas, G. editors. *Gynecologic Cancer: Controversies in Management*. Elsevier, Churchill, Livingston, Philadelphia, PA.

**ABSTRACTS AND MEETING PRESENTATIONS**

1. Benbrook, D.M., Miller, R. (1983) The effects of Norfloxacin, A pyridonecarboxylic acid-derivative, on DNA replication and DNA gyrase activity in *Pseudomonas aeruginosa*, Presented at the Federation of American Society of Experimental Biology Meeting. Published in *Federation Proceedings* 42(7):1982-1982
2. Benbrook, D.M., Miller, R. (1984) The effects of Norfloxacin on *Pseudomonas aeruginosa* and its DNA Gyrase. American Society for Microbiology, 84<sup>th</sup> Annual Meeting, 1984.
3. Rogers, R.S., Benbrook, D.M., Walker, J.L., Lord, B.J., Haas, G.G. (1992) "Silent" carriers of human papillomavirus (HPV) identified in sperm bank donor population. *Proceedings of the American Fertility Society, 48th Annual Meeting.*
4. Benbrook, D.M., Medlin, M., Rogers, R., Ahern-Moore, J., Dunn, S.T., Lord, B., Walker, J.L. (1993) "Retinoid effects on tumor cells in organotypic culture." *American Association for Cancer Research Special Conference "Mechanism of Action of Retinoids, Vitamin D, and Steroid Hormones."*
5. Benbrook, D. M., Heldermon, C., Nunez, E.R., and Waliszewski, P. (1994) Retinoic acid receptor RAR $\beta$  effects in cervical tumor cell lines. *Diet and Cancer: Molecular Mechanisms of Interactions, American Institute of Cancer Research.*
6. Benbrook, D. M., Heldermon, C. (1994) Retinoic acid receptors bind to HPV16LCR sequence and repress transcription indirectly through AP1 sites. *Proceedings of the 13th International Papillomavirus Conference.*
7. Mannel, R. S., Khalifa, M., Wren, M., Walker, J.L., Min, K.-W., Benbrook, D.M. (1994) Epidermal growth factor receptor in vulvar malignancies and its relationship to metastasis and patient survival. *26th Annual Society of Gynecologic Oncologists' Meeting.*
8. Waliszewski, P., Benbrook, D., Nasim, M., Hurst, R.E. (1995) "Human uroepithelial cells contain retinoid signaling pathways." *Proceedings of the American Association for Cancer Research, 36:630.*
9. Waliszewski, P., Benbrook, D., Blaszewski, M.K., Gupta, M., Drews, M., Hurst, R.E. (1995) The retinoic acid signaling pathway in normal and transformed human intestinal epithelial cells. *Proceedings of the American Association for Cancer Research, 36:601.*
10. Nuñez, E.R., Heldermon, C., Benbrook, D.M. (1995) Restoration of RAR $\beta$  expression and function in RAR $\beta$ -deficient cervical tumor cell lines has different effects depending on the intercellular environment. *American Association for Cancer Research Conference "Mechanism of Action of Retinoids, Vitamin D and Steroid Hormones".*
11. Nuñez, E.R., Benbrook, D. M. (1995) Retinoic acid receptor expression effects growth and retinoid sensitivity in cervical tumor cell lines. *American Association for Cancer Research Conference "Molecular Biology of Cancer: Implications for Prevention and Therapy".*
12. Nuñez, E.R., Benbrook, D.M., Berlin, K.D., Nelson, E.C. (1995) A heteroarotinoid affects growth and transactivation of a retinoic acid response element in cervical carcinoma cell lines. *The FASEB Journal, 9(3, part 1): 985.*
13. Benbrook, D. M., Jordan, T.L., Heldermon, C. and Robinson, K. (1995) Evaluation of endogenous retinoic acid receptor function in cervical tumor cells. *Dietary Phytochemicals in Cancer Prevention and Treatment, 62.*

14. Nuñez, E.R., Jordan, T.L., Benbrook, D.M. (1996) 13-Cis acid is a radiosensitizer of SiHa cervical carcinoma cell line. *Proceedings of the American Association for Cancer Research*, **37**:4144.
15. Madler, M., Benbrook, D.M. Birckbichler, P.J., Nelson, E.C., Berlin, K.D. (1996) Biologically active heteroarotinoids. Presented at the *Annual Meeting of the Medicinal Chemistry Division of the American Chemical Society*, August 96. Published in Abstracts of papers of the American Chemical Society, 212:67 (Part 1), Aug.1996
16. Qian, X., Benbrook, D.M., Berlin, K.D., Cushman, J.C., Madler, M.M., Patrick, S.D., Simms, M.D., Nelson, E.S. (1996) Comparative effects of a diaryl heteroarotinoid and all-trans-retinoic acid on induction of differentiation. *The FASEB Journal*, **10**:4390.
15. Benbrook, D.M., Lu, S., Flanagan, C.W., Jordan, T.L. (1996) Retinoids inhibit growth and activate endogenous receptors in a cervical tumor cell line. Presented at the *1996 FASEB Summer Research Conference on Retinoids*.
16. Lu, S., Flanagan, C.W., Shen-Gunther, J., Benbrook, D.M. (1997) Biological assay for activity and molecular mechanism of retinoids in cervical tumor cells. *Gynecologic Oncology*, **64(2)**:312.
17. Flanagan, C., Fishburne, V.H., DiSilvestro, P. Nuñez, E.R., Benbrook, D.M. (1997) Mechanism of retinoid and carotenoid growth inhibition of a cervical tumor cell line. *Gynecologic Oncology*, **64(2)**:357.
18. Benbrook, D.M., Lu, S. (1997) Retinoid regulation of endogenous receptors, growth and EGF-R in a cervical carcinoma cell line. *Proceedings of the 88th Annual Meeting of the American Association for Cancer Research*, **38**:453, abstract #3032.
19. Benbrook, D.M., Nuñez, E.R. (1997) Differences in radiosensitization and cell cycle progression of cervical carcinoma cell lines. *Proceedings of the 88th Annual Meeting of the American Association for Cancer Research*, **38**:44, abstract #296.
20. Benbrook, D.M., Berlin, K.D., Birckbichler, P.J. (1997) Correlation of transactivation with growth inhibition and transglutaminase induction by heteroarotinoids. *Proceedings of the 88th Annual Meeting of the American Association for Cancer Research*, **38**:454, abstract #3037.
21. DiSilvestro, P., Flanagan, C., Angros, L., Benbrook, D. (1997) Decrease in Ki-67 and epidermal growth factor receptor expression correlates with retinoic acid induced growth inhibition in a cervical cancer cell line. *Proceedings of the 88th Annual Meeting of the American Association for Cancer Research*, **38**:88, abstract #592.
22. Ivey, R. T., Brown, D., Berlin, K.D., Benbrook, D.M. (1998) Retinoid response of two ovarian carcinoma cell lines. *Proceedings of the American Association for Cancer Research*, **39**:106-107, abstract #722.
23. Lu, S., Dhar, A., Ivey, R.T., Berlin, K.D., Benbrook, D.M. (1998) Heteroarotinoid structure affects receptor specificity and growth inhibitory activities. *Proceedings of the American Association for Cancer Research*, **39**:107, abstract #723.
24. Zacheis, D.H., Houck, J.R., Berlin, K.D., Benbrook, D.M. (1998) Inhibition of the growth of head and neck squamous cell carcinoma by heteroarotinoids. *Fifth Research Workshop on the Biology, Prevention, and Treatment of Head and Neck Cancer*, Abstract #130.

25. Simms-Kelley, M. D., Subramanian, S., Spruce, L. W., Madler, M. M., Patrick, S. D., Grummer, R., Lemire, T. D., Benbrook, D. M., Birckbichler, P. J., Berlin, K. D., and Nelson, E. C. Growth promoting activity of heteroarotinoids in vitamin A deficient rats. Published in *FASEB Journal* 12(5):A840-A840, (Part 2 Suppl. S), Abstract: 4869, Mar. 1998
26. Dhar, A., Berlin, K.D., Madler, M.M., Ivey, R.T., Birckbichler, P.J., Lu, S., Zacheis, D., and Benbrook, D.M. Flexible Nitrogen Heteroarotinoids: Receptor specificity and Therapeutic Potential in Epithelial Cancers. American Association for Cancer Research Annual Meeting, April 10-14, 1999, Philadelphia, Pennsylvania.
27. Simms-Kelley, M. D., Subramanian, S., Madler, M. M., Patrick, S. D., Klucik, J., Browth, C. E., Liu, S., Lemire, T. D., Benbrook, D. M., Birckbichler, P. J., Berlin, K. D., and Nelson, E. C. Heteroarotinoids promote growth in vitamin A-deficient rats. Published in *FASEB Journal*. *FASEB JOURNAL*, 13 (5): A896-A896 (Part 2 Suppl. S), Mar. 1999
28. Liu, S., Berlin, K.D., Madler, M.M., Benbrook, D.M., Nelson, E.C. Synthesis and structure-activity relationships of nitrogen heteroarotinoids. Published in Abstracts of Papers for the American Chemical Society, 217:U1169-U1169, (Part 1), **Abstract:** 046-MEDI, Mar. 1999
29. Spencer, C., Benbrook, D.M. "Retinoids induce apoptosis in ovarian organotypic cultures" presented at the Western Association for Gynecologic Oncologists 1999 Annual Meeting. Won award for best abstract.
30. Kamelle, S., Sienko, A., Benbrook, D.M. In vitro representation of endometrium using organotypic culture: A future model for the study of endometrial carcinogenesis. Society of Gynecologic Oncologists 31<sup>st</sup> Annual Meeting, San Diego, CA, February 5-9, 2000, Abstract 85, page 169.
31. Hassan, Benbrook, D.M., Lightfoot, S.A., Lerner, M.R., Brackett, D.J., Chowdhury, P.S., Pastan, I. SS1(DSFV)-PE38, A recombinant anti-mesothelin immunotoxin targets human gynecologic tumors overexpressing mesothelin. The 36<sup>th</sup> American Society of Clinical Oncology (ASCO) Annual Meeting, May 20-23, 2000, New Orleans, LA.
32. Dhar, A., Berlin, K.D., Benbrook, D.M. Structural Features of Synthetic Retinoids Confer Receptor Selectivity and Refined Biological Activities. American Association for Cancer Research Annual Meeting, April 1-5, 2000, San Francisco, CA.
33. Guruswamy, S., Benbrook, D.M. Retinoids Induce Differentiation and Apoptosis in Ovarian Adenocarcinoma Organotypic Culture. American Association for Cancer Research Annual Meeting, April 1-5, 2000, San Francisco, CA.
34. Lu, S., Benbrook, D.M. (2000) Anti-AP-1 activity of retinoids may not be a contribution to their growth inhibition activity in some tumor cell lines. *Proceedings of the American Association for Cancer Research*, **41**:851.
35. Spencer, C. Benbrook, D.M. "Retinoids induce apoptosis in ovarian organotypic cultures" Presented at Plenary Session of American Society of Clinical Oncologists (ASCO) 2000 Annual Meeting.
36. Benbrook, D.M. Graphics illustrating adenoviral p53 gene therapy for ovarian cancer were shown on "Health Check" presented on News Channel 4, February, 2000.
37. Patrick, S.D., Waugh, K., Subramanian, S., Simms-Kelley, M.D., Benbrook, D.M., Berlin, K.D., Nelson, E.C. Synthetic retinoids induce differentiation in F9 cells. *FASEB*, 2000.

38. Kamelle SA, Sienko A, Benbrook D. An in vitro model of normal endometrium using organotypic culture: The first step in producing a model to study endometrial carcinogenesis. Society of Gynecologic Oncology (SGO) Annual Meeting 2000
39. Daniele Simoni, Marinella Roberti, Riccardo Rondanin, Marcello Rossi, Riccardo Baruchello, Stefania Grimaudo, Manlio Tolomeo, Dhar Arindam, and Doris Benbrook. "A New Class of Heterocyclic-Containing Arotinoids Endowed with Potent Differentiating and Apoptotic Activity" XVIth International Symposium on Medicinal Chemistry, Bologna, Italy, September 18-22, 2000.
40. Kamelle, S., Sienko, A., Berlin, K.D., Benbrook, D.M. "Retinoid inhibition of ovarian cancer xenograft growth" Western Association of Gynecologic Oncologist (WAGO) Annual Meeting, Monterray, CA, May, 2000.
41. Patrick, S.D, Waugh. K., Subramanian, S., Simms-Kelley, M.D., Benbrook, D.M., Berlin, K.D., Nelson, E.C. Synthetic retinoids induce differentiation in F9 cells. Federation of the American Society of Experimental Biology, BETHESDA, MD, Published in FASEB Journal, 14 (4): A245-A245, Mar. 15 2000.
42. Guruswamy, S., Berlin, K.D., Benbrook, D.M. Chemosensitization of two ovarian carcinoma cell lines to cisplatin by heteroarotinoids. Proceedings of the American Association for Cancer Research. 42:953-954, #5127, 2001.
43. Ju, K.-H., Benbrook, D.M., Berlin, K.D., Hong, W.K., Lotan, R. Induction of apoptosis in head and neck squamous cell carcinoma cell (HNSCC) lines by selected heteroarotinoids. Proceedings of the American Association for Cancer Research. 42:548-549, #2947, 2001.
44. Benbrook, D.M., Sienko, A. A hormonally responsive organotypic model of cycling endometrium. Proceedings of the American Association for Cancer Research. 42:547, #2939, 2001.
45. DuPont, N. Benbrook, D.M. MUC-1 as an indicator of cellular differentiation in ovarian cancer, American College of Obstetricians and Gynecologist (ACOG) District VII meeting, September 25, 2001, Tulsa, OK.
46. Berlin, K.D., Brown, C.W., Benbrook, D.M. Modified heteroarotinoids-anticancer activity. Published in *Abstracts of papers of the American Chemical Society*, 221: U54-U54 (Part 2), Abstract:307-MEDI , Apr. 1 2001
47. Benbrook, D.M., Kamelle, S., Joyce, K., Guruswamy, S., Tillmanns, T., Gould, N., Rutledge, T. Evaluation of Human Papillomavirus and p53 transcriptional activation in the mechanism of 9-*cis*-retinoic acid radiosensitization of squamous gynecologic cancer cell lines. Proceedings of the American Association for Cancer Research 43: 433, #2154, 2002.
48. Guruswamy, S., Benbrook, D.M. The roles of p53, retinoid receptors, and DNA damager response genes in the mechanism of retinoid sensitization of OVCAR-3 to cisplatin. Proceedings of the American Association for Cancer Research 43: #2150, 2002.
49. DuPont, N. Benbrook D.M. The Clinical Significance of MUC-1 Expression in Ovarian Cancer". American College of Obstetricians and Gynecologists District VII meeting, October 11, 2002, New Orleans, LA.
50. Benbrook, D.M. Both receptor-active and receptor-independent retinoids regulate of growth, differentiation and apoptosis without toxicity in an ovarian cancer xenograft model. Proceedings of the American Association for Cancer Research: 2003.

51. Arendse, C.E., Brennan, M., Benbrook, D.M., Hendricks, D.T. Characterisation of heteroarotinoids as potential agents in the treatment of oesophageal cancer. IUBMB conference in Toronto, Ontario, Canada, July 2003
52. Benbrook, D.M. and Lightfoot, S.L. Reactive Oxygen Species (ROS) are involved in the mechanism of SHetA2-induced apoptosis but not differentiation in ovarian cancer organotypic cultures. Proceedings of the American Association for Cancer Research 45: 2004
53. Lightfoot, S.L. and Benbrook, D.M. Effects of steroids and retinoids in an organotypic model of endometrial carcinogenesis. Proceedings of the American Association for Cancer Research 45: 2004
54. Liu, Z. Covey, J., Benbrook, D., Chan, K. "Pharmacokinetic and Metabolism Study of SHetA2 (NSC 683864), a New Heteroarotinoid Antitumor Agent in the Rat" American Association for Pharmaceutical Sciences (AAPS), Nov., 2004
55. Hannafon, B.N., Dearnley, D.D., Benbrook D.M. Gene Expression of the Angiogenic Factor Thrombospondin 4 can be inhibited by SHetA2 in Ovarian Cancer Cells. MD Anderson 5<sup>th</sup> International Conference on Ovarian Cancer, Dec. 1-4, 2004.
56. Dearnley, D.D., Hannafon, B.N., Benbrook, D.M. A Novel Chemotherapeutic Agent, SHetA2, Inhibits Expression of Platelet Derived Endothelial Cell Growth Factor (PD-ECGF) in Ovarian Cancer and Angiogenesis *In Vitro*. MD Anderson 5<sup>th</sup> International Conference on Ovarian Cancer, Dec. 1-4, 2004.
57. De Bault, L.E., Lu, S., Angros, L.H., Benbrookm D.M. Retinoic acid effects on the expression of EGF-receptor mRNA and its protein in cervical cancer cells in vitro. Journal of Histochemistry & Cytochemistry, 52:S36-S36, Jul. 2004
58. Dearnley, D.D., Hannafon, B., Ding, W.-Q., Lind, S., Cook, S. Benbrook, D.M. Regulation of Gene Expression and Vascular Capillary Formation by a Novel Anticancer Compound, SHetA2. Proceedings of the American Association for Cancer Research 46: 2005
59. Kelly, W.J., Gill, L.W., Hannafon, B., Benbrook, D.M. SHetA2 induces mitochondrial swelling, superoxide formation and apoptosis in human cancer cells. Published in *Abstracts of the American Chemical Society*, 22: U492-U492 (Part) 1, **Abstract:** 874-CHED, Mar. 2005 .
60. Lightfoot, S, Chengedza, S., Naylor, M., Benbrook, D.M. Inhibition of thymidine phosphorylase (TP), thrombospondin 4 (TSP4) and angiogenesis by flexible heteroarotinoids (Flex-Het), SHetA2. Proceedings of the American Association for Cancer Research 47:57, 2006
61. Benbrook, D.M., Lightfoot, S., Ranger-Moore, J. Karyometric analysis of inhibition of DMBA carcinogenesis by flexible heteroarotinoids (Flex-Het) SHetA2 in an endometrial organotypic model. Proceedings of the American Association for Cancer Research 47:917, 2006
62. Myers, T., Benbrook, D.M. Thymidine phosphorylase is a molecular target of SHetA2 anti-angiogenesis activity. *Angiogenesis Research & Therapeutics*, February 8-9<sup>th</sup>, 2007
63. Myers, T. Benbrook, D.M. Thymidine phosphorylase is a molecular target of SHetA2 anti-angiogenesis activity. Proceedings of the American Association for Cancer Research 48:4615, 2007

64. Tongzhong Ju, Grainger S. Lanneau, Tripti Gautam, Yingchun Wang, Baoyun Xia, Sean R. Stowell, Margaret T. Willard, Doris Benbrook, Marie H. Hanigan, Richard D. Cummings. Human tumor antigens arising from mutations in Cosmc Proceedings of the American Association for Cancer Research 48:406, 2007
65. Chenedza, S. Liu, T., Benbrook, D.M. SHetA2 Effects on Thymidine Phosphorylase and NF- $\kappa$ B activity. AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics, October 22-26, 2007
66. Masamha, C. P., Liu, T., Benbrook, D.M. SHetA2 targets cyclin D1 for proteasomal degradation through a GSK3 $\beta$ -independent mechanism leading to G1 cell cycle arrest. AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics, October 22-26, 2007. Published in *Molecular Cancer Therapeutics* 6(12):3372S-3372S, Dec. 2007
67. Liu, Masamha, C.P., Chenedza, S., Benbrook, D.M. Regulation of apoptosis, cell cycle progression and differentiation by SHetA2 in renal cancer cells is associated with alterations in Bcl-2, Cyclin D1 and E-Cadherin proteins. AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics, October 22-26, 2007
68. Chenedza, S., Benbrook, D.M. Effects of SHetA2 on I $\kappa$ Ba and NF- $\kappa$ B in Ovarian Cancer. NF-kappaB Keystone Symposium, February 12-17, 2008. Published in *Molecular Cancer Therapeutics*, 6 (12): 3442S-3443S, Dec. 2007
69. Elucidation of the roles of cyclin D1 and up- and down-stream effectors in the mechanism of SHetA2 induced G1 cell cycle arrest. Chioniso Patience Masamha, Tongzu Liu, Doris M. Benbrook, 2008. Abstract # 143. The Cell Cycle. Cold Spring Harbor Laboratory, Cold Springs Harbor, New York. p142
65. Inhibition of NF- $\kappa$ B Activity By SHetA2 Overcomes Tumor Necrosis Factor-Alpha Resistance in Ovarian Cancer Cells. Chenedza, S., Benbrook, D. M. Poster Presentation. Third Annual NIH National Graduate Student Research Festival. September 11 - 12, National Institutes of Health, Bethesda, MD.
66. Deciphering Structural Features Important for Heteroarotinoid Growth Inhibition Activity in Normal and Cancerous Ovarian Cells. McDaniel, Sheree, Benbrook, Doris M. Poster Presentation at 2008 Historically Black Colleges and Universities Undergraduate Program (HBCU-UP) National Conference being held in Atlanta, GA, October 23-27, 2008.
67. Ju, T.Z., Lanneau, G.S., Gautam, T., Wang, Y.C., Xia, B.Y., Stowell, S.R., Willard, M.T., Wang, W.Y., Xia, J.Y., Zuna, R.E., Laszik, Z., Benbrook, D.M., Hanigan, M.H., Cummings, R.D. Anticancer Research, 28(5C): 3337-3337, Meeting Abstract: 315, Sep-Oct, 2008
67. Moxley, K. Dozmorov, I., Lightfoot, S., Benbrook, D.M. Dynamics of DMBA-induced transformation and gene expression in endometrial organotypic cultures. Proceedings of the AACR 100th Annual Meeting 2009 in Denver, CO, Abstract #3305.
68. Masamha, P. Benbrook, D.M. p21 prevents aberrant cyclin E2 expression from interfering with G1 arrest caused by SHetA2-induced cyclin D1 loss in ovarian cancer cell lines. roceedings of the AACR 100th Annual Meeting 2009 in Denver, CO, Abstract #1280.
69. Chenedza, S., Benbrook, D.M. Sensitization of ovarian cancer cell lines to death receptor ligands by the flexible heteroarotinoid (Flex-Het), SHetA2. AACR 100th Annual Meeting 2009 in Denver, CO, Abstract #5121.

## **INVITED LECTURES**

1. "Interaction of CREB and Jun transcription Factors" September 1991  
Department of Microbiology, Oklahoma State University
2. "Interaction of CREB and Jun Transcription Factors" September 1991  
Department of Biochemistry and Molecular Biology, University of Oklahoma
3. "Effects of Retinoids on Organotypically Grown Tumors" 1993  
Department of Biochemistry and Molecular Biology, Oklahoma State University
4. "The Influence of Diet and Retinoic Acid on Cancer" 1993  
Science Forum, Combined NIH Training Grants Meeting  
Oklahoma Memorial Research Foundation
5. "Retinoid Effects on Organotypically Grown Cervical Tumor Tissue" 1993  
Department of Anatomy, University of Oklahoma
6. "Radiation and Retinoid Effects on Cervical Cancer" 1994  
Department of Pathology , University of Oklahoma
7. "Drug Discovery and Design" 1994  
Premed Club, University of Oklahoma Undergraduate School, Norman, Oklahoma
8. "Translational Research: Studying the Relationship Between Nutrition and Cancer"  
November 1995, Obstetrics and Gynecology Grand Rounds, University of Oklahoma
9. "The Food You Eat Can Change You" November 1997  
The Science Forum at the Oklahoma Medical Research Foundation
10. "Oncogenes and Tumor Suppressor Genes" May 1997  
Obstetrics and Gynecology Grand Rounds, University of Oklahoma
11. "Oncogenes and Tumor Suppressor Genes" June 1997  
Cancer Conference at INTEGRIS Baptist Medical Center, Oklahoma City, Oklahoma
12. "Prevention and Treatment of Cervical Cancer with Synthetic Retinoids" July 1997  
Drug Dynamic Institute, University of Texas at Austin, Texas
13. "Cancer Genetics" October 1997  
Womens Health Symposium, Marriot Hotel, Oklahoma City, Oklahoma
14. "Potential and Molecular Markers for 4HPR in Chemoprevention of Ovarian Cancer"  
July 1998, Gynecological Oncology Group Semi-annual Meeting, Toronto, Ontario
15. "Translational Research to Develop Retinoids for Gynecological Cancers" September 1998  
Department of Cellular Biology, Louisiana State University, Shreveport, LA
16. "Translational Research to Develop Retinoids for Gynecological Cancers" September 1998  
Department of Biochemistry and Molecular Biology, University of Oklahoma HSC
17. "Translational Research to Develop Retinoids for Gynecological Cancers" September 1998  
Department of Cellular and Molecular Medicine, University of Ottawa, Ottawa, Ontario

18. "Translational Research to Develop Retinoids for Gynecological Cancers" October 1998  
Oklahoma Memorial Research Foundation, Oklahoma City, OK
19. "Anti-AP1 activity of Retinoids: Correlation with Growth Inhibition and Radiosensitization"  
February 1999, Steroid Hormone Receptor Group, Oklahoma City, OK
20. "Organotypic Culture Models of Gynecological Cancer and Disease" March 1999  
Obstetrics and Gynecology Grand Rounds University of Oklahoma HSC
21. "Adenoviral p53 Gene Therapy for Ovarian Cancer" February 2000  
"Health Check" News Channel 4
22. "Molecular Biological Techniques" February, 2000  
Obstetrics and Gynecology Grand Rounds University of Oklahoma HSC
23. "Molecular Advances in Cancer Therapy" March, 2000  
Academy of Medicine, Oklahoma City, OK
24. "Molecular Mechanisms of Retinoids Against Gynecologic Cancers" June 2000  
Federation of the American Association of Experimental Biology (FASEB)  
Special Meeting on Retinoids, Copper Mountain Colorado
25. "Retinoids, not just for Acne Anymore" September 2000  
Oklahoma Memorial Research Foundation, Oklahoma City, OK
26. "Molecular Mechanisms of Retinoid Drugs" October 2000  
Shanghai Institute of Biochemistry, Shanghai, China
27. "Tumor Suppressor Genes and DNA Tumor Viruses" April, 2001  
Annual Spring Meeting of the Texas Section of the American Association for Clinical Chemistry.  
Sam Noble Historical Museum, Norman, OK
28. "Retinoids, Apoptosis and Cancer", June 7, 2001  
Policlinico P. Giaccone, Palermo, Italy
29. "Development of Retinoids for Chemoprevention" June 21, 2001  
Dip. Sc. Farmaceutiche, Ferrara, Italy
30. "Refining Retinoids with Heteroatoms" March 14, 2002  
Procter & Gamble, Cincinnati, OH
31. "Relations of Differentiation, Apoptosis and MUC1 in Retinoid Growth Inhibition of  
Ovarian Cancer" June 24<sup>th</sup>, 2002  
2002 FASEB Summer Research Conferences, Retinoids, Tucson, AZ
32. "Molecular Biology of Endometrial Cancer" December 5-6, 2002  
Controversies in the Management of Gynecologic Malignancies Conference 3, Washington, D.C.
33. "Organotypic Models of Carcinogenesis", December 13, 2002  
Cancer Group, Oklahoma Memorial Research Foundation, Oklahoma City, OK
34. "Biomarkers, Histology & Stem Cells in Endometrial Cycling & Cancer", February 19, 2003  
Gynecologic Oncology Program of the OU Cancer Center Meeting

Oklahoma Medical Research Foundation (OMRF)

35. "Understanding Cancer and Developing New Prevention and Treatment Strategies",  
February 21, 2003  
Womens Health Center Research Meeting, University of Oklahoma HSC
36. "SHetA2 Regulation of Growth, Differentiation and Apoptosis in Cancer Cells and Tumors  
without Evidence of Toxicity", April 1, 2003  
National Cancer Institute Rapid Access to Intervention and Development (RAID) Program,  
National Cancer Institute, Bethesda, MD
37. "Carcinogenesis and Chemoprevention of Gynecologic Cancers", April 30, 2003  
Department of Biochemistry and Molecular Biology  
University of Oklahoma Health Sciences Center, Oklahoma City, OK
38. "Development of Chemoprevention Drugs that Regulate Growth, Apoptosis and  
Differentiation in Cancer Cells without Toxicity". May 6th  
Breast Cancer Program of the OU Cancer Center Meeting  
University of Oklahoma Health Sciences Center
39. "Translational Research and the Dawn Hope Tissue Bank", May 12, 2003  
Aventis Site Visit, Section of Gynecologic Oncology, Department of Obstetrics and Gynecology  
University of Oklahoma Health Sciences Center
40. "Development of Heteroarotinoids for Chemoprevention", May 19, 2003  
Encore Site Visit  
Free Radical Biology Section  
Oklahoma Medical Research Foundation, Oklahoma City, OK
41. "How to Get an NCI Grant", September 5, 2003  
Grant Writing Workshop  
OU Cancer Center,  
Oklahoma City, OK
42. "Preclinical Development of SHetA2 for Cancer", October 10, 2003  
Huntsman Cancer Center, Ovarian Cancer Research Group  
Salt Lake City, Utah
43. "Mechanism of Differentiation and Apoptosis Induction in Cancer Cells by a Retinoid Receptor-  
Independent Heteroarotinoid, SHetA2" FASEB Summer Research Conference on Retinoids,  
June 12-17, 2004
44. "Preclinical Development of SHetA2 for Cancer", August 23, 2004  
Department of Medicine Grand Rounds, University of Oklahoma HSC  
Oklahoma City, OK
45. "Preclinical Development of Flex-Hets", December 16, 2004  
Section of Endocrinology Grand Rounds, Department of Medicine, University of Oklahoma  
HSC, Oklahoma City, OK
46. "Drug Development in Oklahoma" Aired on January 5<sup>th</sup> and 6<sup>th</sup>, 2005  
Oklahoma Innovations Radio Show  
KCCU, KLCU, KYCU, KCCU, KTOK, KRMG and KMCU  
Oklahoma and Texas (AM and FM).

47. "Development of Drugs that Target Mitochondria", January 10, 2005  
Department of Microbiology  
Oklahoma State University, Stillwater, OK
48. "Flex-Hets" Meet the Scientist, i2E, Oklahoma City, OK, January 26, 2005
49. "How to make a Chemical into a Drug", Chemistry Club, Southwestern Oklahoma State University, Weatherford, OK, March 10, 2005
50. "Mitochondria and Gene Expression in Flex-Het Induction of Apoptosis in Cancer versus Normal Cells". Winship Cancer Center, Emory University, Atlanta, GA, July 15, 2005
51. "Glycoproteins in Cervical Cancer Metastases" OU Cancer Center Cell Biology Program. November 8, 2005
52. "Angiogenesis Biomarkers in GOG Thalidomide Trials" Gynecologic Oncology Group (GOG) semi-annual meeting, January 21, 2006.
53. "Developing Drugs and Biomarkers for Cancer" Biochemistry and Cell Biology Seminar Series, University of Oklahoma Health Sciences Center, May 10, 2006.
54. "Flex-Het Regulation of Gene Expression, Angiogenesis and Apoptosis" Federation for the American Association of Experimental Biology (FASEB) Conference on Retinoids, June 2006.
55. "Angiogenesis targeting in Ovarian Cancer" 7th Annual International Conference on Ovarian Cancer, November 30, 2006.
56. "Molecular Mechanisms of Apoptosis and Angiogenesis Regulation by Flex-Het Drugs", University of Maryland, December 11, 2006.
57. "Reversal of Abnormal Differentiation in Cancer and Polycystic Kidney Disease by Flex-Hets" University of Oklahoma Health Sciences Center, Pathology Grand Rounds, October 1, 2007.
58. "Translating Flex-Het Drug and Biomarker Research to Clinical Application" MD Anderson Cancer Center, Gynecologic Oncology Grand Rounds, November 7, 2007.
59. "Translating Flex-Het Drug and Biomarker Research to Clinical Application" University of Oklahoma Health Sciences Center, College of Pharmacy, Research Seminar November 8, 2007.
60. "Developing a Pill for Cancer Prevention",  
Newspaper articles: The Tulsa World, The Oklahoman,  
Television News: NewsChannel 9 (KWTV), NewsChannel 4 (KFOR) January 31, 2008; OETA February 1, 2008, Tulsa World Editorial, February 3, 2008, Edmond Sun, February 11<sup>th</sup>.
61. "Signal Transduction Mechanisms of Flex-Het Therapeutic and Chemoprevention Activity" University of Illinois at Chicago, March 18, 2008
62. "Systems Biology of Flex-Het Drugs and Cancer Biomarkers in Experimental Models and Clinical Trials", Notre Dame, Indiana, May 13<sup>th</sup>, 2008.

63. Oklahoma Sunday Magazine Interview aired by Citadel Radio on various stations, including KATT-FM, KYIS-FM, WWLS-FM & AM and KKWD, August 24, 2008.
64. Interview with Robing Decken-Kite about my research on Community Talk Radio aired on KTLR AM890 September 30, 2008.
70. "Systems Biology and Translation of an Organotypic Model of Carcinogenesis and Chemoprevention", Department of Physiology, University of Oklahoma HSC, Sep 11, 2008
71. "OU Medicine Minute", 04/08/09 06:06:15AM Oklahoma City (KWTV) 01:00 News 9 This Morning; 04/08/09 05:17:19PM Oklahoma City (KWTV) 01:00 News 9 @ 5pm; 04/09/09 04:43:56PM Oklahoma City (KWTV) 01:00 News 9 @ 4pm; 04/10/09 12:04:09PM Oklahoma City (KWTV) 01:00 News 9 @ Noon; 04/10/09 06:03:24PM Oklahoma City (KWTV) 01:00 News 9 @ 6pm; 04/11/09 06:12:05AM Oklahoma City (KWTV) 01:00 News 9 Saturday Morning; 04/12/09 10:06:14PM Oklahoma City (KWTV) 01:00 News 9 @ 10pm Sunday
72. "Translation of Biological Systems Driving Experimental Carcinogenesis and Chemoprevention to Clinical Application" University of Louisiana Shreveport Cancer Center, April 30, 2009.
73. "We're Betting on a Cure" Speaking part in thirty second media commercial, produced by Skyline Media Group, Inc., aired May, 2009.