UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

NOV 04 1987

"OFFICIAL RECORD COPY"

Department of Health & Human Services
Public Health Service
ATTN: Dr. Philip Hamrick
National Institute of Env. Sciences
PO Box 12233
Research Triangle Park, NC 27709

Docket No. 030-05596
License No. 32-12358-01
Control No. 251856

Gentlemen:

SUBJECT: LICENSE RENEWAL APPLICATION

This is to acknowledge receipt of your application for renewal of the nuclear material license identified above. Your application is deemed timely filed, and accordingly, the license will not expire until final action has been taken by this office.

Any correspondence regarding your renewal application should reference the control number and license number specified above.

Sincerely,

Nuclear Materials Safety Section
Division of Radiation Safety
and Safeguards

ITEM 7 - INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

The radiation safety program is overseen by the radiation safety committee and the radiation safety officer. A copy of the charter for the radiation safety committee is attached and resumes for the current committee members and ex officio members.

RADIATION SAFETY COMMITTEE MEMBERS

MEMBER	TERM EXPIRES
Linda Birnbaum	10/30/88
Steve Reynolds	10/30/88
Robert Voelker	10/30/88
Louis Crompton	10/30/89
John Pritchard	10/30/89
Anton Jetten	10/30/87
Lawrence Boone	10/30/87
Michael Culler	10/30/89
Kenneth Korach	10/30/87

Ex-Officio

Philip E. Hamrick
Christopher L. Hunt, Jr.
John M. Dement

ITEM 7

CHARTER FOR NIEHS RADIATION SAFETY COMMITTEE

The Radiation Safety Committee of the National Institute of Environmental Health Sciences shall oversee all uses of ionizing radiation, promote their safe use, and insure that all applicable regulations governing their use are followed. The primary objective is to insure that all employees, visitors, guests, and neighbors receive the lowest dose of ionizing radiation that is practically achievable.

The Radiation Safety Committee is appointed by and reports to the Deputy Director, NIEHS. The chairman and ;members of the Committee are appointed by the Deputy Director and serve for three years, at which time they may be re-appointed at the discretion of the Deputy Director. The Committee shall consist of nine members. Seven Committee members are chosen to be representative of the various uses of ionizing radiation; they shall possess a basic knowledge of health physics, and be qualified in the safe use of ionizing radiation. Two additional members are chosen to represent management and engineering capabilities. These latter two members are not required to have specific knowledge relating to radiation safety. The Radiation Safety Officer, Safety Officer and Health and Safety Manager shall serve as permanent ex officio members of the Committee.

The Chairman shall arrange the time and place for all regular meetings, notify all members of the meetings, and appoint a secretary to record the minutes. The secretary shall distribute copies of the minutes to all members and the Radiation Safety Officer. A quorum shall consist of five members.

Specific duties of the Committee are:

1. Propose and promulgate policies for the use of ionizing radiation; participate in the administration of a radiation safety program.

2. Meet at least once a quarter and at any other time on the request of a Committee member or the Radiation Safety Officer to resolve emergency matters relating to radiation safety.

3. Review all proposals for the use of ionizing radiation for adequacy in the following areas:

    a. experience and training of personnel
    b. facilities, techniques and containment
    c. personnel exposures
    d. waste disposal
    e. emergency procedures

4. Close any laboratory when a situation is judged to exist which leads to unnecessary exposure to radiation or which is likely to result in exposures exceeding the maximum permissible limits of the NRC and other recognized national and international groups. Any member of the Committee or the Radiation Safety officer may make the decision to close a laboratory until the full Committee can meet or until the hazardous conditions have been corrected.

5. Provide advice and technical assistance to the Radiation Safety Officer in the performance of his duties.

6. Review the Radiation Safety Program for the following:

   a. compliance surveys and their results
   b. procurement, storage, use, and disposal of radioactive materials
   c. personnel dose records
   d. training programs

CURRICULUM VITAE

Name: Philip E. Hamrick

Date and Place of Birth: August 2, 1938, Cleveland County, North Carolina

Citizenship: United States

Marital Status: Married, two daughters

Education:

Gardner-Webb Jr. College, Boiling Springs, North Carolina 1956-1958,
Associate of Arts Diploma, 1958
North Carolina State College, Raleigh, North Carolina, 1958-1960
B.S. Nuclear Engineering, 1961; M.S. Applied Physics, 1962
Medical College of Virginia (Virginia Commonwealth University)
Richmond, Virginia, 1962-1968, Ph.D. Biophysics, 1968

Brief Chronology of Employment

1) Alco Products, Inc., Schenectady, New York, Summer 1960,
Reactor Core Design Engineer Assistant

2) North Carolina State College, Raleigh, North Carolina 1962,
Physics Laboratory Instructor

3) Medical College of Virginia. Richmond, Virginia, 1962-66,
Physics Laboratory Instructor, 1967-68 (also summer 1969),
Postdoctoral research

4) Pfeiffer College, Misenheimer, North Carolina, 1968-71,
Assistant Professor of Physics

5) National Institute of Environmental Health Sciences, Research
Triangle Park, North Carolina, 1971-June 1976, Staff Fellow and
Senior Staff Fellow, Radiation Safety Officer
June 1976 - June 1983, NIEHS, Senior Scientist, Commissioned
Corps, USPHS, Radiation Safety Officer
November 1986 - March 1987, Acting Health and Safety Manager
June 1983 - present, Scientist Director, Commissioned Corps,
USPHS, Radiation Safety Officer

Military Service:

None

Society Memberships:

American Association of Physicists in Medicine (past)
Health Physics Society (present)
Bioelectromagnetics Society (past)

Honors:

Phi Kappa Phi
Tau Beta Pi
Sigma Pi Sigma
Phi Delta Sigma
Graduated with honors, North Carolina State College

Professional Certification:

Certified by the American Board of Health Physics in Health Physics, October 10, 1976 - Recertified through 1989.

Some Professionally Related Activities:

1) Served on subcommittee of N. C. Radiation Protection Commission on Protection of the Public from Microwave Exposure 1979-80.

2) Member of Local Arrangements Committee for American Association of Physicists in Medicine summer school "Quantitative and Qualitative Measurements of Recording Systems in Medical Imaging", July 1979.

3) Served on subcommittee on Low Level Radioactive Waste Task Force appointed by the Governor of North Carolina 1981

4) Served on Hazardous and Low Level Radioactive Waste subcommittee for Triangle J Council of Governments 1980-82

5) Member of Awards Committee Bioelectromagnetics Society 1979-80

6) Member Federal and State Legislation Committee - Health Physics Society 1981-1984

7) Member of Executive Council 1979-81, President Elect 1981-82 and President 1982-83 - N. C. Chapter of Health Physics Society

8) Member N. C. Health Physics Society's Team of Emergency Response Volunteers - Participated in McGuire Nuclear Drill in Dec. 1982 and Shearon Harris Nuclear Drill in May, 1985

9) Co-chairman session on non-ionizing radiation for the Annual Meeting of the Health Physics Society, Baltimore, MD, June 1983

10) Directed masters and Ph.D. research projects on special appointment and as Adjunct Associate Professor, University of North Carolina Graduate School 1982 - present

Thesis Completed:

Monitoring of Effluents From Low-Level Radioactive Waste Incineration, Michael G. Parker M.S. 1983

Monitoring of High Temperature Incineration of ^{3}H and ^{14}C Contaminated Liquid Scintillation Wastes, Steven J. Knapp M.S. 1984

Development of an Improved Fingertip Dosimeter for Beta Radiation, Nelson W. Couch Ph.D. 1986

Evaluation of the Angular Dependence of the Couch Fingertip Dosimeter to Point, Plane and Volume Beta Sources Including Sr/Y-90, P-32, Tl-204 and Tc-99 Kimberly Dee Elkins M.S. 1987

Thesis in Process:

Evaluation of the Light Sensitivity of a LiF Thermoluminescent Dosimeter, Frances Adams

Incineration and Monitoring of Low-Level ^{35}S Wastes, Ben Wall

PUBLICATIONS:

Hamrick, P.E. and Cleary, S.F.: Laser-Induced Acoustic Breakage of Tobacco Mosaic Virus. Nature 220: 909-910, 1968.

Hamrick, P.E. and Cleary, S.F.: Breakage of Tobacco Mosaic Virus by Acoustic Transients: A Hydrodynamical Model. Journal of the Acoustical Society of America, 45:1-6, 1969.

Cleary, S.F. and Hamrick, P.E.: The Generation of Elastic Plane Waves by Linear Thermal Transients. The Virginia Journal of Science, 19:228-232, 1968.

Cleary, S.F. and Hamrick, P.E.: Laser Induced Acoustic Transients in the Mammalian Eye. The Journal of the Acoustical Society of America 46:1037-1044, 1969.

Cleary, S.F. and Hamrick, P.E.: Induced Retinal Damage. Non-ionizing Radiation 2:1-10, 1971.

Hamrick, P.E. and Butler, B.T.: Exposure of Bacteria to 2450 MHz Microwave Radiation. Journal of Microwave Power, 8:228-233, 1973.

Walsh, P.J., Hamrick, P.E. and Underwood, N.: Application of X-ray Emission Spectrometry to the Determination of Mercury in Biological Samples. Review of Scientific Instruments 44:1019-1020, 1973.

Hamrick, P.E.: Thermal Denaturation of DNA Exposed to 2450 MHz CW Microwave Radiation. Radiation Research 56:400-404, 1973.

McRee, D.I., Hamrick, P.E., Zinkl, J.G., Thaxton, P. and Parkhurst, C.R.: Some Effects of Exposure of Japanese Quail Embryo to 2.45 GHz Microwave Radiation. Annals of the New York Academy of Sciences 247:337-390, 1975.

Hamrick, P.E. and Walsh, P.J.: Environmental Radiation and the Lung, Environmental Health Perspectives 9:533-552, 1974.

Hamrick, P.E., Zinkl, J.G., McRee, D.I., Thaxton, P. and Parkhurst, C.R.: Leucopenia in Neonatal Japanese Quail. Poultry Science 54:312-314, 1975.

Hamrick, P.E., McRee, D.I., Zinkl, J.G., Thaxton, P. and Parkhurst, C.R.: Hematology of Neonatal Japanese Quail. Laboratory Animal Science, Vol. 24, No. 4, 495-499, 1975.

Hamrick, P.E. and Zinkl, J.G.: Exposure of Rabbit Erythrocytesto Microwave Radiation. Radiation Research 62:164-168, 1975.

Walsh, P.J. and Hamrick, P.E.: Radioactive Materials - Determinants of Dose to the Respiratory Tract. Handbook of Physiology - Reactions to Environmental Agents, 1976.

Hamrick, P.E. and McRee, D.I.: Exposure of the Japanese Quail Embryo to 2.45 GHz Microwav Radiation During the Second Day of Development. Journal of Microwave Power, 10(2):211-221, 1975.

McRee, D.I. and Hamrick, P.E.: Exposure of Japanese Quail Embryo to 2.45 GHz Microwave Radiation During Development. Radiation Research 71:355-366, 1977.

Hamrick, P.E., McRee, D.I., Thaxton, P. and Parkhurst, C.R.: Humoral Immunity of Japanese Quail Subjected to Microwave Radiation During Embryogeny. Health Physics 33:23-33, 1977.

Hamrick, P.E. and Fox, S.S.: Rat Lymphocytes in Cell Culture Exposed to 2450 MHz Microwave Radiation. Journal of Microwave Power, 12(2):125-132, 1977.

Konishi, T., Walsh, P.J., Hamrick, P.E. and Yankwich, A.H.: Permeability of Cochlear Partition to Potassium and Sodium Ions. J. Acoust. Soc. Amer. 60, suppl. S79, 1976.

Konishi, T., Hamrick, P.E. and Walsh, P.J.: Ion Transport in Guinea Pig Cochlea. I. Potassium and Sodium Transport. Acta Otolaryngol (Stockh) 86:22-34, 1978.

Konishi, T. and Hamrick, P.E.: Ion Transport in the Cochlea of Guinea Pig. II. Chloride Transport. Acta Otolaryngol 86:176-184, 1978.

Konishi, T. and Hamrick, P.E.: The Uptake of Methyl Mercury in Guinea Pig Cochlea in relation to its Ototoxic Effect. Acta Otolaryngol 88:203-210, 1979.

Konishi, T., Salt, A.N. and Hamrick, P.E.: Effects of Exposure to Noise on Ion Movement in Guinea Pig Cochlea. Hearing Research 1:325-342, 1979.

Hamrick, P.E. and McRee, D.I.: The Effect of 2450 MHz Microwave Irradiation on the Heart Rate of Embryonic Quail. Health Physics 38:261-268, 1980.

Konishi, T., Salt, A.N. and Hamrick, P.E.: Effects of Hypothermia on Ionic Movement in Guinea Pig Cochlea. Hearing Research 4:265-278, 1981.

Konishi, T., Salt, A.N. and Hamrick, P.E.: Effects of Exposure to Noise on Permeability to Potassium of Endolymph-Perilymph Barrier in Guinea Pigs. Acta Otolaryngol 94:395-401, 1982.

Konishi, T., Hamrick, P.E. and Mori, H.: Water Permeability of the Endolymph-Perilymph Barrier in the Guinea Pig Cochlea. Hearing Research 15:51-58, 1984.

Hamrick, P.E., Knapp, S.J., Parker, M.G. and Watson, J.E. Jr. Incineration and Monitoring of Low-Level ^{3}H and ^{14}C Wastes at a Biological Research Institution. Health Physics 51:469-478, 1986.

Abstracts

Hamrick, P.E., Walter, D.B. and Hunt, C.L.: Integration of Radiation and Chemical Hazard Safety at NIEHS. Proceedings of the 178th National American Chemical Society Meeting, Washington, D.C., September, 1979.

Walters, D.B., Hunt, C.L., and Hamrick, P.E.: Training Program Concepts in Chemical Health and Safety in Federal Research Laboratories. Proceedings of the 183rd National American Chemical Society Meeting, Atlanta, Georgia, March, 1981.

Submitted for Publication:

Couch, N.W., Watson, J.E. and Hamrick, P.E. A Small Multi-element Fingertip Dosimeter for Beta Radiation Submitted to Health Physics-summer 1987.

Invited Talks

Hamrick, P.E. "Laser Basics". Presented at UNC Microwave and Laser Conference, University of North Carolina, July 1970.

Hamrick, P.E. "Management of Hazardous Chemical and Low-Level Radioactive Waste at a Biological Research Institute." Presented at the 12th annual meeting District IV American Association for Laboratory Animal Sciences, Raleigh, N.C. March, 1987.

Hamrick, P.E. "Low-Level Radioactive Waste Management" presented at 2 locations - Wilmington, N.C. and Asheville, N.C., October 1986 and November 1986 respectively at symposium, Strategies for Improved Chemical and Biological Waste Management - sponsored by Duke Medical Center, University of North Carolina and N. C. Pollution Prevention Pays Program.

DR. JETTEN

16a. University of Nijmegen, Safety course 16 hrs., 1968
Radiation Safety, NIH, Bethesda 15 hrs., 1979
Radiation Safety, NIEHS, Research Triangle Park 15 hrs., 1983

b. University of Nijmegen, Safety course 16 hrs., 1968
Radiation Safety, NIH, Bethesda 15 hrs., 1979
Radiation Safety, NIEHS, Research Triangle Park 15hrs., 1983

c. University of Nijmegen, Biophysics course 10 hrs., 1967
Radiation Safety, NIH, Bethesda 15 hrs., 1979
Radiation Safety, NIEHS, Research Triangle Park 15 hrs., 1983

d. University of Nijmegen, Biophysics course 10 hrs., 1967
Radiation Safety, NIH, Bethesda 15 hrs., 1979
Radiation Safety, NIEHS, Research Triangle Park 15 hrs., 1983

Dr. A.M/ Jetten has a 20-year experience with various isotopes using a wide variety of compounds and procedures.

	Max.
^{32}P-phosphate	10 mCi
^{32}P-ATP	10 mCi
^{125}I-various	10 mCi
^{35}S-sulfate	10 mCi
^{35}S-methionine	10 mCi
^{3}H-various	20 mCi
^{14}C-various	10 mCi

The experience was obtained at the University of Nijmegen (The Netherlands), Roche Institute of Molecular Biology (Nutley, NJ), NIH (Bethesda, Md) and NIEHS (RTP, NC).

CURRICULUM VITAE

Name: Anton M. Jetten

Date and Place of Birth: June 26, 1946, Nijmegen, The Netherlands

Citizenship: Permanent resident of U.S.

Marital Status: Married, 1973, two children

Education:

1963-1966	Bachelor Degree in Chemistry, University of Nijmegen Nijmegen, The Netherlands
1966-1969	Master Degree of Science, University of Nijmegen Major subject: Biochemistry Minor subjects: Organic and Biophysical Chemistry, Biology
1969-1973	Ph.D., Department of Biochemistry, Faculty of Sciences, University of Nijmegen, Nijmegen, The Netherlands Title Thesis: Bacteriocins of Staphylococci

Brief Chronology of Employment:

September 1973- September 1976	Research Associate in research group headed by Professor S.E. Luria, M.D., Department of Biology Massachusetts Institute of Technology, Cambridge Massachusetts 02139
June 1976	Cell Culture Course, Cold Spring Harbor Laboratories, Cold Spring Harbor, New York 11724
September 1976- December 1978	Research Associate, Department of Cell Biology Roche Institute of Molecular Biology, Nutley New Jersey 07110
May 1979- October 1982	Expert Scientist, Laboratory of Tumor Promotion and Cellular Carcinogenesis. National Cancer Institute, National Institutes of Health, Bethesda, Maryland 20205
October 1982- Present	Head, Cell Biology Section, Laboratory of Pulmonary Pathobiology, National Institute of Environmental Health Sciences, National Institutes of Health, Research Triangle Park, North Carolina 27709 U.S.A.

Professional Activities and Memberships

1985	Member special review committee, Roger Williams Cancer Center, Brown University, Providence, R.I.

Anton M. Jetten

1987 Member special review committee, Dana Farber Cancer Center, Harvard University, Boston, MA.

Reviewed manuscripts for 18 different Journals among which:

Proceedings of the National Academy of Sciences
Archives of Biophysics and Biochemistry
Journal of Cell Biology
Cancer Research
Experimental Cell Research
Journal of Cellular Physiology
Carcinogenesis

Editorial Activities

Editor: Monograph on "Regulation of Differentiation in Eukaryotic Cells" (1988).

Societies: American Society for Cell Biology.
American Association for Cancer Research

BIBLIOGRAPHIC REFERENCES

1. Jetten, A.M., Vogels, G.D., and De Windt, F.: Production and purification of a Staphylococcus epidermidis bacteriocin. J. Bacteriol. 112: 235-242. 1972.

2. Jetten, A.M. and Vogels, G.D.: Nature and properties of a Staphylococcus epidermidis bacteriocin. J. Bacteriol. 112: 243-250, 1972.

3. Jetten, A.M.: Mode of action of a Staphylococcus epidermidis bacteriocin. Antimicrob. Ag. Chemother. 2: 456-463, 1972.

4. Jetten, A.M.: Effects of colicin A and staphylococcin 1580 on amino acid uptake into membrane vesicles of Escherichia coli and Staphylococcus aureus. Biochim. Biophys. Acta 311: 483-495, 1973.

5. Jetten, A.M. and Vogels, G.D.: Characterization and extra-chromosomal control of bacteriocin production in Staphylococcus aureus. Antimicrob. Ag. Chemother. 4: 49-57, 1973.

6. Jetten, A.M. and Vogels, G.D.: Characteristics of the killing effect of a Staphylococcus epidermidis bacteriocin. Antonie van Leeuwenhoek 40: 177-183, 1974.

7. Plate, C.A., Suit, J.L., Jetten, A.M. and Luria, S.E.: Effects of colicin K on a mutant of Escherichia coli deficient in Ca^{2+}, Mg^{2+}-activated adenosine triphosphatase. J. Biol. Chem. 249: 6138-6143, 1974.

8. Jetten, A.M. and Jetten, M.E.R.: Energy requirement for the initiation of colicin action in Escherichia coli. Biochim. Biophys. Acta 387: 12-22, 1975.

9. Jetten, A.M.: Effects of colicins K and E1 on the glucose phosphotransferase system. Biochim. Biophys. Acta 440: 401-411, 1976.

10. Jetten, A.M., Jetten, M.E.R. and Sherman, M.I.: Stimulation of differentiation of several embryonal carcinoma cell lines by retinoic acid. Exp. Cell Res. 124: 381-391, 1979.

11. Jetten, A.M., Jetten, M.E.R. and Sherman, M.I.: Analysis of cell surface and secreted proteins of primary cultures of mouse extraembryonic membranes. Develop. Biol. 70: 89-104, 1979.

12. Jetten, A.M., Jetten, M.E.R., Shapiro, S. and Poon, P.: Characterization of the action of retinoids on mouse fibroblast cell lines. Exp. Cell. Res. 119: 289-299, 1979.

13. Jetten, A.M. and Jetten, M.E.R.: Possible role of retinoic acid binding protein in stimulation of differentiation of embryonal carcinoma cells by retinoids. Nature 278: 180-182, 1979.

14. Trown, P.W., Palleroni, A.V., Bohoslawec, O., Richelo, B.N., Halpern, J.M., Gizzi, N., Geiger, R., Lewinski, C., Machlin, L.J., Jetten, A.M. and Jetten, M.E.R.: Relationship between binding affinities to cellular retinoic acid binding protein and in vivo and in vitro properties for 20 retinoids. Cancer Res. 40: 212-220, 1980.

15. Jetten, A.M.: Retinoids specifically enhance the number of epidermal growth factor receptors. Nature 284: 626-629, 1980.

16. Jetten, A.M., Meeks, R.G. and De Luca, L.M.: Specific and nonspecific alterations in membrane microvisosity induced by retinoids in embryonal carcinoma and fibroblast cells. Ann. N.Y. Acad. Sci. 359: 398-400, 1981.

17. Jetten, A.M.: Action of retinoids and phorbol esters on cell growth and the binding of epidermal growth factor. Ann. N.Y. Acad. Sci. 359: 200-217, 1981.

18. Jetten, A.M. and De Luca, L.M.: Studies on antagonistic actions of TPA and retinoic acid on carcinogenesis and biological effects of tumor promoters. Carcinogenesis 7: 513-518, 1981.

19. Jetten, A.M., De Luca, L.M. and Meeks, R. Enhancement in apparent membrane microviscosity during differentiation of embryonal carcinoma cells induced by retinoids. Exp. Cell Res. 138: 494-498, 1982.

20. Jetten, A.M.: Effects of retinoic acid on the binding and mitogenic activity of epidermal growth factor. J. Cell Physiol. 110: 235-240, 1982.

21. Jetten, A.M.: Action of retinoids on the anchorage independent growth of normal rat kidney fibroblasts induced by TPA or SGF. Cancer Res. 43: 68-72, 1983.

22. Jetten, A.M. and Goldfarb, R.H.: Interaction between epidermal growth factor and retinoic acid on anchorage dependent and independent growth of NRK cells. Cancer Res. 43: 2094-2099, 1983.

23. Lechner, J.F., Kaighn, M., Jetten, A.M., Grooden, J. and German, J.: Bloom's syndrome cells have an abnormal serum growth response. Exp. Cell. Res. 145: 381-388 (1983).

24. Nagarajan, L., Jetten, A.M., and Anderson, W.B.: A new differentiated cell line (Dif 5) derived by retinoic acid treatment of F9 teratocarcinoma cells capable of extracellular matrix production and growth in the absence of serum. Exp. Cell Res. 147: 315-327 (1983).

25. Anderson, W., Nagarajan, L., Jetten, A.M., Rechler, M., and Nissley, S.: Production of insulin-like growth factor by dif 5 endoderm cells: possible early embryonic growth hormone. Cell Biol. Int. Rep. 7: 563 (1983).

26. Jetten, A.M., and De Luca, L.M.: Induction of differentiation of embryonal carcinoma cells by retinol: possible mechanisms. Biochem. Biophys. Res. Comm. 114: 593-599 (1983).

27. Jetten, A.M.: Modulation of cell growth by retinoids and their possible mechanisms of action. Federation Proc. 43: 134-139 (1984).

28. Strickland, J.E., Jetten, A.M., Kawamura, H. and Yuspa, S.H.: Interaction of epidermal growth factor with basal and differentiating epidermal cells of mice resistant and sensitive to carcinogenesis. Carcinogenesis 5: 735-740 (1984).

29. Jetten, A.M. and Shirley, J.E.: Inhibition of ornithine decarboxylase by retinoic acid and difluoromethylornithine in relation to their effects on differentiation and proliferation. Exp. Cell Res 156: 221-230 (1985).

30. Jetten, A.M. and De Luca, L.M.: Retinoic acid and 12-O-tetradecanoyl-13-acetate alter release of glycoproteins from mouse fibroblast Balb/c 3T6 cells. Carcinogenesis 6: 337-342 (1985).

31. Kim, K.C., Rearick, J.I., Nettesheim, P. and Jetten, A.M. Biochemical characterization of mucous glycoproteins synthesized and secreted by hamster tracheal epithelial cells in primary culture. J. Biol. Chem. 260: 4021-4027 (1985).

32. Jetten, A.M., Ganong, B.R., Vanderbark, G.R., Shirley, J.E. and Bell, R.M.: Role of protein kinase C in diacylglycerol-mediated induction of ornithine decarboxylase and reduction of epidermal growth factor binding. Proc. Natl. Acad. Sci, USA 82: 1941-1945 (1985).

33. Jetten, A.M. and Shirley, J.E.: Retinoids antagonize the induction of ornithine decarboxylase actvity by phorbol esters and phospholipase C in rat tracheal epithelial cells. J. Cell. Physiol. 123: 386-394 (1985).

34. Nagarajan, L., Anderson, W. B., Nissley, S. P., Rechler, M. M., and Jetten, A. M. Production of insulin-like growth factor-II (MSA) by endoderm-like cells derived from embryonal carcinoma cells: Possible mediator of embryonic cell growth. J. Cell. Physiol. 124: 199-206 (1985).

35. Jetten, A.M., Rearick, J.I. and Smits, H.: Regulation of Differentiation of Airway Epithelial Cells by Retinoids. Biochem. Soc. Transactions. 14: 930-933 (1986).

36. Jetten, A.M. and Shirley, J.E.: Retinoic acid inhibits diacylglycerol-induced ornithine decarboxylase activity without affecting protein kinase C. Exp. Cell Res. 166: 519-525 (1986).

37. Rearick, J. and Jetten, A.M.: Accumulation of cholesterol sulfate during squamous cell differentiation of rabbit tracheal epithelial cells. Regulation by retinoids. J. Biol. Chem. 261: 13898-13904 (1986).

38. Jetten, A.M., Barrett, J.C. and Gilmer, T.: Differential response to retinoic acid of Syrian hamster embryo fibroblasts expressing v-src or v-Ha-ras oncogenes. Mol. Cell. Biol. 6: 3341-3348 (1986).

39. Jetten, A.M., Shirley, J.E. and Stoner, G.: Regulation of proliferation and differentiation of epithelial cells of the respiratory tract by TGF$_\beta$. Exp. Cell Res. 167: 539-549 (1986).

40. Patton, S.E., Gilmore, L.B., Jetten, A.M., Nettesheim, P. and Hook, G.E.R.: Biosynthesis and Release of Proteins by Isolated Pulmonary Clara Cells. Exp. Lung Res. 11: 277-294 (1986).

41. Jetten, A.M. and Shirley, J.E.: Characterization of transglutaminase activity in rabbit tracheal epithelial cells: regulation by retinoids. J. Biol. Chem. 261: 15097-15101 (1986).

42. Jetten, A.M.: Regulation of Squamous Differentiation of Airway Epithelial Cell. Chest. 91: 22-23S (1987).

43. Rearick, J.I., Deas, M. and Jetten, A.M.: Synthesis of mucous glycoproteins by rabbit tracheal epithelial cells in vitro: modulation by substratum, retinoids and cyclic AMP. Biochem. J. 242: 19-25 (1987).

44. Bauman, M.D., Jetten, A.M. and Brody, A.R.: Biological and biochemical characterization of a macrophage derived growth factor (MDGF) for rat lung fibroblasts. Chest. 91: 15-16S (1987).

45. Brody, A.R., Hook, G.E.R., Cameron, G., Jetten, A.M., Butterick, C. and Nettesheim, P.: The differentiation capacity of Clara cells isolated from lungs of rabbits. Lab. Invest. 57: 219-228 (1987).

46. Hook, G.E.R., Brody, A.R., Cameron, G.S., Jetten, A.M., Gilmer, L.B. and Nettesheim, P.: Repopulation of denuded tracheas by Clara cells isolated from the lungs of rabbits. Exp. Lung Res. 12: 311-330 (1987).

47. Jetten, A.M., Brody, A.R., Deas, M.A., Hook, G.E.R., Rearick, J.I. and Thatcher, S.M.: Retinoic acid and substratum regulate the differentiation of rabbit tracheal epithelial cells into squamous and secretory phenotype. Morphological and biochemical characterization. Lab. Invest. 56: 654-664 (1987).

48. Jetten, A.M., Anderson, K., Deas, M.A., Kagechika, H., Lotan, R., Rearick, J.I., and Shudo, K.: New benzoic acid derivatives with retinoid activity: Lack of a direct correlation between biological activity and binding to CRABP. Cancer Res. 47: 3523-3527 (1987).

BOOK CHAPTERS

49. Strickland, J.E., Hennings, H., Jetten, A.M., Yuspa, S.H., Allen, P.T., Hellmann, A.G., and Strickland, A.G.: Susceptibility determinants for mouse epidermal carcinogenesis. In: Host Factors in Human Carcinogenesis, B. Armstrong and H. Bartsch (eds.), Lyon, pp. 259-268 1982.

50. Jetten, A.M.: Modulation of cell growth and differentiation by retinoids and their mechanisms of action. In: Modulation and Mediation of cancer by vitamins. Eds. F.L. Meyskens and K.N. Prasad, Karger, Basel. pp. 177-186 (1983).

51. Nagarajan, L., Jetten, A.M., Anderson, W.B.: Characterization of a new endodermal cell line (Dif 5) derived from retinoic acid-treated F9 teratocarcinoma cells. In: Cold Spring Harbor Conference on Cell Proliferation, Vol. 10: Teratocarcinoma Stem Cells. Cold Spring Laboratory, pp. 571-575 (1983).

52. Jetten, A.M.: Retinoids and their modulation of cell growth. In: Growth and maturation factors. Ed. G. Guroff, Wiley Interscience, N.Y. Vol. 3, pp. 221-293 (1985).

53. Strickland, J. E., Jetten, A. M., Kawamura, H., and Yuspa, S. H.: Interaction of epidermal growth factor (EGF) with basal and differentiating mouse keratinocytes. In: Growth and Differentiation of Cells in Defined Environment, Eds. Murakami H. et. al., pp. 419-424, Springer Verlag, (1985).

54. Jetten, A.M. and Smits, H.: Regulation of differentiation of tracheal epithelial cells by retinoids. In: Retinoids, Differentiation and Disease. CIBA Symposium, Pitman Publ. Ltd., London. pp. 61-76 1985).

55. Jetten, A.M.: Induction of differentiation of embryonal carcinoma cells by retinoids. In: Retinoids and cell differentiation. Ed. M.I. Sherman. CRC Press, Inc. Boca Raton, FL., pp. 105-136 (1986).

56. Jetten, A.M., Fitzgerald, D.J. and Nettesheim, P.: Control of Differentiation and proliferation of normal and transformed airway epithelial cells by retinoids. In: Nutritional Diseases: Research Directions in Comparative Pathobiology. Ed. Migaki, G. Alan R. Liss, Inc. N.Y., pp. 33-70 (1986).

IN PRESS

57. Bhat, P.V. and Jetten, A.M.: Metabolism of all-trans-retinol and all-trans-retinoic acid in rabbit tracheal epithelial cells in culture. Biochem. Biophys. Acta.

58. Smits, H.L., Floyd, E.E., and Jetten, A.M.: Molecular cloning of gene sequences regulated during squamous differentiation of tracheal epithelial cells and controlled by retinoic acid. Mol. Cell. Biol.

59. Gupta, R.P., Patton, S.E., Jetten, A.M. and Hook, G.E.R.: Purification and characterization of a low molecular weight Clara cell secretory protein from the pulmonary extracellular lining. Biochem. J.

60. Rearick, J.I., Hesterberg, T.W., and Jetten, A.M.: Human bronchial epithelial cells synthesize cholesterol sulfate during squamous differentiation in vitro. J. Cell. Physiol.

61. Rearick, J.I., Albro, P.W. and Jetten, A.M.: Cholesterol sulfotransferase activity is induced upon squamous differentiation of RTE cells in vitro. J. Biol. Chem.

62. Jetten, A.M.: Regulation of tracheobronchial epithelial cells by synthetic retinoids. IN: Dawson, M.I. and Okamura, W. (eds.) Chemistry and biology of synthetic retinoids. CRC Press. (1988).

63. Jetten, A.M.: Multistep process of squamous differentiation of tracheobronchial epithelial cells. Role of Retinoids. Dermatologica, Karger Press. (1987).

SUBMITTED

64. Smits, H. and Jetten, A.M.: Regulation of squamous differentiation and keratin expression in rabbit tracheal epithelial cells by retinoids. Exp. Cell Res.

65. Gupta, R.P., Patton, S.E., Jetten, A.M., Nettesheim, P. and Hook, G.E.R.: Identification of soluble non-serum proteins from the pulmonary extracellular lining. Lab. Invest.

66. Bauman, M.D., Jetten, A.M. and Brody, A.R.: A pulmonary macrophage-derived growth factor for rat lung fibroblasts. Lab. Invest.

67. Patton, S.E., Gupta, R.P., Nishio, S., Eddy, E.M., Jetten, A.M., Plopper, C.G., Nettesheim, P. and Hook, G.E.R.: Synthesis, secretion and immunohistochemical localization of major Clara cell secretory proteins in the lungs of rabbits. Lab. Invest.

68. Inayama, Y., Hook, G.E.R., Brody, A.R., Cameron, G., Jetten, A.M., Gilmore, L., Gray, T. and Nettesheim, P.: The differentiation potential of tracheal basal cells. Lab. Invest.

Anton M. Jetten

ABSTRACTS

1. Jetten, A.M.: Effects of colicin A and staphylococcin 1580 on amino acid transport into membrane vesicles. Antonie van Leeuwenhoek 39: 360, 1973.

2. Jetten, A.M., Jetten, M.E.R. and Luria, S.E.: Energy requirement for the initiation of colicin action. Abstract Annual Meeting of the American Society for Microbiology p. 183, 1975.

3. Jetten, A.M. and Jetten, M.E.R.: Action of retinoids on embryonal carcinoma and mouse fibroblast cell lines. Abstract, III. International Conference on Differentiation and Neoplasma. Minneapolis. Abstr. No. 147, 1978.

4. Jetten, A.M.: Conference on modulation of cellular interactions of vitamin A and derivatives. Action of retinoids on EGF binding in cultured cells. Abstr. No. 20, 1980.

5. Jetten, A.M. and Meeks, R.G.: Conference on modulation of cellular interactions of vitamin A and derivatives. Specific and nonspecific alterations in membrane microviscosity induced by retinoids in embryonal carcinoma and fibroblast cells. Abstr. No. p. 14, 1980.

6. Jetten, A.M.: Retinoids enhance specifically the number of epidermal growth factor receptors. Proceedings of the American Association for Cancer Research. Abstr. No. 512, 1980.

7. Jetten, A.M and De Luca, L.M.: Studies on antagonistic actions of TPA and retinoic acid. Symposium on Cocarcinogenesis and Biological; Effects of Tumor Promoters. Abstract p. 98, 1980.

8. Jetten, A.M. and De Luca, L.M.: Proceedings of the American Association for Cancer Research. Abstr., 1981.

9. Jetten, A.M. and De Luca, L.M.: Retinoids modulate the responses to various growth factors in mouse 3T6 and normal rat kidney fibroblasts. J. Cell Biol. 91, 203a. 1981.

10. Jetten, A.M. and De Luca, L.M: Retinoids modulate the responses to various growth factors in mouse 3T6 and normal rat kidney fibroblasts. The 1st International Conference on Vitamins and Cancer. Abstract 2, 1982.

11. Jetten, A.M.: Antagonism between retinoids and TPA. First International Conference on the modulation and mediation of cancer by vitamins.

12. Jetten, A.M.: Retinoid binding protein and MRP synthetase: Role in vitro. FASEB summer research conference on micronutrients: vitamin A and the retinoids. Retinoids:" modulators of cell growth. (1982)

13. Nagarajan, L., Jetten, A.M., Anderson, W.B.: Characterization of a new endodermal cell line (dif. 5) derived from retinoic acid treated F9 teratocarcinoma. 10th Cold Spring Harbor Conference on Cell Proliferation. Teratocarcinoma Stem cells, p. 62.

14. Ar[illegible], W., Nagarajan, L., Jetten, A.M., Rechler, M., and Nissley, P.: Ec[illegible] production of insulin-like growth factor (IGF) which might serve as early embryonic growth hormone. Growth Control in Normal and Malignant Cells. Oxford, 1983.

15. Strickland, J.E., Jetten, A.M., and Yuspa, S.H.: Factors influencing interactions of epidermal growth factor (EGF) with mouse epidermal cells in culture. Proceedings of the American Association for Cancer Research, 1983.

16. Kim, K.C., Rearick, J.I., Nettesheim, P. and Jetten, A.M.: Biochemical characterization of mucin secreted by hamster tracheal cells in primary culture. Fed. Proc., 1984.

17. Rearick, J.I., Kim, K.C., Nettesheim, P. and Jetten, A.M.: Hamster tracheal mucin secreted in vitro contains poly-N-acetylactosamine oligo-saccharides. Fed. Proc., 1984.

18. Jetten, A.M., Shirley, J. and Alexander, S. Action of retinoids, difluoromethylornithine and phorbol esters on the induction and activity of orinthine decarboxylase. Proc. Am. Assoc. Cancer Res. p. 154, 1984.

19. Patton, S.E., Gilmore, L.B., Dethloff, L.A., Chhabra, R.S., Collins, K.D., Jetten, A.M., Nettesheim, P. and Hook, G.E.R.: Isolation of pulmonary Clara cells and their maintenance in in vitro culture. Fed. Proc., 1984.

20. Strickland, J.E., Jetten, A.M., and Yuspa, S.H.: Interaction of epidermal growth factor (EGF) with basal and differentiating mouse keratinocytes. International Symposium on growth and differentiation of cells in defined environments.

21. Patton, S.E., Gilmore, L.B., Jetten, A.M., Nettesheim, P. and Hook, G.E.R.: Biosynthesis and release of proteins by isolated Clara cells and other cells of the pulmonary epithelium. Fed. Proc., 1985.

22. Smits, H.L. and Jetten, A.M.: Action of retinoic acid on keratin expression by epithelial cells of the rabbit trachea in culture. Fed. Proc., 1985.

23. Jetten, A.M., Gilmer, T.M. and Barrett, J.C.: Action of retinoic acid on the expression of the transformed phenotype in Syria Hamster embryo cells containing different oncogenes. Proc. Am. Assoc. Cancer Res., 1985.

24. Dawson, M.J., Hobbs, P.D., Derdzinski, K., Chao, W., Schiff, L.J., Jetten, A.M. and Napoli, J.L. Photo affinity-labeled retinoids. Int. Symposium on Org. Chem. and Medicinal Natural Products. (1985).

25. Patton, S.E., Gupta, R.P., Jetten, A.M., Nettesheim, P. and Hook, G.E.R., Regulation of proliferation and differentiation of respiratory tract epithelial cells by TGFβ. Ann. Meeting of Cell Biology. Washington, D.C. 1986.

26. Gilmer, T.M., Barrett, J.C. and Jetten, A.M. Differentiation response to retinoic acid of Syrian hamster fibroblasts expressing v-src or v-Ha-ras oncogenes. Second Ann. Meeting on Oncogenes. Frederick, Md. 1986.

27. Bhat, P.V. and Jetten, A.M. Uptake and Metabolism of [11-^{3}H] all-trans retinoic acid by rabbit tracheal epithelial cells. Fed. Proc. 1986

28. Jetten, A.M. and Bhat, P.V. Metabolism of retinol to retinoic acid by rabbit tracheal epithelial (RTE) cells in culture. Fed. Proc. 1986.

29. Bauman, M.D., Jetten, A.M. and Brody, A.R. Biological and biochemical characterization of a macrophage-derived growth factor for rat lung fibroblasts 29th Ann. Aspen Lung Conference. 1986.

30. Jetten, A.M., Rearick, J.I. and Smits, H. Regulation of squamous differentiation of airway epithelial cells. 29th Ann. Aspen Lung Conference. 1986.

31. Jetten, A.M. Regulation of squamous differentiation of airway epithelial cells. First International Conference of Differentiation Therapy. Sardinia, Italy. 1986.

32. Jetten, A.M., Rearick, J.I. and Smits, H.E. Regulation of proliferation and differentiation of respiratory tract epithelial cells by TGFβ. Ann. Meeting of Cell Biology. Washington, D.C. 1986.

33. Jetten, A.M. Regulation of squamous differentiation of airway epithelial cells. International Congress of Dermatology. Berlin, West Germany. 1987.

34. Jetten, A.M., Anderson, K., Deas, M.A., Kagechika, H., Rearick, J.I., Shudo, K. and Lotan, R. New benzoic acid derivations with retinoid activity. Lack of a direct connection between biological activity and binding to cellular retinoic acid-binding protein (CRABP). Proc. Am. Assoc. Cancer 28, p. 43, 1987.

Anton M. Jetten

SPEAKING ENGAGEMENTS

1. Erasmus University, Department of Cell Biology, Rotterdam, The Netherlands, 1978.

2. Hubrecht Laboratory, Utrecht, The Netherlands, 1979.

3. National Cancer Institute, Antonie van Leeuwenhoek Huis, Amsterdam, The Netherlands, 1981.

4. Modulation of Cellular Interactions by Vitamin A and Derivatives (Retinoids). New York Academy of Sciences, February 27, 1981, N.Y., N.Y.

5. Medical School, Department of Pharmacology, University of Maastricht, The Netherlands, 1982.

6. Conference on the "Modulation and Mediation of Cancer by Vitamins", Tucson, Arizona, February 23-27, 1982.

7. Symposium on "Control of cell growth by nutrients". 66th Annual FASEB Meeting, New Orleans, Lo, April 17, 1982.

8. FASEB Summer conference on "Micronutrients: vitamin A". Saxons River, Vermont, June 1982.

9. Ciba Symposium on "Retinoids, differentiation and disease". London, England, September 24-27, 1984.

10. Pfizer Travelling Fellow, The Clinical Research Institute of Montreal. Montreal, Canada, November 1985.

11. Department of Biochemistry, School of Medicine, Morgantown, W. Va., January 22, 1986.

12. Southern Research Institute, Birmingham, Ala., March 5-6, 1986.

13. Annual meeting Biochemical Society Symposium on Retinoids, Liverpool, England, April 2-4, 1986.

14. 29th Annual Aspen Lung Conference, Aspen, CO., June 10-14, 1986.

15. 1st International Conference on Differentiation Therapy, Sardinia, Italy, Sept. 1-3, 1986.

16. Institute of Histology and General Embryology. University of Rome, Rome, Italy, Sept. 5, 1986.

17. Department of Tumor Biology, M.D. Anderson Hospital and Tumor Institute, Houston, TX., Dec. 4-5, 1986.

18. World Congress of Dermatology, Berlin, West Germany, May 24-29, 1987.

19. Daniel den Hoed Cancer Center, Rotterdam, The Netherlands, June 1, 1987.

20. Department of Clinical Biochemistry. University of Oxford, England, June 4, 1987.

21. "Airway" Club, Miles Laboratories, Stough, England, June 5, 1987.

22. Department of Physiology and Pediatrics, University of North Carolina, Chapel Hill, N.C., August 26, 1987.

23. Control of Growth and Differentiation in Lung Cells, St. Louis, MO, November 18, 1987

DEPARTMENT OF HEALTH & HUMAN SERVICES

National Institutes of Health
National Institute of
Environmental Health Sciences
P.O. Box 12233
Research Triangle Park, N.C. 27709

Memorandum

Date October 6, 1987

From Research Physiologist, LP Dr. Pritchard

Subject Radiation Safety Training and Experience

To Radiation Safety Officer, NIEHS

Formal Training:

Harvard University - 1966-7 -- Classroom and laboratory instruction in all aspects of radiation hazard and safety considerations over a two week period.

NIEHS - 1976 -- The Institutes standard radiation safety course.

Experience:

Harvard University -- Tritium and ^{14}C - ~1mCi each over the period from 1966-1970. Chromium 51 - ~50 uCi - 1968-9. All work was in vitro, except Cr tagged red cells were injected into rats.

Mt. Desert Island Biological Laboratory, Salsbury Cove, Maine -- Tritium and carbon 14
- 0.5 to 1 mCi each - Primarily for in vitro studies of renal transport. Some intact animal renal clearance studies were performed. Served as Assistant Radiation Safety Officer from September 1971-September 1972.

Medical University of South Carolina - 1972-1976 -- Several mCi's of trituim and carbon 14, primarily in vitro. Sulfur 35 -~100 uCi - also used in vitro.

NIEHS - 1976-79 -- Tritium and carbon 14 in vitro and in vivo - 2-5 mCi.

C.V. Whitney Laboratory (under auspices of the University of Florida) - 1979-1984 -- Tritium and carbon 14 in vitro and in vivo as above -~20 mCi of ^{3}H and 5 of ^{14}C. Five to 10 mCi of sulfur 35 was also used for in vitro transport studies in isolated membrane vesicles or tissues. Small quantities of sodium 22 were also used, in vitro only. In addition, as the most experienced user of isotopes at the laboratory, I served as Acting Radiation Safety Officer for ~2 years - 1982-4.

NIEHS - 1984-1987 -- Tritium (~50 mCi), carbon 14 (~2 mCi), sulfur 35 (~20 mCi), and chloride 36 (~10 mCi) were used almost exclusively for in vitro studies using isolated membranes or individual cells. Served on the Radiation Safety Committee since 1984.

John B. Pritchard

John B. Pritchard, Ph.D.

CURRICULUM VITAE

Name: John B. Pritchard

Date and Place of Birth: July 31, 1943, Buffalo, New York

Citizenship: United States

Education:

1965 - A.B. (Biology) *magna cum laude*, highest honors in biology, Oberlin College

1970 - Ph.D. (Physiology), Harvard University
Teaching Fellow (1968-1970)

1970 - 1971 Postdoctoral Fellow, National Science Foundation, Upstate Medical Center, Syracuse, New York

1971 - 1972 Postdoctoral Fellow, National Institutes of Health, Mt. Desert Island Biological Laboratory, Salsbury Cove, Maine

Brief Chronology of Employment:

1972 - 1976 Assistant Professor (1972-1976) and Associate Professor (1976, tenured), Department of Physiology, Medical University of South Carolina, Charleston, South Carolina

1976 - 1979 Research Physiologist, Comparative Pharmacology and Physiology Section, Laboratory of Pharmacology, National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, North Carolina

1979 - 1984 Research Physiologist and Head, NIEHS Marine Laboratory, Comparative Pharmacology and Physiology Section, Laboratory of Pharmacology, NIEHS, St. Augustine, Florida

1979 - 1984 Adjunct Associate Professor, Department of Pharmacology, University of Florida, School of Medicine, Gainesville, Florida

1984 - Date Research Physiologist, Molecular and Comparative Pharmacology Section, Laboratory of Pharmacology, National Institute of Environmental Health Sciences (NIEHS), Research Triangle Park, North Carolina

1986 - Date Adjunct Associate Professor, Department of Physiology, Duke University School of Medicine, Durham, North Carolina

Teaching Experience:

Have taught all major areas of physiology with primary emphasis on gastrointestinal and renal physiology. These courses were taught to graduate and professional students. Served as course coordinator for medical physiology for three years. Taught portions of courses on membrane pharmacology and on comparative pharmacology and toxicology.

Research Interests and Experience:

Primary interests are in two areas: (1) study of the application of comparative physiological and pharmacological techniques to mechanisms controlling xenobiotic excretion; (2) the interactions of xenobiotics with membrane functions, particularly renal and biliary excretion, osmoregulation, CSF formation, and similar processes dependent upon active transport.

Related Experience: Reviewer for the Following Publications:

American Journal Physiology (Editorial Board, 1986-), Journal of Pharmacology and Experimental Therapeutics, Kidney International Science, Chemical-Biological Interactions, Biochemical Pharmacology, Journal of Comparative Physiology, Environmental Health Perspectives (Editorial Board, 1986-).

Societies:

Phi Beta Kappa
Mt. Desert Island Biological Laboratory (Trustee 1977-1979; Secretary 1978-1979)
South Carolina Academy of Science (Secretary 1976)
American Physiological Society
American Society of Pharmacology and Experimental Therapeutics
American Society of Zoologists

Honors and Other Special Scientific Recognition:

1965	Phi Beta Kappa, Sigma Xi
1965 - 1970	National Science Foundation, Predoctoral Fellow
1970 - 1971	National Science Foundation, Postdoctoral Fellow
1971 - 1972	National Institutes of Health, Postdoctoral Fellow
1974	Sonoco Award for Environmental Research, South Carolina Academy of Science
1976	Outstanding Teacher Award. Freshman Medical Class, Medical University of South Carolina
1978	Invited Speaker, American Society of Pharmacology and Experimental Therapeutics
1979	Invited Speaker, American Society of Pharmacology and Experimental Therapeutics
1983	Invited Speaker, 29th Congress of the International Union of Physiological Sciences
1984	Invited Speaker, Symposium on Safer Chemicals Through Molecular Design, Washington, D.C.
1985	Invited Speaker, Third International Symposium on Responses of Marine Organisms to Pollutants, Plymouth, England
1986	Presented W. B. Kinter Memorial Lecture, Mt. Desert Island Biological Laboratory, Salisbury Cove, Maine

BIBLIOGRAPHY

JOURNAL ARTICLES

Pritchard, J. B., Chavez-Peon, F. and Berlin, R. D.: Purines: Supply by liver to tissues. Amer. J. Physiol. 219: 1263-1267, 1970.

Pritchard, J. B., Guarino, A. M. and Kinter, W. B.: Distribution, metabolism and excretion of DDT and Mirex in a marine teleost. Environ. Hlth. Persp. 4: 45-54, 1973.

Peakall, D. B., Lincer, J. L., Risebrough, R. W., Pritchard, J. B. and Kinter, W. B.: DDE-induced eggshell thinning: Structure and physiological effects. Comp. Gen. Pharmacol. 4: 305-313, 1973.

Guarino, A. M., Pritchard, J. B., Anderson, J. B. and Rall, D. P.: Tissue distribution ^{14}C-DDT in the lobster after administration via intravascular or oral routes or after exposure from ambient sea water. Toxicol. Appl. Pharmacol. 29: 277-288, 1974.

Pritchard, J. B., O'Connor, N., Oliver, J. M. and Berlin, R. D.: Uptake and supply of purine compounds by the liver. Amer. J. Physiol. 229: 967-972, 1975.

Pritchard, J. B. and Kleinzeller, A.: Renal sugar transport in the winter flounder: I. Renal clearance studies. Amer. J. Physiol. 231: 603-607, 1976.

Guarino, A. M., Pritchard, J. B., Anderson, J. B. and Rall, D. P.: Tissue distribution of ^{14}C-methyl mercury in the lobster, Homarus americanus. J. Toxicol. Environ. Hlth. 2: 13-24, 1976.

Pritchard, J. B.: In vitro analysis of DDA handling by rat kidney and liver. Toxicol. Appl. Pharmacol. 38: 621-630, 1976.

Pritchard, J. B., Karnaky, K. J., Jr., Guarino, A. M. and Kinter, W. B.: Renal handling of the polar DDT metabolite, DDA (2,2-bis[p-chlorophenyl]acetic acid) by marine fish. Amer. J. Physiol. 233: F126-F132, 1977.

Pritchard, J. B., Booz, G. and Kleinzeller, A.: Renal sugar transport in the winter flounder: V. Secretion of 2-deoxy-D-galactose. Amer. J. Physiol. 234: F424-F431, 1978.

Journal Articles -- Continued

Pritchard, J. B.: Kinetic analysis of the renal handling of 2,2-bis(p-chlorophenyl)acetic acid (DDA) by rat kidney in vitro. J. Pharmacol. Exptl. Therap. 205: 9-18, 1978.

Pritchard, J. B. and James, M. O.: Determinants of the renal handling 2,4-dichlorophenoxyacetic acid by winter flounder. J. Pharmacol. Exptl. Therap. 208: 280-286, 1979.

Neufeld, G. J. and Pritchard, J. B.: Osmoregulation and gill Na,K-ATPase in the rock crab, Cancer irroratus: Response to DDT. Comp. Biochem. Physiol. 62C: 165-172, 1979.

Neufeld, G. J., Holliday, C. W. and Pritchard, J. B.: Salinity adaption of gill Na,K-ATPase in the blue crab, Callinectes sapidus. J. Exptl. Zool. 211: 215-224, 1980.

Koschier, F. J. and Pritchard, J. B.: Renal handling of 2,4-D by the dogfish shark (Squalus acanthias). Xenobiotica 10: 1-6, 1980.

Pritchard, J. B., Anderson, J. B., Rall, D. P. and Guarino, A. M.: Comparative hepatic and renal handling of phenol red and indocyanine green by three marine species. Comp. Biochem. Physiol. 65C: 99-104, 1980.

Pritchard, J. B.: Accumulation of anionic pesticides by rabbit choroid plexus in vitro. J. Pharmacol. Exptl. Ther. 212: 354-359, 1980.

Pritchard, J. B., Krall, A. R. and Silverthorn, S. U.: Effects of anionic xenobiotics on rat kidney. I. Tissue and mitochondrial respiration. Biochem. Pharmacol. 31: 149-155, 1982.

Pritchard, J. B., Booz, G. and Kleinzeller, A.: Renal sugar transport in the winter flounder. VI. Reabsorption of D-mannose. Am. J. Physiol. 242: F415-F422, 1982.

Mitchell, W., Kim, C. S., O'Tuama, L. A., Pritchard, J. B. and Pick, J. R.: Choroid plexus, brain and kidney na^+,K^+-ATPase: Comparative activities in fetal, newborn and young adult rabbits. Neuroscience Lett. 31: 37-40, 1982.

Journal Articles -- Continued

Renfro, J. L. and Pritchard, J. B.: H^+-dependent sulfate secretion in the marine teleost renal tubule. Am. J. Physiol. 243: F150-F159, 1982.

Lee, S.-H. and Pritchard, J. B.: Role of electrochemical gradient for Na^+ in D-glucose transport by mullet kidney. Am. J. Physiol. 244: F278-F288, 1983.

Renfro, J. L. and Pritchard, J. B: Sulfate transport by renal tubule brush border: Presence of anion exchange. Am. J. Physiol. 13: F488-F496, 1983.

Pritchard, J. B. and Renfro, J. L.: Renal sulfate transport at the basolateral membrane is mediated by anion exchange. Proc. Nat. Acad. Sci. USA 80: 2603-2607, 1983.

Lee, S.-H. and Pritchard, J. B.: Proton coupled L-lysine uptake by renal brush border membrane vesicles from mullet (Mugil cephalus). J. Membrane Biol. 75: 171-178, 1983.

Little, P. J., James, M. O., Pritchard, J. B. and Bend, J. R.: Benzo(a)pyrene metabolism in hepatic microsomes from untreated and 3-methylcholanthrene-treated southern flounder, Paralichthys lethostigma. J. Environ. Pathology and Toxicology 5: 309-320, 1984.

Squibb, K. S., Pritchard, J. B. and Fowler, B. A.: Cadmium-metallothionein nephrotoxicity I. Correlative, morphological and functional studies. J. Pharmacol. Exptl. Ther. 299: 311-321, 1984.

Little, P. J., James, M. O., Pritchard, J. B. and Bend, J. R.: Temperature dependent disposition of ^{14}C-benzo(a)pyrene in the spiny lobster, Panulirus argus. Toxicol. Appl. Pharmacol. 77: 325-333, 1985.

Lee, S.-H. and Pritchard, J. B.: Bicarbonate/chloride exchange in gill plasma membranes of the blue crab. Am. J. Physiol. 249: R544-R550, 1985.

Pritchard, J. B.: Sulfate/bicarbonate exchange in brush border membranes from rat renal cortex. Am. J. Physiol. 252: F346-F356, 1987.

Pritchard, J. B.: Mechanism of renal organic anion transport. Biochem. Biophys. Acta Biomembrane Reviews 906: 295-308, 1987.

James, M. O. and Pritchard, J. B.: *In vivo* and *in vitro* renal metabolism of benzoic acid by a marine teleost, the southern flounder. Drug. Metab. Dispos. In Press.

Kim, C. S., Keizer, R. F. and Pritchard J. B.: 2,4-Dichlorophenoxyacetic acid intoxication increases its accumulation within the brain. Brain Res. In Press.

Smith, P. M., Pritchard, J. B. and Miller, D. S.: Membrane potential drives organic cation transport into teleost renal proximal tubules. Am. J. Physiol. Submitted.

SYMPOSIUM PROCEEDINGS

Scott, T. K. and Pritchard, J. B.: Control of apical dominance in the Alaska Pea. In: Proceedings of the NATO/Ege University Summer Inst. on "The Transport of Plant Hormones." Amsterdam, North Holland, pp. 309-319, 1968.

Pritchard, J. B.: Renal handling of DDA in the southern flounder. In: (Vernberg, R. J. and W. B. (Eds.): Pollution and Physiology of Marine Organisms. New York, Academic Press, pp. 165-180, 1974.

Neufeld, G. and Pritchard, J. B.: An assessment of DDT toxicity on osmoregulation and gill Na,K-ATPase activity in the blue crab. Proceedings of the Symposium on "Aquatic Toxicology," American Society for Testing and Materials, pp. 23-34, 2979.

Pritchard, J. B.: Toxic substances and cell membrane function. Fed. Proc. 38: 2220-2225, 1979.

Guarino, A. M., Miller, D. S., Arnold, S. T., Pritchard, J. B., Davis, R. D., Urbanek, M. A., Miller, T. J. and Litterst, C. L.: Platinate toxicity: Past, present and prospects. Cancer Treat. Rep. 63: 1475-1483, 1979.

Pritchard, J. B. and Miller, D. S.: Teleost kidney in evaluation of xenobiotic toxicity and elimination. Fed. Proc. 39: 3207-3212, 1980.

Squibb, K. S., Pritchard, J. B. and Fowler, B. A.: Renal metabolism and toxicity of metallothionein. In: Biological roles of metallothionein. New York, Elsevier, pp. 181-192, 1982.

Pritchard, J. B. and Bend, J. R.: Mechanisms controlling the renal excretion of xenobiotics in fish: Effects of chemical structure. Drug Metab. Rev. 15: 655-671, 1984.

Pritchard, J. B. and Miller, D. S. The comparative approach to mechanisms of pollutant toxicity. Environ. Health Perspectives 71: 3-4, 1987.

Dr. Michael D. Culler

Training and Experience with Radioactive Substances

Course Work:

1977- University of Maryland - Course in Physiological Techniques - included radioimmunoassay using ^{125}I, ^{3}H and ^{14}C labeled compounds and safety methods.

1979- Texas A & M University - Course in Molecular Endocrine Techniques - included radioimmunoassay using ^{125}I, ^{3}H and ^{14}C labeled compounds and safety methods.

1980- Baylor University - Course in Molecular Endocrine Techniques - included radioimmunoassay using ^{125}I, ^{3}H and ^{14}C labeled compounds, use of labeled compounds as markers in vitro and for separation of peptides, proteins and DNA.

1981- NIEHS, NIH - Radiation Safety Course

Experience:

1977-present -Radioimmunoassay using ^{125}I and ^{3}H labeled isotopes (ave. 2 assays /wk)

-Radioiodination of peptide hormones including rLH, bLH, rFSH, rPrl, bPrl, TSH, ACTH, β-endorphin, rGH, LHRH, rCRF, oCRF, hGHRH, rGHRH, somatostatin, hGAP, hInhibin, etc.

-All publications after 1979 have relied on RIA methodology including several which describe or include new RIA methods.

1979-81 -Taught course in Endocrine Physiology that included radioimmunoassay techniques using ^{125}I and 3H labeled compounds and safety methods - Texas A & M University.

1981-84 -In vitro labeling techniques using ^{45}Ca and ^{3}H - Tulane University School of Medicine.

CURRICULUM VITAE

Name: Dr. Michael DeWitt Culler

Date and Place of Birth: October 6, 1954, Frederick, Maryland

Citizenship: United States

Marital Status: Married, 1978

Education and Training:

1976 - B.A. (Biology), Hood College, Frederick, Maryland.

1976 - Internship in Mammalian Karyology, Smithsonian Institute, Washington D.C. Sponsored by Dr. Alfred L. Gardner and Dr. Charles O. Handley.

1978 - M.S. (Physiology), University of Maryland, College Park, Maryland (Thesis: The Antimicrobial Activity of Straight and Branched Chained Alkyl Amines: In Vitro and In Vivo Activity and Efficiency in Reducing Mastitic Bacterial Populations on the Bovine Teat Surface). Advisor: Dr. Joel Bitman.

1980 - Training Course in "Molecular Endocrinology and Techniques for Hormone Action," Co-sponsored by the Endocrine Society and the Baylor College of Medicine, Houston, Texas.

1981 - Ph.D. (Physiology of Reproduction) Texas A and M University, College Station, Texas (Dissertation: Quantitative and Qualitative Determination of the Effects of Ovariectomy and Suckling on Hypothalamic Luteinizing Hormone Releasing Hormone (LHRH)). Advisor: Dr. Paul G. Harms.

Brief Chronology of Employment:

1970 - 1972	Student Technician, Frederick County Microbiological Culture Center, Frederick, Maryland.
1976	Field Biologist, Maryland Wildlife Administration, Frederick, Maryland.
1976 - 1978	Graduate Research Assistant, Nutrient Utilization Laboratory, U.S.D.A. Agricultural Research Center, Beltsville, Maryland.
1978 - 1980	Graduate Teaching Assistant, Department of Animal Science, Texas A M University, College Station, Texas.
1980	Graduate Research Assistant, Department of Animal Science, Texas A M University, College Station, Texas.
1980 - 1981	Instructor, Department of Animal Science, Texas A and M University, College Station, Texas.

Brief Chronology of Employment (continued):

1981 - 1983	Postdoctoral Research Fellow, Departments of Medicine and Anatomy, Tulane University School of Medicine, New Orleans, Louisiana. Sponsor: Dr. Akira Arimura.
1983 - Date	Senior Staff Fellow, Reproductive Neuroendocrinology Section, Laboratory of Reproductive and Developmental Toxicology, NIH, NIEHS.

Honors and Other Scientific Recognition:

1976	Elected Member of Tri-Beta Honorary Biological Society, Hood College
1981	Awarded Tom Slick Graduate Research Fellowship, Texas A and M University
1984	Awarded Endocrine Society Travel Grant for International Congress of Endocrinology, Quebec, Canada
1985	Awarded Endocrine Society Travel Grant for 67th Annual Meeting of the Endocrine Society, Baltimore, Maryland
1986	Selected Speaker, Fogarty International Seminar, National Institutes of Health, Bethesda, MD.
1986	Awarded Travel Grant for First International Congress of Neuroendocrinology, San Francisco, CA.
1987	Awarded Travel Grant for Second World Congress of Neuroscience, Budapest, Hungary

Research Interests:

Neuroendocrine regulation of reproduction, pulsatile hormone secretion, suckling-lactation induced infertility, intracellular mediators of hormone action, intragonadal peptides.

Invited Lectures:

1986	Fogarty International Seminar, Washington, DC "Regulation of Pulsatile Pituitary Secretion"
1986	Tulane University School of Medicine, New Orleans, LA "New Concepts in Regulation of Pulsatile Hormone Secretion"
1987	Second World Congress of Neuroscience, Budapest, Hungary "Regulation of Pulsatile Gonadotropin Secretion"
1987	Peptidergic and Purinergic Neurons, Satellite Symposium of Second World Congress of Neuroscience, Pecs, Hungary. "Physiology and Processing of the Gonadotropin-Releasing Hormone Associated Peptide of the LHRH Precursor"

Committees:

1986-present	Computer Use Committee - NIEHS
1987-present	Radiation Safety Committee - NIEHS

Societies

1986	Elected Member Endocrine Society

BIBLIOGRAPHY

1. Culler, M. D., Bitman, J., Thompson, M. J., Robbins, W. E., and Dutky, S. R.: Mastitis: I. In vitro antimicrobial activity of alkyl amines against mastitic bacteria. J. Dairy Sci. 62: 584-595, 1979.

2. Culler, M. D., Bitman, J., Turck, F. A., Schultze, W. D., Thompson, M. J., and Robbins, W. E.: Mastitis: II. Evaluation of antimicrobial amines for use as teat dips. J. of Dairy Sci. 63: 95-100, 1980.

3. Turkelson, C. M., Arimura, A., Culler, M. D., Fishback, J. B., Groot, K., Kanda, M., Luciano, M., Thomas, C. R., Chang, D., Chang, J. K., and Shimizu, M.: In vivo and in vitro release of ACTH by synthetic CRF. Peptides 2: 425-429, 1981.

4. Culler, M. D., McArthur, N. H., Dees, W. L., Owens, R. E., and Harms, P. G.: Inhibition of the postovariectomy depletion of hypothalamic luteinizing hormone releasing hormone (LHRH) by suckling. Biol. Reprod. 26: 633-639, 1982.

5. Culler, M. D., McArthur, N. H., Dees, W. L., Owens, R. E., and Harms, P. G.: Immunocytochemical evidence that suckling inhibits the postovariectomy depletion of median eminence luteinzing hormone releasing hormone. Neuroendocrinology 34: 258-264, 1982.

6. Arimura, A., Culler, M. D., Turkelson, C. M., Luciano, M. G., Thomas, C. R., Obara, N., Groot, K., Rivier, J., and Vale, W.: In vitro pituitary hormone releasing activity of 40 residue human pancreatic tumor growth hormone releasing factor. Peptides 4: 107-110, 1983.

7. Dees, W. L., McArthur, N. H., Farr, K. L., Culler, M. D., and Harms, P. G.: Effects of ethanol on rat hypothalamic luteinizing hormone releasing hormone. A study utilizing radioimmunoassay. Biol. Reprod. 28: 1066-1070, 1983.

8. Culler, M. D., Turkelson, C. M., Thomas, C. R., and Arimura, A.: Arginine^8 vasopressin potentiates the β-endorphin-releasing activity of ovine corticotropin-releasing factor (oCRF) in vitro. Proc. Soc. Exp. Biol. Med. 173: 264-269, 1983.

9. Culler, M. D., Kenjo, T., Obara, N., and Arimura, A.: Stimulation of pituitary cAMP accumulation by human pancreatic GH-releasing factor-(1-44). Am. J. Physiol. 247 (Endocrinol. Metab. 10): E609-E615, 1984.

10. Culler, M. D. and Negro-Vilar, A.: Evidence that pulsatile follicle-stimulating hormone secretion is independent of endogenous luteinizing hormone-releasing hormone. Endocrinology 118: 609-612, 1986.

11. Culler, M. D., Fernandez, L. A., Tarlatzis, B. C., Lightman, A., DeCherney, A. H., Negro-Vilar, A., and Naftolin, F.: Angiotensin II-like immunoreactivity in human ovarian follicular fluid. J. Clin. Endocrinol. Metab. 62: 613-615, 1986.

12. Culler, M.D. and Negro-Vilar, A: Development of specific antisera and a radioimmunoassay procedure for the gonadotropin-releasing hormone associated peptide (GAP) of the LHRH prohormone. Brain Res. Bull. 17:219-223, 1986.

13. Sar, M., Culler, M. D., McGimsey, W. C. and Negro-Vilar, A.: Immunocytochemical localization of the gonadotropin-releasing hormone associated peptide of the LHRH precursor. Neuroendocrinology 45:172-175, 1987.

14. Lightman, A., Tarlatzis, B. C., Rzasa, P. J., Culler, M. D., Caride, V. J., Negro-Vilar, A. F., Lennard, D., Fernandez, L. A., DeCherney, A. H. and Naftolin, F.: The ovarian revin-angiotensin system: Revin-like activity and angiotensin II in gonadotropin stimulated and unstimulated human follicular fluid. Am. J. Obstet. Gynecol. 156:808-816, 1987.

15. Culler, M. D. and Negro-Vilar, A.: Pulsatile follicle-stimulating hormone secretion is independent of luteinizing hormone-releasing hormone (LHRH): Pulsatile replacement of LHRH bioactivity in LHRH-immunoneutralized rats. Endocrinology 120: 2011-2021, 1987.

BOOK CHAPTERS

1. Arimura, A., Culler, M. D., Matsumoto, K., Kanda, M., Itoh, Z., Murphy, W., Shively, J. E., and Palkovits, M.: Growth hormone releasing factors in the brain and gut: chemistry, actions, and localization. In Scott, D. E. and Sladek, J. R. Jr. (eds.): Brain-Endocrine Interaction Symposium V, Neuropeptides: Central and Peripheral. (Würzburg, West Germany). Fayetteville, New York, Ankho International Inc. Peptides 5 (Suppl. 1), 1984, pp. 41-44.

2. Arimura, A., Merchenthaler, I., Culler, M. D., and Iwasaki, K.: Distribution and release of GRF. In Labrie, F. and Proulx, L. (eds.): Endocrinology. Amsterdam, The Netherlands, Elsevier Science Publishers, B.V., 1984, pp. 827-830.

3. Arimura, A. and Culler, M. D.: Regulation of growth hormone secretion. In Imura, H. (ed.): The Pituitary Gland. New York, Raven Press, 1985, pp. 221-259.

4. Negro-Vilar, A. and Culler, M. D.: Computer-controlled perifusion system for neuroendocrine tissues: Development and applications. In Conn, P. M. (ed.): Hormone Action: Neuroendocrine Peptides, Part B; Methods in Enzymology. New York, Academic Press, Vol. 124, 1986, pp. 67-79.

5. Negro-Vilar, A., Culler, M. D., and Masotto, C.: Peptide-steroid interactions in brain regulation of pulsatile gonadotropin secretion. In Martini, L. and Sciarra, F. (eds.): Peptide-steroid Interactions; Proceedings of the XII International Study Group for Steroid Hormones (Rome, Italy). Oxford, Permagon Press. J. Steroid Biochem. 25: 741-747, 1986.

6. Tarlatzis, B. C., Culler, M.D., Lightman, A., Fernandez, L. A., Rzasa, P. J., Caride, V. J., DeCherney, A. H., Negro-Vilar, A., and Naftolin, F. The ovarian renin-angiotensin system. The Serona Symposium, Paris, 1986 (In Press).

7. Negro-Vilar, A., Culler, M. D., Valenca, M. M., Flack, T., and Wisniewski, G.: Pulsatile peptide secretion: Encoding of brain messages regulating endocrine and reproductive functions. Environmental Health Perspectives, 1987 (In Press).

8. Negro-Vilar, A., Valenca, M. M. and Culler, M. D.: Transmembrane signals and intracellular messengers mediating LHRH and LH secretion. In Mahesh, V. B., Anderson, E., Dhindsa, D., Kalra, S. (eds.) New York, Plenum Press, 1987 (In Press).

9. Culler, M. D., Wetsel, W. C., Valenca, M. M., Johnston, C. A., Masotto, C., Sar, M. and Negro-Vilar, A.: Orchidectomy induces temporal and regional changes in the synthesis and processing of the LHRH prohormone in the rat brain. In Mahesh, V. B., Anderson, E., Dhindsa, D., Kalra, S. (eds.) New York, Plenum Press, 1987 (In Press).

MANUSCRIPTS SUBMITTED

1. Turkelson, C. M., Thomas, C. R., Shibata, T., Culler, M. D., and Arimura, A.: Immunological and chromatographic properties of two testicular luteinizing hormone-releasing hormone-like substances. Endocrinology.

ABSTRACTS

1. Culler, M. D.: The effects of ultraviolet irradiation on the Euglena and Rotifers--a comparison. Abstracts from the Ninth National Science and Humanities Symposium, West Point, NY 9: 52, 1971.

2. Culler, M. D., Bitman, J., Thompson, J. H., and Robbins, W. E.: The antimicrobial activity of straight and branched chain alkyl amines against mastitic organisms. J. Am. Oil Chem. Soc. 55: 259A, 1978.

3. Bitman, J., Culler, M. D., Turck, P. A., Thompson, M. J., and Robbins, W. E.: Evaluation of antimicrobial amines for use as teat dips. J. Dairy Sci. (Supplement 1) 62: 125, 1979.

4. Culler, M. D., McArthur, N. H., Dees, W. L., Owens, R. E., and Harms, P. G.: Inhibition of postcastration depletion of median eminence LHRH by suckling. 63rd Annual Meeting of the Endocrine Society, Cincinnati, Ohio. Abstract #823, 1981.

5. Owens, R. E., Culler, M. D., Kraemer, D. C., Fleeger, J. L., and Harms, P. G.: Effect of ovariectomy and progesterone replacement on patterns of plasma luteinizing hormone (LH) in the bovine. 73rd Annual Meeting of the American Society of Animal Science, Raleigh, North Carolina. Abstract #564, 1981.

6. Paull, W. K., Scholer, J., Turkelson, C. M., Thomas, C. R., Fishback, J., Culler, M., and Arimura, A.: Alterations of the rat adenohypophysis following the administration of synthetic corticotropin releasing factor (CRF). Anat. Rec. 202: 146A, 1982.

7. Culler, M. D., Kenjo, T., and Obara, N.: Stimulation of cAMP accumulation in pituitary cell cultures by a human pancreatic tumor growth hormone releasing factor. 65th Annual Meeting of the Endocrine Society, San Antonio, Texas. Abstract #296, 1983.

8. Arimura, A., Matsumoto, K., Culler, M., Turkelson, C., Luciano, M., Obara, N., Kenjo, T., Thomas, R., Groot, K., Shibata, T., and Shively, J.: GH releasing factor (GHRF) in ovine brain and gut. 65th Annual Meeting of the Endocrine Society, San Antonio, Texas. Abstract #291, 1983.

9. Culler, M. D., Obara, N., and Arimura, A.: Ca^{++} involvement in hpGRF$_{44}$ stimulated GH release in vitro. 7th International Congress of Endocrinology, Quebec, Canada, Abstract #675, 1984.

10. Arimura, A., Merchenthaler, I., Iwasaki, K., Culler, M. D., Thomas, C. R., Kanda, M., and Palkovits, M.: Distribution and release of GRF. 7th International Congress of Endocrinology, Quebec, Canada, Abstract #S.166, 1984.

11. Culler, M. D. and Negro-Vilar, A.: Passive LHRH immunoneutralization suppresses pulsatile LH but not FSH secretion in the castrate male rat. 67th Annual Meeting of the Endocrine Society, Baltimore, MD. Abstract #788, 1985.

12. Tarlatzis, B. C., Culler, M. D., Lightman, A., Fernandez, L. A., Rzasa, P. J., Caride, V. J., DeCherney, A. H., Negro-Vilar, A. F., and Naftolin, F.: The ovarian renin-angiotensin system: Renin activity (RA) and angiotensin II (AII) in human follicular fluid. 4th World Conference on In Vitro Fertilization, Melbourne, Australia, 1985.

13. Lightman, A., Rzasa, P. J., Culler, M. D., Tarlatzis, B. C., Jones, C., Fernandez, L. A., DelValle, A., Caride, V. J., Negro-Vilar, A. F., DeCherney, A. H., Naftolin, F.: OVRAS: The ovarian renin-angiotensin system--biochemical, immunohistochemical, and tissue culture evidence. 1986 Annual Program for the Society for Gynecologic Investigation, Toronto, Canada, 1986.

14. Negro-Vilar, A., Culler, M. D., Johnston, C. A., Nikolics, K., Seeburg, P., Masotto, C., and Valenca, M. M.: Orchidectomy and hyperprolactinemia induce marked changes in hypothalamic and preoptic LHRH precursor levels. 68th Annual Meeting of the Endocrine Society, Anaheim, California, Abstract #476, 1986.

15. Naftolin, F., Lightman, A., Tarlatzis, B. C., Caride, V. J., Rzasa, P. J., Culler, M. D., Negro-Vilar, A. F., Jones, C., Ait-Aovane, A., DelValle, A., Ark, C., Fernandez, L., MacLusky, N. J., and DeCherney, A. H.: OVRAS: The ovarian renin-angiotensin system. Annual meeting of the American Gynecologic and Obstetrical Society, 1986.

16. Lightman, A., Jimenez, J. M., Culler, M. D., Rzasa, P. J., DelValle, A., Negro-Vilar, A. F., Caride, V. J., DeCherney, A. H., and Naftolin, F.: Pulsatile stimulation of perifused rat ovaries: secretion of reinin activity (RA), angiotensin II-immunoreactivity (AII), estradiol (E_2) and progesterone (P). 1986 Annual Meeting of the American Fertility Society/Canadian Fertility and Andrology Society, 1986.

17. Lightman, A., Rzasa, P. J., Culler, M. D., Tarlatzis, B. C., DeCherney, A. H. Caride, V. J., Negro-Vilar, A. F., Ark, C., Fernandez, L. A., Russell, J. B., and Naftolin, F.: Gonadotrophins stimulate renin-like activity and angiotensin II immunoreactivity in ovarian follicular fluid. 1986 Annual Meeting of the American Fertility Society/Canadian Fertility and Andrology Society, 1986.

18. Culler, M. D. and Negro-Vilar, A.: Pulsatile FSH secretion is independent of LHRH. 1st International Congress of Neuroendocrinology, San Francisco, Abstract #10, 1986.

19. Culler, M. D., Valenca, M. M., Romanelli, F., and Negro-Vilar, A.: Computer-controlled perifusion: characterization for studies of pulsatile gonadotropin secretion. 16th Annual Meeting of Society for Neuroscience, Washington, D.C., Abstract #282.7, 1986.

20. Valenca, M. M., Culler, M. D., Romanelli, F., and Negro-Vilar, A.: Evaluation of the intracellular events leading to pulsatile LH secretion using computer-designed input signal and controlled perifusion. 16th Annual Meeting of the Society for Neuroscience, Washington, D.C., Abstract #282.8, 1986.

21. Johnston, C. A., Wetsel, W. C., Culler, M. D., and Negro-Vilar, A.: Dynamic changes in LHRH and gonadotropin-releasing hormone associated peptide (GAP) in cell bodies, fibers and terminals during the estrous cycle of the rat. 16th Annual Meeting of the Society for Neuroscience, Washington, D.C., Abstract #5.10, 1986.

22. Wetsel, W. C., Johnston, C. A., Culler, M. D., and Negro-Vilar, A.: Regional changes in multiple molecular forms of the LHRH prohormone in rat brain. 20th Anniversary Celebration of the National Institute of Environmental Health Sciences, Research Triangle Park, NC. Abstract #56, 1987.

23. Culler, M. D., Valenca, M., Romanelli, F. and Negro-Vilar, A.: Computer-controlled perifusion: Studies of intracellular events leading to pulsatile hormone secretion. 20th Anniversary Celebration of the National Institute of Environmental Health Sciences, Research Triangle Park, NC. Abstract #55, 1986.

24. Negro-Vilar, A., Valenca, M., and Culler, M. D.: Transmembrane signals and intracellular messengers mediating LHRH and LH secretion. Gonadal Regulation Workshop: Regulation of Ovarian and Testicular Function, Augusta, GA. 1987.

25. Culler, M. D., Wetsel, W. C., Valenca, M. M., Johnston, C. A., Masotto, C., Sar, M. and Negro-Vilar, A.: Orchidectomy induces temporal and regional changes in the synthesis and processing of the LHRH prohormone in the rat brain. 68th Annual Meeting of the Endocrine Society, Augusta, Georgia, 1987.

26. Culler, M. D., Wetsel, W. C., Valenca, M. M., and Negro-Vilar, A.: Induction of temporal and regional changes in the processing of rat hypothalamic LHRH prohormone by castration. Second World Congress of Neuroscience, Budapest, Hungary (Submitted) 1987.

27. Culler, M. D., Valenca, M., Wetsel, W. C., Sar, M., Johnston, C. A., and Negro-Vilar, A.: Physiology and processing of the gonadotropin-releasing hormone associated peptide of the LHRH precursor. Peptidergic and Purinergic Neurons, Satellite Symposium of Second World Congress of Neuroscience, Pecs, Hungary, (Submitted) 1987.

28. Liposits, Z. S., Sievers, L., Paull, W. K., Lechan, R. M., Coen, C. W., Culler, M. D., Merchenthaler, I., and Jackson, I. M. D.: Monoamine and peptidergic innervation of chemically characterized hypophysiotropic neurons. Second World Congress of Neuroscience, Budapest, Hungary (Submitted) 1987.

29. Culler, M.D. and Negro-Vilar, A.: Regulation of pulsatile gonadotropin secretion. Second World Congress of Neuroscience, Budapest Hungary (Submitted), 1987.

30. Wetsel, W. C., Johnston, C. A., Culler, M. D., Nikolics, K. and Seeburg, P.: Different processed forms of the LHRH prohormone in rat brain. 69th Annual Meeting of the Endocrine Society, Indianapolis, IN (Submitted) 1987.

31. Merchenthaler, I., Culler, M. D., Negro-Vilar, A., and Flerko, B.: Comparative immunocytochemical studies with GAP and LHRH antisera. 69th Annual Meeting of the Endocrine Society, Indianapolis, IN (Submitted) 1987.

32. Wetsel, W. C., Valenca, M., Culler, M. D. and Negro-Vilar, A.: Gonadotropin-releasing hormone associated peptide (GAP) and luteinizing hormone releasing hormone (LHRH) are secreted as intact peptides from median eminence in response to different secretagogues in vitro. 17th Annual Meeting of the Society for Neuroscience, New Orleans, LA (Submitted) 1987.

33. Culler, M.D. and Negro-Vilar, A.: Development of specific antisera for quantitation of inhibin in biological fluids and for passive immunoneutralization. 17th Annual Meeting of the Society for Neuroscience, New Orleans, LA (Submitted) 1987.

MANUSCRIPTS IN PREPARATION

1. Culler, M.D., Valenca, M. M., and Negro-Vilar, A.: Effects of orchidectomy on the regional brain levels and ratios of LHRH and the gonadotropin-releasing hormone associated peptide (GAP) of the LHRH prohormone. Endocrinology

2. Merchenthaler, I., Culler, M. D., Negro-Vilar, A., Petrusz, P. and Flerko, B. Immunocytochemical localization of the gonadotropin-releasing hormone-associated peptide portion of the LHRH precursor in the rat brain.

3. Merchenthaler, I., Culler, M. D., Negro-Vilar, A. and Flerko, B. Local changes in immunoreactive LHRH and gonadotropin releasing hormone associated peptide portion of the LHRH prohormone in the rat brain during the estrous cycle. Endocrinology.

4. Merchenthaler, I., Culler, M. D., Negro-Vilar, A., and Flerko, B. The effect of ovariectomy and orchidectomy on LHRH and the gonadotropin releasing hormone associated peptide portion of the LHRH precursor: an immunocytochemical study. Endocrinology.

5. Block, B., Gaillard, R., Culler, M. D., Negro-Vilar, A., and Bugnon, C. Immunohistochemical detection of gonadotropin releasing hormone associated peptide in LHRH neurons in the human adult and fetal hypothalamus. J. Clin. Endo. Metab.

6. Leposits, Z. S., Culler, M. D., Negro-Vilar, A. Ultrastructural analysis of the gonadotropin-releasing hormone associated peptide (GAP) of the LHRH precursor in the neuronal structures of the rat brain. J. Cell Tiss. Res.

STATEMENT OF TRAINING
AND EXPERIENCE FOR USE OF
HAZARDOUS CHEMICALS, RADIOISOTOPES, OR BIOLOGICAL AGENTS

NAME Louis W Crompton, Jr

LABORATORY/BRANCH OFE BLDG./ROOM 102 EXT. 3765

CIRCLE HIGHEST ATTAINED ACADEMIC DEGREE

High School Technical School B.S. (M.S.) Ph.D /M.D./D.V.M.

ACADEMIC, GENERAL, OR SPECIALIZED TRAINING IN LABORATORY SAFETY, SAFE HANDLING OF HAZARDOUS COMPOUNDS, RADIATION SAFETY, USE OF RADIOISOTOPES, BIOHAZARD SAFETY, ETC.

COURSE TITLE	INSTITUTION/LOCATION	DATE
Introduction to Radiation Safety	NIEHS	Sep. 17-19, 1986

EXPERIENCE IN HANDLING HAZARDOUS COMPOUNDS/RADIOISOTOPES/BIOLOGICAL AGENTS

DATE	AGENT/ COMPOUND/RADIOISOTOPE	ACTIVITY (mCi)	TYPE OF STUDY	INSTITUTION/ LOCATION
None - I work in facilities engineering.				

CURRICULUM VITAE

Name: Louis W. Crompton, Jr.

Date of Birth: August 24, 1942

Citizenship: United States of America

Marital Status: Married with Children

Education:

1964 - B.S. (Mechanical Engineering)
New Jersey Institute of Technology
1972 - M.S. (Engineering Management)
University of Southern California

Licenses: Current registration as Professional Engineer in Wisconsin.

Brief Chronology of Employment:

1964 - 1966 Construction Engineer, Kemper Group, Mid-Atlantic States
1966 - 1976 Mechanical Engineer, U.S. Air Force (one tour Viet Nam)
1976 - 1978 Mechanical Engineer, Headquarters Eighth Army, Seoul, Korea
1978 - 1980 Program Manager, Navy Officer In Charge of Construction - Far East, Yokosuka, Japan
1980 - 1985 Chief, Engineering Division, Director of Facilities Engineering, Fort McPherson, Atlanta, GA.
1986 - Date Chief, Engineering Design Section, Office of Facilities Engineering, National Institute of Environmental Health Sciences, Research Triangle Park, N.C.

Additional Employment:

Served in U.S. Air Force Reserve 1966 - 1987 as Engineer Officer. Selected as the Outstanding Officer Reservist of Calendar Year 1976. Retired as Lieutenant Colonel (O-5) in 1987.

Work Experience:

I have had extensive experience in design, construction, and renovation of administrative, industrial, and medical facilities.

STATEMENT OF TRAINING AND EXPERIENCE FOR USE OF HAZARDOUS CHEMICALS AND/OR RADIOISOTOPES

NAME Steve Reynolds

LABORATORY/BRANCH LBRA/BRAP BLDG./ROOM 101/C348 EXT. 2654

CIRCLE HIGHEST ATTAINED ACADEMIC DEGREE

High School Technical School B.S. M.S. (Ph.D.)/M.D./D.V.M.

ACADEMIC, GENERAL, OR SPECIALIZED TRAINING IN LABORATORY SAFETY, SAFE HANDLING OF HAZARDOUS COMPOUNDS, RADIATION SAFETY, USE OF RADIOISOTOPES, ETC.

COURSE TITLE	INSTITUTION/LOCATION	DATE
Radiation Safety	NCI, NIH Bethesda , MD	March 6, 1984
The Laboratory		

EXPERIENCE IN HANDLING HAZARDOUS COMPOUNDS/RADIOISOTOPES

DATE	COMPOUND/RADIOISOTOPE	ACTIVITY (mCi)	TYPE OF STUDY	INSTITUTION LOCATION
74/76	^{35}S-Methionine	1mCi	Protein Synthesis	University of Nebraska Lincoln, Nebraska
77/81	$^{32}PO_4$, ^{14}C-leucine, ^{35}S-Methionine	^{35}S-1mCi, ^{14}C-0.1 mCi ^{32}p 10 mCi	RNA Protein Syn.	UNC Chapel Hill
82/83	32P-dCTP, ^{32}P-dATP ^{35}S-Methionine	^{35}S 1mCi ^{32}P 0.2 mCi	Protein Synthesis DNA/RNA Hybridization	Fred Hutchinson Cancer Ct Seattle, Washington
83/85	32P-dCTP, ^{3}H-Palmitic Acid 35S-Methionine	^{32}P 1mCi, ^{3}H 50mCi ^{35}S 30 mCi	Protein Synthesis DNA/RNA Hybridization	NCI, NIH
85/87	32P-dCTP ^{14}C-Amino Acids 35S-Methionine	32P 1 mCi 14C 0.1mCi 35S 30mCi	Protein Synthesis DNA Hybridization	NIEHS

CURRICULUM VITAE

Name: Steven H. Reynolds

Date and Place of Birth: July 5, 1952/Eden, North Carolina

Citizenship: United States

Marital Status: Married, 1983; One Child

Education:

1974	B.A. (Chemistry) Appalachian State University
1976	M.S. (Chemistry) University of Nebraska, Lincoln
1981	Ph.D. (Biochemistry) University of North Carolina (Thesis: Stable RNA Synthesis in A Mutant Strain of *Escherichia coli*)

Brief Chronology of Employment:

1974 - 1976	Graduate Student, Department of Chemistry, University of Nebraska, Lincoln, Nebraska.
1977 - 1981	Graduate Student, Department of Biochemistry, University of North Carolina, Chapel Hill, North Carolina.
1981 - 1983	National Research Service Fellowship (Postdoctoral) Tumor Virology, Fred Hutchinson Cancer Research Center, Seattle, Washington.
1983 - 1985	Staff Fellow, Laboratory of Cellular and Molecular Biology, National Cancer Institute, National Institutes of Health, Bethesda, Maryland.
1985 - DATE	Senior Staff Fellow, Laboratory of Biochemical Risk Analysis, Biometry and Risk Assessment Program, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.

Research Interests:

Nucleic acids, cell growth and regulation, RNA and protein synthesis, transforming retroviruses.

Honors and Other Special Scientific Recognition:

Phi Lambda Upsilon National Chemistry Honorary

Trainee Fellowship, Public Health Service
National Research Service Award

Invited Speaker:

U.S. - Japan Co-operative Cancer Research Meetings, 1985

Exhibits:

"Effects of Carbon Source on MS1 Metabolism in a Mutant Strain of E. coli", S.H. Reynolds and S.G. Chaney, XIth International Congress of Biochemistry, July 1979.

"Stable RNA Synthesis in a Mutant of E. coli", S.H. Reynolds and S.G. Chaney, American Society of Biological Chemists, June 1980.

"Fibronectin Gene Expression in Chick Embryo Fibroblasts Transformed by Partial Transformation Mutants of Rous Sarcoma Virus", S.H. Reynolds and L.R. Rohrschneider, The Cancer Cell (Cold Spring Harbor Laboratory), September 1983.

Abstracts of Presentations at National and International Meetings

1. Ras Gene Activation in Spontaneous Mouse Hepatocellular Tumors. S. H. Reynolds, S. J. Stowers, M. W. Anderson, R. R. Maronpot and S. A. Aaronson. J. Cell. Biochem. Abstract #1206, Supplement 9C, 1985.

2. Activation of the K-ras Oncogene in Chemically-Induced Rat Lung Tumors. S. J. Stowers, S. H. Reynolds, M. W. Anderson, R. R. Maronpot and S. A. Aaronson: J. Cell. Biochem. Abstract #1212, Supplement 9C, 1985.

3. Ras Gene Activation in Rat Tumors Induced by Various Benzidine Derived Dyes. S. H. Reynolds, R. M. Maronpot, J. H. Mennear, S. A. Aaronson and M. W. Anderson. J. Cell. Biochem. Abstract #1958, Supplement 10A, 1986.

PUBLICATIONS

1. Majumdar, A., Reynolds, S., and Gupta, N. K.: Protein synthesis in rabbit reticulocytes XIII: Lack of messenger RNA (poly R(A)) binding activity in highly purified EIF-1. Bioc. Biop. Res. Comm. 67: 689-695, 1975.

2. Reynolds, S. H., DasGupta, A., Palmieri, S., Majumdar, A., and Gupta, N. K.: Protein synthesis initiation in eukaryotic cells: A comparative study of the mechanism of peptide chain initiation using cell free systems from mouse ascites tumor cells and rabbit reticulocytes. Arch. Bioch. and Biophys. 184: 328-335, 1977.

3. Willingham, W., Stafford, E., Reynolds, S. H., and Chaney, S. G.: Mechanism of eukaryotic protein synthesis inhibition by the antitumor drug brusatol. Biochem. Biophys. Acta. 654: 169-174, 1981.

4. Reynolds, S. H. and Chaney, S. G.: Carbon source transport, nucleotide levels, and stable RNA synthesis in a mutant strain of Escherichia coli. Arch. Bioch. and Biophys. 221: 548-556, 1983.

5. Reynolds, S. H., Brantley, C. K., Harris, J. S., and Chaney, S. G.: Guanosine 5'-diphosphate 3'-diphosphate levels, carbon source, and ribonucleic acid synthesis in a mutant strain of Escherichia coli. Biochemistry. 22: 1123-1128, 1983.

6. Srivastava, S. K., Yuasa, Y., Reynolds, S. H., and Aaronson, S. A.: Effects of two major activating lesions on the structure and conformation of human ras oncogene products. Proc. Natl. Acad. Sci. USA 82: 38-42, 1985.

7. Srivastava, S. K., Lacal, J. C., Reynolds, S. H., and Aaronson, S. A.: Antibody of predetermined specificity to a carboxy-terminal region of H-ras gene products inhibits their guanine nucleotide-binding function. Mol. Cell. Biol. 5: 3316-3319, 1985.

8. Rohrschneider, L. R. and Reynolds, S. H.: Regulation of cellular morphology by the Rous Sarcoma Virus src gene: Analysis of fusiform mutants. Mol. Cell. Biol. 5: 3097-3107, 1985.

9. Reynolds, S. H., Stowers, S. J., Maronpot, R. R., Anderson, M. W., and Aaronson, S. A.: Detection and identification of activated oncogenes in spontaneously occurring benign and malignant hepatocellular tumors of the B6C3F1 mouse. Proc. Natl. Acad. Sci. USA 83: 33-37, 1986.

10. Reynolds, S. H., Stowers, S. J., Patterson, R. M., Maronpot, R. R., Aaronson, S. A., and Anderson, M. W.: Activated oncongenes in B6C3F1 mouse liver tumors: Implications for risk assessment. Science, in press.

11. Stowers, S. J., Glover, P. L., Reynolds, S. H., Boone, L. L., Maronpot, R. R., and Anderson, M. W.: Activation of the K-ras oncogene in lung tumors from rats and mice chronically exposed to tetranitromethane. Cancer Res. 47: 3212-3219, 1987.

12. Harper, J. R., Reynolds, S. H., Greenhalgh, D. A., Lacal, J. C., and Yuspa, S. H.: Analysis of the H-ras oncogene and its p21 product in chemically-induced skin tumors and tumor derived cell lines. Carcinogenesis, submitted.

13. Fujita, J., Park, J. B., Srivastava, S. K., Reynolds, S. H., and Rhim, J. S.: Analysis of p21 ras proteins to detect mutationally activated ras oncogenes in human tumors. Cancer Res., submitted.

14. Fujita, J., Reynolds, S. H., and Aaronson, S. A.: Molecular and histochemical analysis of ras oncogene activation in chemically-induced rat bladder tumors. J. Natl. Cancer Inst., submitted.

15. Reynolds, S. H., Patterson, R. M., Maronpot, R. R., and Anderson, M. W.: Ras oncogene activation in a variety of rat tumors induced by benzidine dyes. In preparation.

STATEMENT OF TRAINING AND EXPERIENCE FOR USE OF
HAZARDOUS CHEMICALS, RADIOISOTOPES, OR BIOLOGICAL AGENTS

NAME Linda S. Birnbaum SUPERVISOR Dr. H.B. Matthews

LABORATORY/BRANCH STB/DTRT BLDG./ROOM 101/C352A EXT. 3583

HIGHEST ATTAINED ACADEMIC DEGREE (CIRCLE ONE)

High School Technical School B.S. M.S. Ph.D./M.D./D.V.M.

EMPLOYMENT STATUS (CIRCLE ONE)

(Research Scientist)
Visiting Associate
Visiting Fellow
Stay-in-Schooler
Visiting Scientist
Staff Fellow
Senior Staff Fellow
Graduate Student
(P or Q Appointment)
Expert
Guest Worker/Research
Technician
IPA

YEARS OF LABORATORY EXPERIENCE PAST ACADEMIC TRAINING

GENERAL, OR SPECIALIZED TRAINING IN LABORATORY SAFETY, SAFE HANDLING OF HAZARDOUS COMPOUNDS, RADIATION SAFETY, USE OF RADIOISOTOPES, BIOHAZARD SAFETY, ETC.

COURSE TITLE	INSTITUTION/LOCATION	DATE
Chemical Safety Course	NIEHS	1982
Biochemical Techniques	Univ. of Illinois, Urbana	1969
Introductory Biochemistry	Univ. of Illinois, Urbana	1967-68
Individual training with Radiation Safety Officer	Univ. of Illinois, Urbana	1969

EXPERIENCE IN HANDLING HAZARDOUS COMPOUNDS/RADIOISOTOPES/BIOLOGICAL AGENTS

DATE	AGENT/ COMPOUND/RADIOISOTOPE	AMOUNT/(G/mg) ACTIVITY (mCi)	TYPE OF STUDY	INSTITUTION/ LOCATION
1968-72	^{3}H, ^{32}P, ^{14}C basis, free acids, amino acids	50	In vitro RNA synthesis, enzyme assays	U. of Illinois
1973-74	^{3}H, ^{14}C	5	Enzyme assays, in vitro protein synthesis, DNA labeling	U. of Mass.
1975-79	^{3}H, ^{14}C styrene oxide, benzpyrene PCB's, etc.	1	Metabolism	Masonic Res. Lab Utica, NY
1979-present	^{3}H, ^{14}C TCDD, TCF, PCB's, etc.	1	Metabolism and distribution	NIEHS
1987-present	I^{125}-proteins	1	Receptor studies	NIEHS

CURRICULUM VITAE

Name: Linda S. Birnbaum

Data and Place of Birth: December 21, 1946, Passaic, New Jersey

Citizenship: United State

Marital Status: Married 1967, three children

Education:

June 1967 - B.S. (Biology) University of Rochester, Rochester, NY
June 1969 - M.S. (Microbiology) University of Illinois, Urbana,IL
Feb. 1972 - Ph.D. (Microbiology, Biochemistry minor) University of Illinois (Thesis: Localization, Enrichment, and in vitro Transcription of Ribosomal RNA genes in Escherichia coli)

Brief Chronology of Employment:

1972	Visiting Assistant Professor of Microbiology at University of Illinois
1973 - 1974	Postdoctoral work at University of Massachusetts, Amherst, Mass. (Biochemistry)
1974 - 1975	Assistant Professor of Science at Kirkland (Hamilton) College, Clinton, New York
1975 - 1976	Research Associate, Masonic Medical Research Lab., Utica, N. Y.
1976 - 1978	Research Fellow, Masonic Medical Research Laboratory Utica, N. Y.
1978 - 1979	Research Scientist, Masonic Medical Research Laboratory, Utica, N.Y.
1979 - 1980	Senior Staff Fellow, National Toxicology Program, National Cancer Institute, Research Triangle Park, NC
1980 - 1987	Research Microbiologist, National Toxicology Program, NIEHS, Research Triangle Park, NC
1987 - Date	Supervisory Research Microbiologist, National Toxicology Program, NIEHS, Research Triangle Park, NC

Societies:

Society of Toxicology
American Society for Pharmacology and Experimental Therapeutics
International Union of Pharmacology, Section on Toxicology
North Carolina Chapter, Society of Toxicology
American Aging Association
Gerontological Society
American Association for the Advancement of Science
Phi Beta Kappa
Phi Kappa Phi
Sigma Xi

Awards:

NIH Predoctoral Traineeship (1967-1972)
Sigma Xi Award, University of Illinois (1971)
Damon Runyon Foundation Postdoctoral Fellowship (1973-1974)
Mellon Foundation Research Grant (1974-1975)
National Research Service Award (1976-1978)
Career Employment and Training Award (1978-1979)
Young Investigator Grant - N.I.A. (1979)
Diplomate, American Board of Toxicology (1982)

Other Activities:

1976	Adjunct Professor, Genetics, State University College of Technology, Utica, NY
1977 - 1979	Chairperson, Guest Speaker Program at Masonic Medical Research Laboratory
1978 - 1979	Consultant, Syracuse Research Corporation (detection of carcinogens as mutagens)
1979 - 1983	Member, Executive Board, American Aging Association
1980 - 1981	Vice President, American Aging Association
1980 - 1982	Adjunct Assistant Professor, Department of Environmental Science, School of Public Health, University of North Carolina
1982 - Date	Adjunct Associate Professor, Department of Environmental Science, School of Public Health, University of North Carolina
1983 - Date	Curriculum in Toxicology, University of North Carolina
1985 - Date	Editorial Board, AGE

Invited Speaker:

Duke University (1982); University of Buffalo (1983); Rutgers University (1984); EPA (Washington, DC, 1985); University of Arizona (1985); Duke VA (1986); University of Nebraska (1986); CIIT (1987). Texas A&M University (1987); St. Johns University (1987); Veterans Administration Medical Center, St. Louis (1987)

Invited Symposium/Workshop Participant:

Liver and Aging, II (Japan, 1982); SOT (Atlanta, 1984); Organizer, Annual symposium, American Aging Association (1984); Butadiene ISSRP workshop (1985); Toxicity and Aging Workshop (EPA/NIA, 1985); Gerontology Society (New Orleans, 1985); Strain Selection for Carcinogenesis (NIEHS, 1985); Gerontology Society (Chicago, 1986).

Major Committee Responsibilities:

TRTP Promotion Committee (1984-present)
NIEHS Radiation Safety Committee (1985-present)
Mouse Strains for Carcinogensis Studies (1985)

NIEHS Research Support Subcommittee (1986)
NIEHS Laboratory Casework Committee (1986 - present)
Judge, SOT Mechanism Section Graduate Student Awards (1985,1986)
Treasurer, NC SOT (1986-present)
NAS Committee on Chemical Toxicity and Aging (1986-present)

Reviewer

Grant Proposals for FDA, EPA, NSF, March of Dimes.
Health Criteria Documents for EPA, NAS.

Referee For:

Toxicology and Applied Pharmacology, Biochemical Pharmacology, Life Sciences, AGE, Science, Proc. Soc. Exp. Biol. Med., J. Physiol., Exp. Gerontol., Environmental Health Perspectives, Environmental Toxicology and Chemistry.

BIBLIOGRAPHY

1. Birnbaum, L. S. and Kaplan S.: Localization of a portion of the ribosomal RNA genes in Escherichia coli. Proc. Nat. Acad. Sci. USA 68:925-929, 1971.

2. Unger, M., Birnbaum, L. S, Kaplan, S., and Pfister, A.: Location of the ribosomal RNA cistrons of Escherichia coli: A second site. Mol. Gen. Genet. 119:377-380, 1972.

3. Birnbaum, L. S. and Kaplan, S.: In vitro synthesis of Escherichia coli ribosomal RNA. J. Mol. Biol. 75:73-81, 1973.

4. Baird, M. B., Birnbaum, L. S., Samis, H. V., Massie, H. R., and Zimmerman, J.: Allylisopropylacetamide preferentially interacts with the phenobarbital-inducible form of rat hepatic microsomal P_{450}. Biochem. Pharmacol. 25:2415-2417, 1976.

5. Birnbaum, L. S., Baird, M. B., Massie, H. R.: Pregnenolone-16α-carbonitrile-inducible Cytochrome P_{450} in rat liver. Res. Commun. Chem. Path. Pharmacol. 15:553-562, 1976.

6. Baird, M. B., Massie, H. R., and Birnbaum, L. S.: Presence of a high-molecular-weight form of catalase in enzyme purified from mouse liver. Biochem. J. 163:449-453, 1977.

7. Birnbaum, L. S. and Baird, M. B.: Induction of hepatic mixed function oxidases in senescent rodents. Exp. Geront. 13:299-303, 1978.

8. Birnbaum, L. S. and Baird, M. B.: Induction of hepatic mixed function oxidases in senescent rodents, II. Effects of polychlorinated biphenyls. Exp. Gerontol. 13: 469-477, 1978.

9. Birnbaum, L. S. and Baird, M. B.: Differences in the senescent changes in hepatic epoxide metabolism in rats and mice. Chem.-Biol. Interactions 26:245-256, 1979.

10. Baird, M. B. and Birnbaum, L. S.: Inhibition of 2-fluorenamine-induced mutagenesis in Salmonella typhimurium by vitamin A. J. Natl. Cancer Inst. 63: 1093-1096, 1979.

11. Baird, M. B. and Birnbaum, L. S.: Increased production of mutagenic metabolites of carcinogens by tissues from senescent rodents. Cancer Res. 39:4752-4755, 1979.

12. Ambrecht, H. J., Birnbaum, L. S., Zenser, T. V., Mattammal, M. B., and Davis, B. B.: Renal Cytochrome P_{450}'s - Electrophoresis and Election Paramagnetic Resonance Studies. Arch. Biochem. Biophys. 197:277-284, 1979.

BIBLIOGRAPHY (Cont'd)

13. Baird, M. B., Birnbaum, L. S., and Sfeir, G. T.: NADPH-dependent lipid peroxidation in rat liver nuclei and nuclear membranes. Arch. Biochem. Biophys. 200:108-115, 1980.

14. Birnbaum, L. S., Decad, G. M., and Matthews, H. B.: Disposition and excretion of 2,3,7,8-tetrachlorodibenzofuran in the rat. Toxicol. Appl. Pharmacol. 55: 342-352, 1980.

15. Birnbaum, L. S.: Altered hepatic drug metabolism in senescent mice. Exp. Geront. 259-267, 1980.

16. Decad, G. M., Birnbaum, L. S., and Matthews, H. B.: 2,3,7,8-Tetrachlorodibenzofuran tissue distribution and excretion in guinea pigs. Toxicol. Appl. Pharmacol. 57:231-240, 1981.

17. Birnbaum, L. S., Decad, G. M., Matthews, H. B., and McConnell, E.E.: Fate of 2,3,7,8-tetrachlorodibenzofuran in the monkey. Toxicol. Appl. Pharmacol. 57: 189-196, 1981.

18. Decad, G. M. and Birnbaum, L. S.: Noninvasive technique for intravenous injection of guinea pigs. Lab. An. Sci. 31: 85-87, 1981.

19. Decad, G. M., Birnbaum, L. S., and Matthews, H. B.: Distribution and excretion of 2,3,7,8-tetrachlorodibenzofuran in C57BL/6J and DBA/2J mice. Toxicol. Appl. Pharmacol. 59: 564-573, 1981.

20. Armbrecht, H. J., Birnbaum, L. S., Zenser, T. U., and Davis, B. B.: Changes in Hepatic microsomal membrane fluidity with age. Exp. Geront. 17:41-48, 1982.

21. Decad, G. M., Birnbaum, L. S., and Matthews, H. B.: Disposition of 2,3,7,8-tetrachlorodibenzofuran in guinea pigs, rats, and monkeys. Chlorinated Dioxins and Related Compounds: Impact on the Environment, O. Hutzinger (ed.), Pergamon Press, Oxford and New York, 1982, pp. 307-315.

22. Robertson, I. and Birnbaum, L. S.: Age-related changes in mutagen activation by rat tissues. Chem.-Biol. Interactions. 38:243-252, 1982.

23. Birnbaum, L. S.: Changes in the disposition of two hexachlorobiphenyls in senescent rats. In. 2nd Tokyo Symposium, Liver and Aging, 1982: Liver and Drugs, K. Kitani (ed.). Elsevier Press, Amsterdam, 1982, pp. 99-113.

24. Matthews, H. B. and Birnbaum, L. S.: Factors affecting the disposition and persistence of halogenated furans and dioxins. In. Human and Environmental Risks of Chlorinated Dioxins and Related Compounds, R. E. Tucker, A. L. Young, and A. P. Gray (eds.), Plenum Publish. Corp., NY, 1983, pp. 463-475.

BIBLIOGRAPHY (Cont'd)

25. King, F. G., Dedrick, R. L., Collins, J. M., Matthews, H. B. and Birnbaum, L. S.: Physiological Model for the Pharmacokinetics of 2,3,7,8-Tetrachlorodibenzofuran in Several Species. Toxicol. Appl. Pharmacol. 67: 390-400, 1983.

26. Birnbaum, L. S.: Distribution and Excretion of 2,3,6,2',3',6'- and 2,4,5,2',4',5'-Hexachlorobiphenyl in Senescent Rats. Toxicol. Appl. Pharmacol. 70: 262-272, 1983.

27. Birnbaum, L. S., Darcey, D. J. and McKinney, J. D.: Hexabromonapthalene contaminants in polybrominated biphenyls: Chemical composition and disposition in the rat. J. Toxicol. Env. Health. 12:555-573, 1983.

28. Ioannou, Y. M., Birnbaum, L. S., and Matthews, H. B.: Chronic toxicity and disposition of 2,3,7,8-tetrachlorodibenzofuran in male guinea pigs. J. Toxicol. Env. Health. 12:541-553, 1983.

29. Birnbaum, L. S., Eastin, W. C., Jr., Johnson, L., and Matthews, H.B.: Disposition of 4,4'-Thio-bis-(6-t-butyl-m-cresol) in rats. Drug Metab. Dispos. 11:537-543, 1983.

30. Dieter, M., Wilson, R. and Birnbaum, L.S.: Age-related changes in glucose metabolizing enzymes in spleen, thymus, and pulmonary macrophages of F344 rats. Mech. Ageing Devpt. 26:253-264, 1984.

31. Medinsky, M. A., Bond, J.A., Dutcher, J. S. and Birnbaum, L. S.: Disposition of ^{14}C-2,3-dichloropropene in Fischer-344 rats after oral or intraperitoneal administration. Tox. Letts. 23:119-125, 1984.

32. Medinsky, M. A. Bond, J. A., Dutcher, J. S., and Birnbaum, L. S.: Disposition of ^{14}C-methyl bromide in Fischer-344 rats after oral or intraperitoneal administration. Toxicology. 32:187-196, 1984.

33. McKinney, J. D., Chae, K., McConnell, E. E. and Birnbaum, L. S.: Structure-induction versus structure-toxicity relationships for polychlorinated biphenyls and related aromatic hydrocarbons. Environmental Health Perspectives. 60:57-68, 1985.

34. Birnbaum, L. S.: The role of structure in the disposition of halogenated aromatic xenobiotics. Environ. Health Perspectives. 61: 11-20, 1985.

35. Birnbaum, L. S. and Johnson, L.· Disposition of benzo(f)quinoline in male rats. Drug Metab. Dispos. 13:18-24, 1985.

BIBLIOGRAPHY (Cont'd)

36. Borghoff, S. J. and Birnbaum, L. S.: Age-related changes in glucuronidation and deglucuronidation in liver, small intestine, lung, and kidney of male Fischer rats. Drug Metab. Dispos. 13:62-67, 1985.

37. Birnbaum, L. S., Weber, H., Harris, M. W., Lamb, J. C. and McKinney, J. D.: Toxic interaction of specific polychlorinated biphenyls and 2,3,7,8-tetrachlorodibenzo-p-dioxin: Increased incidence of cleft palate in mice. Toxicol. Appl. Pharmacol. 77:292-302, 1985.

38. Birnbaum, L. S. and McKinney, J. D.: A persistent hexabromonapthalene isomer is 2,3,4,5,6,7-hexabromonapthalene. J. Toxicol. Env. Health. 16:219-227, 1985.

39. Bond, J. A., Medinsky, M. A., Dutcher, J. S., Henderson, R. F., Cheng, Y. S., Mewhinney, J. A., and Birnbaum, L. S.: Disposition and metabolism of ^{14}C-2,3,-dichloropropene in rats after inhalation. Toxicol. Appl. Pharmacol. 78:47-54, 1985.

40. Dutcher, J. S., Medinsky, M. A., Bond, J. A., Cheng, Y. S., Snipes, M. B., Henderson, R. F., and Birnbuam, L. S.: Effect of vapor concentration on the disposition of inhaled 2,3-dichloropropene in Fischer-344 rats. Fund. Appl. Toxicol. 5:997-1005, 1985

41. Bond, J. A., Dutcher, J. S., Medinsky, M. A., Henderson, R. F., Cheng, Y. S., Mewhinney, J. A., and Birnbaum, L. S.: Disposition of ^{14}C-methyl bromide in rats after inhalation. Toxicol. Appl. Pharmacol. 78:259-267, 1985.

42. Medinsky, M. A., Dutcher, J. S., Bond, J. A., Henderson, R. F., Mauderly, J. L., Snipes, M. B., Mewhinney, J. A., Cheng, Y. S., and Birnbaum, L. S.: Uptake and excretion of ^{14}C-methyl bromide as influenced by exposure concentration. Toxicol. Appl. Pharmacol. 78:215-225, 1985.

43. Weber, H., Harris, M. W., Haseman, J. K., and Birnbaum, L. S.: Teratogenic potency of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), 2,3,7,8-tetrachlorodibenzofuran (TCDF), and TCDD-TCDF combinations in C57BL/6N mice. Tox. Letts. 26:159-167, 1985.

44. Weber, H. and Birnbaum, L. S.: 2,3,7,8-Tetrachlorodibenzo-p-dioxin and 2,3,7,8-tetrachlorodibenzofuran in pregnant C57BL/6N mice: Distribution to the embryo and excretion. Arch. Toxicol. 57:159-162, 1985.

45. Birnbaum, L. S.: Distribution and excretion of 2,3,7,8-tetrachlorobenzo-p-dioxin in congenic strains of mice which differ at the Ah locus. Drug Metab. Dispos., 14:34-40, 1986.

BIBLIOGRAPHY (Cont'd)

46. Kao, L. R., Goldstein, J., and Birnbaum, L. S.: The effect of o-benzyl-p-chlorophenol on drug metabolizing enzymes in rats. Biochem. Pharmacol., 35:613-620, 1986.

47. Birnbaum, L. S., Harris, M. W., Miller, C. P., Pratt, R. M., and Lamb, J. C.: Synergistic interaction of 2,3,7,8-tetrachlorodibenzo-p-dioxin and hydrocortisone in the induction of cleft palate in mice. Teratology, 33:29-35,1986.

48. Kao, L. R. and Birnbaum, L. S.: Disposition of o-benzyl-p-chlorophenol in male rats. J. Toxicol. Environ. Health, 18:441-458, 1986.

49. Lamb, J. C., Harris, M. W., McKinney, J. D., and Birnbaum, L. S.: Interaction of 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) with thyroid hormones in the induction of cleft palate in C57BL/6N mice. Toxicol. Appl. Pharmacol. 84:115-124, 1986.

50. Bond, J.A., Dahl, A.R., Henderson, R.F., Dutcher, J.S., Mauderly, J.L., and Birnbaum, L.S.: Species differences in the disposition and metabolism of inhaled butadiene. Toxicol. Appl. Pharmacol. 84:617-627, 1986.

51. Borghoff, S. J. and Birnbaum, L. S.: Age-related changes in the metabolism and excretion of allylisothiocyanate: A model compound for glutathione conjugation. Drug Metab. and Disp. 14:417-422, 1986.

52. Miller, C. P. and Birnbaum, L. S.: Teratologic evaluation of hexabrominated napthalenes in C57BL/6N mice. Fund. Appl. Toxicol. 7:398-405, 1986.

53. Birnbaum, L.S., Deskin, R., Grumbein, S.L., Kurtz, P., Fowler, K.L., and Peters, A.C.: Prechronic Toxicity of o-Benzyl-p-chlorophenol in Rats and Mice. Fund. Appl. Toxicol. 7:615-625, 1986.

54. Shopp, G. M., Cheng, Y. S., Gillett, N. A., Bechtold, W. E., Medinsky, M. A., Hobbs, C. H., Birnbaum, L. S., and Mauderly, J. L.: Acute Inhalation Exposure of Azodicarbonamide in the Guinea Pig. Am. Industrial Hygiene Assoc. J. 48:127-132, 1987.

55. Birnbaum, L. S.: Age-related changes in carcinogen metabolism. J. Am. Geriatric Soc. 35:51-60, 1987.

56. Mewhinney, J. A., Ayres, P. H., Bechtold, W. E., Dutcher, J. S., Cheng, Y. S., Bond, J. A., Medinsky, M. A., Henderson, R. F., and Birnbaum, L. S.: The Fate of Inhaled Azodicarbonamide in Rats. Fund. Appl. Toxicol. 8:372-381, 1987.

BIBLIOGRAPHY (Cont'd)

57. Sabourin, P. J., Chen, T.-H., Lucier, G., Birnbaum, L. S., Fisher, E., and Henderson, R. F.: Effect of dose on the absorption and excretion of ^{14}C-benzene administered orally or by inhalation in rats and mice. Toxicology Appl. Pharmacol. 87:325-336, 1987.

58. Abbott, B. D., Birnbaum, L. S., and Pratt, R. M.: TCDD-induced hyperplasia of the ureteral epithelium produces hydronephrosis in murine fetuses. Teratology. 35:329-334, 1987.

59. Abbott, B. D., Morgan, K. S., Birnbaum, L. S., and Pratt, R. M.: TCDD alters the extracellular matrix and basal lamina of the fetal mouse kidney. Teratology. 35:335-344, 1987.

60. Birnbaum, L. S. and Heeany, S. M.: Dermal absorption of the Antioxidant 4,4'-Thiobis-(6-t-butyl-m-cresol) in Sencar mice and Fischer rats. Toxicology Letters. 37:13-19, 1987.

61. Eastin, W. C. and Birnbaum, L. S.: Intestinal absorption of two glucose analogues in rats of different ages. Exp. Gerontol. In press.

62. Dahl, A. R., Birnbaum, L. S., Bond, J. A., Gervasi, P. G., and Henderson, R. F.: The fate of isoprene inhaled by rats: Comparison to Butadiene. Toxicol. Appl. Pharmacol. 89:37-248, 1987.

63. Hebert, C. D. and Birnbaum, L. S.: The influence of aging on intestinal absorption of TCDD in rats. Toxicology Letters 37:47-55, 1987.

64. Bond, J. A., Dahl, A. R., Henderson, R. F., and Birnbaum, L. S.: Species Differences in the Distribution of Inhaled Butadiene in Tissues. Am. Industrial Hygiene Assoc. J. In press.

65. Birnbaum, L. S., Harris, M. W., Barnhart, E. R. and Morrissey, R. E.: Teratogenicity of Three Polychlorinated Dibenzofurans in C57BL/6N mice. Toxicol. Appl. Pharmacol. In press.

66. Brewster, D. W. and Birnbaum, L. S.: Disposition and excretion of 2,3,4,7,8-pentachlorodibenzofuran in the rat. Toxicol. Appl. Pharmacol. In press.

67. Birnbaum, L. S., Harris, M. W., Crawford, D. D. and Morissey, R. E.: Teratogenic effects of polychlorinated dibenzofurans in combination in C57BL/6N mice. Toxicol. Appl. Pharmacol. In press.

BIBLIOGRAPHY (Cont'd)

68. Brewster, D. W., Elwell, M. R. and Birnbaum, L. S.: Toxicity and disposition of 2,3,4,7,8-pentachlorodibenzofuran (4 PeCDF) in the Rhesus monkey (Macaca mulatta). Submitted to Toxicol. Appl. Pharmacol.

69. Birnbaum, L. S. and Couture, L. A.: Disposition of octachlorodibenzodioxin (OCDD) in male rats. Submitted to Toxicol. Appl. Pharmacol.

70. Couture, L. A., Elwell, M. R. and Birnbaum, L. S.: Dioxin-like effects observed in male rats following exposure to octachlorodibenzodioxin (OCDD) during a 13-week toxicity study. Submitted to Toxicol. Appl. Pharmacol.

71. Rao, G. N., Birnbaum, L. S., Collins, J. J., Tennant, R. W. and Skow, L. C.: Mouse strains for chemical carcinogenicity studies: Overview of a workshop. Submitted to Fundam. Appl. Toxicol.

72. Borghoff, S. J., Stefanski, S. A. and Birnbaum, L. S.: The effects of age on the glucuronidation and toxicity of 4,4'-Thiobis(6-t-butyl-m-cresol). Submitted to Toxicol. Appl. Pharmacol.

ABSTRACTS

1. Birnbaum, L. S. and Kaplan, S.: Localization and enrichment of ribosomal RNA cistrons in Escherichia coli. Am. Soc. Microbiol. Abstracts, 1971:163, 1971.

2. Birnbaum, L. S. and Kaplan, S.: In vitro transcription of ribosomal RNA genes in Escherichia coli. Am. Soc. Microbiol. Abstracts, 1972:161, 1972.

3. Baird, M. B., Massie, H. R., and Birnbaum, L. S.: Decreased rate of hepatic metabolism of benzo(a)pyrene in Senescent rats. Am. Assoc. Cancer Res. Abstracts, 17:212, 1976.

4. Baird, M. B., Birnbaum, L. S., and Massie, H. R.: Age-related changes in rats hepatic mixed function oxidase activity reflect alterations in distribution of components or interaction of components with the lipid matrix. Gerontological Society Abstracts, 1976:35.

5. Birnbaum, L. S., Baird, M. B., and Massie, H. R.: Age-related changes in hepatic microsomal mixed function oxidase induction. Gerontological Society Abstracts, 1976, 35.

6. Birnbaum, L. S. and Baird, M. B.: Altered metabolism of carcinogens by senescent rodents. AGE 1:71, 1978.

7. Birnbaum, L. S. and Baird, M. B.: Senescent alterations in hepatic epoxide metabolism in rodents. Fed. Proc. 37:888, 1978.

8. Baird, M. B. and Birnbaum, L. S.: Vitamin A inhibits mutagenicity by 2-Fluoreneamine in Salmonella typhimurium. Fed. Proc. 38:701, 1979.

9. Birnbaum, L. S. and Baird, M. B.: Senescent changes in mouse heptic aryl hydrocarbon hydroxylase. Fed. Proc. 38:658, 1979.

10. Zenser, T. V., Armbrecht, H. J., Birnbaum, L. S., Mattammal, M. B., and Davis, B. V.: Characterization of renal cytochrome P_{450} systems. Fed. Proc. 38:658, 1979.

11. Zenser, T. V., Mattammal, M. B., Armbrecht, H. J., Birnbaum, L. S., and Davis, B. B.: Mechanisms of renal drug metabolism. Am. Fed. Clin. Res., 1979.

12. Birnbaum, L. S.: Enhanced metabolism of 7-ethoxycoumarin in senescent rodents. AGE 2:125, 1979.

13. Birnbaum, L. S.: Decad, G. M., and Matthews, H. B.: Distribution of tetrachlorodibenzofuran in male rats. Fed. Proc. 29:999, 1980.

ABSTRACT (Cont'd)

14. Armbrecht, H. J., Birnbaum, L. S., Zenser, T. V., and Davis, B. B.: Changes in hepatic microsomal membrane fluidity with age. Fed. Proc. 39: 2099, 1980.

15. Robertson, I. G. C. and Birnbaum, L. S.: Changes in mutagen activation with senescence in rat tissues. AGE. 3:107, 1980.

16. Decad, G. M., Birnbaum, L. S., and Matthews, H. B.: Disposition of 2,3,7,8-tetrachlorodibenzofuran in mice. The Toxicologist. 1:65, 1981.

17. Dieter, M. P. and Birnbaum, L. S.: Intermediary metabolism in lymphoid components of aging F344 rats. Fed. Proc. 41: 1673, 1982.

18. Birnbaum, L. S. and Darcey, D. J.: Disposition of 1,2,3,4,6,7-hexabromonaphthalene in the rat. J. Am. College Toxicol. 1:128, 1982.

19. Birnbaum, L. S. and Matthews, H. B.: Disposition of 4,4'-Thio-bis-(6-tert-butyl-m-cresol) in Rats. Toxicologist 3:89, 1983.

20. Birnbaum, L. S.: Changes in the distribution and excretion of two hexachlorobiphenyls in senescent rats. Environ. Health Perspect. 52:280-281, 1983.

21. Borghoff, S. and Birnbaum, L. S.: Age-related changes in glucuronidation and deglucuronidation in hepatic and extrahepatic tissues of rats. AGE 6:140, 1983.

22. Borghoff, S. and Birnbaum, L. S.: Changes in glucuronidation and deglucuronidation in hepatic and extrahepatic tissues of aging rats. The Toxicologist 4:99, 1984.

23. Birnbaum, L. S. and Johnson, L.: Disposition of benzo(f)quinoline in rats. The Toxicologist 4:98, 1984.

24. Deskind, R., Grumbein, S., Kurtz, P., Peters, A., and Birnbaum, L. S.: Prechronic toxicity evaluation of O-benzyl-p-chlorophenol: Comparison between F344 rats and B6C3F1 mice. The Toxicologist 4:176, 1984.

25. Dutcher, J. S., Medinsky, M. A., Bond, J. A., Chung, Y. S., Snipes, M. B., Henderson, R. F., and Birnbaum, L. S.: Effect of vapor concentration on the disposition of inhaled 2,3-dichloropropene in Fischer-344 rats. The Toxicologist 4:4, 1984.

ABSTRACT (Cont'd)

26. Borghoff, S. and Birnbaum, L.S.: Changes in metabolism and excretion of allyl isothiocyanate in senescent rats. AGE 7:139, 1984.

27. Birnbaum, L. S., Johnson, L., and Eastin, W.: Age-related changes in glucose absorption. AGE 7: 140, 1984.

28. Lamb, J. C., Harris, M. W., Weber, H., McKinney, J. D., and Birnbaum, L. S.: Potentiation of 2,3,7,8-tetrachlorodibenzo-(p)dioxin (TCDD) induced cleft palate (CP) by triiodothyronine (T3) in C57BL/6N (B6) mice. Biology of Reproduction 30 (supp. 1): 268, 1984.

29. Muni, I. A., Mansur, C. A., and Birnbaum, L. S.: 14-Day dose-feed toxicity study of 4,4'-thiobis-(6-t-butyl-m-cresol) in rats and mice. Am. Chem. Society. 188th ACS National Meeting, Philadelphia, PA. Abstract MEDI 0053, 1984.

30. Medinsky, M. A., Dutcher, J. S., Bond, J. A., Henderson, R. F., Mauderly, J. C., Snipes, M. B., Cheng, Y. S., Mewhinney, J. A., and Birnbaum, L. S.: Uptake and excretion of ^{14}C-methyl bromide as influenced by exposure concentration. The Pharmacologist 26:238, 1984.

31. Bond, J. A., Medinsky, M. A., Dutcher, J. S., Henderson, R. F., Mewhinney, J. A., Cheng, Y. S., and Birnbaum, L. S.: Disposition and metabolism of inhaled 2,3,-dichloropropene in Fischer-344 rats. The Pharmacologist 26: 235, 1984.

32. Birnbaum, L. S., Harris, M. W., McKinney, J. D., and Lamb, J. C.: Toxic interaction of TCDD with thyroxine: Enhanced incidence of cleft palate in mice. The Pharmacologist 26:232, 1984.

33. Birnbaum, L. S. and Matthews, H. B.: Species differences in the toxicity of tetrachlorodibenzofuran (TCDF): Role of Disposition. Fundament. Appl. Pharmacol. In press.

34. Birnbaum, L. S., Johnson, L., and Eastin, W.: Age-related changes in glucose absorption. AGE 7:139, 1984.

35. Borghoff, S. J. and Birnbuam, L. S.: Changes in metabolism and excretion of allyl isothiocyanate in senescent rats. AGE 7:140, 1984.

36. Kao, L. R. and Birnbaum, L. S.: Disposition of O-benzyl-p-chlorophenol in rats. The Toxicologist 5:239, 1985.

37. Borghoff, S. J. and Birnbaum, L. S.: Age-related changes in the metabolism and excretion of allyl isothiocyanate. The Toxicologist 5:239, 1985.

ABSTRACT (Cont'd)

38. Miller, C. P., Harris, M. W., and Birnbaum, L. S.: Teratogenicity of hexabrominated naphthalene, a toxic contaminant of polybrominated biphenyls, in C57Bl/6N mice. The Toxicologist 5:122,1985.

39. Birnbaum, L. S., Harris, M. W., Miller, C. P., Pratt, R. M., and Lamb, J. C.: Teratogenicity of TCDD in mice: Enhancement by hydrocortisone. The Toxicologist 5: 201, 1985.

40. Eastin, W. C. and Birnbaum, L. S.: Age-related changes in intestinal transport. The Toxicologist 5:160, 1985.

41. Bond, J. A., Dutcher, J. S., Medinsky, M. A., Henderson, R. F., Birnbaum, L. S.: Metabolism and disposition of ?14?C-methyl bromide in Fischer-344 rats after inhalation. The Toxicologist 5: 73, 1985.

42. Dutcher, J. S., Bond, J. A., Henderson, R. F., and Birnbaum, L. S.: Effect of concentration on the disposition of inhalated ^{14}C-methyl bromide in Fischer-344 rats after inhalation. The Toxciologist. 5:73, 1985.

43. Lobaugh, B., Drezner, M. K., Birnbaum, L. S., Schuette, S. A., and Havlir, D. V.: The role of decreased renal 25-hydroxy-vitamin D-1-hydroxylase (1-OHase) activity in gastrointestinal (Gl) malabsorption of calcium (Ca) in the aging rat: A Reappraisal. 6th International Congress on Vitamin D, Mareno, Italy, March, 1985.

44. Birnbaum, L. S.: Age-related changes in the disposition of toxic substances. Symposium at 38th Annual Meeting of Society of Gerontology, New Orleans, Nov. 1985.

45. Agarwal, D. K, Birnbaum, L. S., and Kluwe, W. M.: The influence of age on biological effects of Di-2-ethylhexylphthalate (DEHP) in male rats. The Pharmacologist 27: 252, 1985.

46. Gordon, E. B., Mansur, C. A., Muni, I. A., Mullenix, P., Smith K. N., and Birnbaum, L. S.: Safety evaluation of 4,4'-thiobis-(6-t-butyl-m-cresol) in rats and mice. II. Subchronic Test. 12th Symposium on Environmental Pollutants and Toxicology. Kyoto, Japan, Oct. 1985. pp. 7-8.

47. Hebert, C. D. and Birnbaum, L. S.: Age-related changes in TCDD Absorption. The Toxicologist 6:310, 1986.

48. Birnbaum, L. S. and Couture, L. A.: Disposition of Octachlorodi-benzo-p-dioxin (OCDD) in Rats. The Toxicologist 6:310, 1986.

49. Borghoff, S. J. and Birnbaum, L. S.: Alterations in glucuronida-tion with Age in vivo and in vitro using 4,4'-Thiobis(6-t-butyl-m-cresol) as module compound. The Toxicologist 6:147, 1986.

ABSTRACT (Cont'd)

50. Dahl, A. R., Bond, J. A., Henderson, R. F., and Birnbaum, L. S.: Studies on the fate of inhaled isoprene (2-methyl-1,3-butadiene) in rats may predict its toxicity. The Toxicologist 6:57, 1986.

51. Bond, J. A., Dahl, A. R., Henderson, R. F., and Birnbaum, L. S.: Species differences in the disposition and metabolism of inhaled butadiene. The Toxicologist 6:56, 1986.

52. Mewhinney, J. A., Ayres, P. H., Bechtold, W. E., Dutcher, J. S., Cheng, Y. S., Bond, J. A., Medinsky, M. A., Henderson, R. F., and Birnbaum, L. S.: The fate of inhaled azodicarbonamine in rats. The Toxicologist 6:56, 1986.

53. Sabourin, P. J., Chen, B. T., Henderson, R. F., Lucier, G. and Birnbaum, L. S.: Effect of dose on absorption and excretion of ^{14}C-benzene administered orally or by inhalation. The Toxicologist 6:163, 1986.

54. Mansur, C. A., Muni, I. A., and Birnbaum, L. S.: Prechronic dose feed toxicity studies of 4,4'-Thiobis-(6-t-butyl-m-cresol) in rats and mice. The Toxicologist 6:300, 1986.

55. Chang, M. J. W., Hejtmancik, M. R., Peters, A. C., and Birnbaum, L. S.: Effects of o-benzyl-p-chlorophenol (BCP) on porphyrin excretion in F344 rats. The Toxicologist 6:313, 1986.

56. Tomaszewski, K., Harrington, F., Greenwell, A., Rahn, C., Moore, J., Birnbaum, L. S., and Melnick, R.: Interactive effects of Di(2-ethylhexyl)phthalate (DEHP) and 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) on lipid metabolism in F344 rats. The Toxicologist 6:44, 1986.

57. Abbott, B. D., Morgan, D., Birnbaum, L., and Pratt, R. M.: Morphological alterations in fetal mouse kidneys exposed to TCDD in utero. Teratology, 33:87C, 1986.

58. Abbott, B. D., Birnbaum, L. S., and Pratt, R. M.: TCDD-induced hyperplasia of the fetal ureteric epithelium produces hydronephrosis. The Pharmacologist 28:179, 1986.

59. Brewster, D. W. and Birnbaum, L. S.: Disposition and excretion of 2,3,4,7,8-pentachlorodibenzofuran in the rat. The Pharmacologist 28:179, 1986.

60. Birnbaum, L. S., Harris, M. W., and Morrissey, R. E.: Teratogenicity of polychlorinated dibenzofurans (PCDFs) in mice. The Pharmacologist 28:179, 1986.

ABSTRACT (Cont'd)

61. Birnbaum, L. S., Harris, M. W., and Morrissey, R. E.: Additive teratogenic effects of polychlorinated dibenzofurans (PCDFS). The Toxicologist 7:159, 1987.

62. Ryan, R. P., Nelson, K. G., Lucier, G. W., Birnbaum, L. S. and Surahara, G. I.: 2,3,4,7,8-Pentachlorodibenzofuran and 1,2,3,4,7,8-hexachlorodibenzofuran decrease glucocorticoid receptor binding in mouse liver and placental cytosol. The Toxicologist 7:125, 1987.

63. Brewster, D. W. and Birnbaum, L. S.: Toxicity and disposition of 2,3,4,7,8-pentachlorodibenzofuran (PCDF) in the rhesus monkey. The Toxicologist 7:160, 1987.

64. Brewster, D.W. and Birnbaum, L.S.: 2,3,4,7,8-Pentachlorodibenzofuran (PCDF): Toxicokinetics and metabolism in the rat. The Toxicologist 7:159, 1987.

65. Couture, L. A. and Birnbaum, L. S.: Evaluation of subchronic exposure to octachlorodibenzodioxin (OCDD). The Toxicologist 7: 161, 1987.

66. Diliberto, J. J., Usha, G. and Birnbaum, L. S.: Citral: Model for terpene disposition in rats. The Toxicologist 7:247, 1987.

67. Usha, G., Diliberto, J. J. and Birnbaum, L. S.: Distribution and excretion of 3,7-dimethyl-2,6-octadienal (citral) in rats. The Toxicologist 7:120, 1987.

68. Borghoff, S. J., Stefanski, S. and Birnbaum, L. S.: Alterations in glucuronidation and toxicity with age using 4,4'-thiobis(6-t-butyl-m-cresol) (TBBC) as a model compound. The Toxicologist 7:119, 1987.

69. Abbott, B. D., Birnbaum, L. S. and Pratt, R. M.: TCDD produces hydronephrosis in fetal mice by inducing hyperplasia of the ureteric epthelium. The Toxicologist 7:124, 1987.

70. Abbott, B. D., Birnbaum, L. S. and Pratt, R. M.: TCDD effects the basal lamina and extracellular matrix of the fetal mouse kidney. The Toxicologist 7:124, 1987.

71. Medinsky, M. A., Bechtold, W. E., Birnbaum, L. S., Chico, D. M., Henderson, R. F. and Gerlach, R. L.: Uptake of vinylidene fluoride (VDF) in rats simulated by a physiological model. The Toxicologist 7: 32, 1987.

72. Bond, J. A., Sabourin, P. J., Dahl, A. R., Birnbaum, L. S. and Henderson, R. F.: Disposition and metabolism of inhaled 1-chloro-2-propanol in rats. The Toxicologist 7:30, 1987.

ABSTRACT (Cont'd)

73. Sabourin, P. J., Bechtold, W. E., Birnbaum, L. S., Lucier, G. and Henderson, R. F.: Water-soluble benzene metabolites in F344/N rats and B6C3F$_1$ mice during and following N-benzene inhalation. The Toxicologist 7:929, 1987.

TECHNICAL REPORTS

Birnbaum, L. S. (Chemical Manager): Carcinogenesis bioassay of 1,1,1,2-tetrachloroethane, NTP TR 237, Department of Health and Human Services, Research Triangle Park, NC, 1982.

Birnbaum, L. S. (Chemical Manager): Carcinogenesis bioassay of 1,1,1-trichloroethane (methyl chloroform), NTP TR 262, Department of Health and Human Services, Research Triangle Park, NC. In press.

BOOKS

Sohal, R.S., Birnbaum, L.S., and Cutler, R.G. (eds.). Molecular Biology of Aging: Gene Stability and Gene Expression. Raven Press, New York, 1985. 351 pages.

Kenneth S. Korach, Ph.D. October 5, 1987

TRAINING

Radioisotope Handling Safety (1971-1972)
Formal graduate training course at the Medical College of Georgia taught in the Department of Biochemistry.

Radioisotope Safety (1974)
Radiation safety course taught by the Department of Biological Chemistry, Harvard Medical School.

Introduction to Radiation Safety (1977)
Course offered on Safe Handling of Radioisotopes by Radiation Safety Office at the NIEHS.

AEC License (1975-1976)
Held license for laboratory at Harvard Medical School for use of radioactive chemicals (02-05-KD50178).

Experience

1969 - 1974	^{3}H and ^{14}C	Medical College of Georgia Augusta, GA	10 mCi
1974 - 1976	^{3}H and ^{14}C	Harvard Medical School Boston, MA	100 mCi
1976 - present	^{3}H	NIEHS	100 mCi
	^{14}C	NIEHS	30 mCi
	^{32}P	NIEHS	10 mCi
	^{125}I	NIEHS	20 mCi
	^{35}S	NIEHS	30 mCi

CURRICULUM VITAE

Name: Dr. Kenneth S. Korach

Date and Place of Birth: November 26, 1946, Lackawanna, New York

Citizenship: United States

Marital Status: Married, 1970, two children

Education:

June 1964	Graduated from Butler High School, Augusta, Georgia
June 1969	B.S. (Biology); Minor (Chemistry), Augusta College, Augusta, Georgia
Feb. 1974	Ph.D. (Endocrinology) Medical College of Georgia, Augusta, Georgia

Brief Chronology of Employment:

1969 - 1971	Teaching Assistant, Department of Endocrinology, Medical College of Georgia
1970 - 1974	Graduate Student in the Laboratory of Dr. Thomas G. Muldoon, Department of Endocrinology, Medical College of Georgia
1971 - 1974	Research Assistant III, Department of Endocrinology, Medical College of Georgia, Laboratory of Dr. Thomas G. Muldoon
1972 - 1974	Graduate Student Lecturer, Department of Endocrinology, Medical College of Georgia
1974 - 1976	Research Fellow in Biological Chemistry in the Laboratory of Dr. Lewis L. Engel, Harvard Medical School
1976 - 1978	Staff Fellow, Laboratory of Reproductive and Developmental Toxicology, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina
1978 - 1980	Senior Staff Fellow, Laboratory of Reproductive and Developmental Toxicology, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina
1980 - 1985	Research Endocrinologist, Laboratory of Reproductive and Developmental Toxicology, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina
1985 - 1986	Senior Research Endocrinologist, Laboratory of Reproductive and Development Toxicology, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina
1987 - date	Head, Receptor Biology Section, Laboratory of Reproductive and Developmental Toxicology, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina

Societies:

Endocrine Society
Sigma Xi (University of Georgia Chapter)
American Association for the Advancement of Science
Georgia Academy of Science
North Carolina Chapter of Society of Toxicology

Honors and Other Special Scientific Recognition:

President, Graduate Student Association, Medical College of Georgia, 1973

Who's Who in American Universities and Colleges, 1973-1974

Student Research Award, Georgia Academy of Sciences, 1973

Representative to the Graduate Council, School of Graduate Studies, Medical College of Georgia, 1972-1974

Ford Fellowship, Laboratory of Human Reproduction and Reproductive Biology, Harvard Medical School, 1975-1976

Outstanding Young Men in America, 1976

Organizing Committee, Symposium on Estrogens in the Environment, NIEHS, 1979

Search Committee Member, Staff Scientist, Laboratory of Organ Function and Toxicology, NIEHS, 1980

Co-Organizer, Target Organ Toxicity Symposium: Endocrine System, University of West Virginia Medical School, 1980

Ad Hoc Member, Scientific Review Committee, NIH, 1979-Date

Radiation Safety Committee, NIEHS, 1981-Date

Scientific Review Board, Environmental Health Perspectives, 1981-Date

Chairman, Laboratory of Reproductive and Developmental Toxicology Scientific Search Committee, 1982

Co-Organizer, Receptor Mechanisms Discussion Group, NIEHS, 1982-Date

Advisor, Biochemistry Honors Research, Department of Biochemistry, North Carolina State University, 1982-Date

Safety Committee, NIEHS, 1983-Date

Adjunct Member, Laboratory of Reproductive Biology, University of North Carolina Medical School, 1983-Date

Honors and Other Special Scientific Recognition (continued):

IRP Representative, Arts, Graphics and Photography Policy Committee, NIEHS, 1984-Date

Promotion Committee (Ad Hoc Member), NIEHS, 1985-Date

Search Committee Member, Mass Spectrometry Workgroup Leader, Laboratory of Molecular Biophysics, 1985

Subject Matter Expert (Biochemistry), Biological Laboratory Technician, Office of Personnel Management, NIEHS, 1985

Organizing Committee, Mammalian Genital Tract Gordon Conference, Plymouth, New Hampshire, 1985-1986

Chairman, Radiation Safety Committee, NIEHS, 1985-date

Member, Training Committee, Laboratory for Reproductive Biology, University of North Carolina Medical School, 1985-date

Chairman, Research Support Subcommittee, NIEHS Productivity Council, NIEHS, 1986-date

Search Committee, Reproductive Toxicology Workgroup Leader, Toxicology Research Testing Program, NIEHS, 1986

Invited Presentations and Lectures:

Department of Pharmacology, University of North Carolina Medical School, Chapel Hill, North Carolina

Department of Obstetrics and Gynecology, Duke University Medical School, Durham, North Carolina

Department of Urology, University of Minnesota Medical School, Minneapolis, Minnesota

Worcester Foundation for Experimental Biology, Steroids and Cancer Symposium, Shrewsbury, Massachusetts

Target Organ Toxicology Symposium, University of West Virginia Medical School, Morgantown, West Virginia

Department of Medicine, Division of Endocrinology, Emory University Medical School, Atlanta, Georgia

Division of Developmental Pharmacology, National Institute of Child Health and Human Development, Bethesda, Maryland

Invited Presentations and Lectures (continued):

Department of Animal Science, University of Wisconsin, Madison, Wisconsin

Department of Pediatric Endocrinology, Endocrine Seminar Series, University of North Carolina Medical School, Chapel Hill, North Carolina

Worcester Foundation Experimental Biology, Endocrinology Division, Shrewsbury, Massachusetts

Department of Endocrinology, Medical College of Georgia, Augusta, Georgia

Society of Toxicology, Symposia on Receptors in Toxicology, Atlanta, Georgia

Mammalian Genital Tract Gordon Research Conference, Plymouth, New Hampshire

Molecular Biology Department, Burroughs Wellcome Company, Research Triangle Park, North Carolina

Southwest Foundation for Research and Education, Symposium on Estrogens and Cell Transformation, Wimberly, Texas

Department of Obstetrics and Gynecology, Endocrine Division, University of Pennsylvania Medical School, Philadelphia, Pennsylvania

Receptors in Toxicology Symposia, International Society of Toxicology Meeting, Budapest, Hungary

Pharmacology and Toxicology Colloquium, Institute of Pharmacology and Toxicology, University of Würzburg, Würzburg, West Germany

Department of Biochemistry, North Carolina State University, Raleigh, North Carolina

Symposium on Estrogens in the Environment, Raleigh, North Carolina

Hormonal Carcinogenesis Gordon Research Conference, New Hampton School, New Hampton, New Hampshire

Speaker and Session Chairman, Mammalian Genital Tract Gordon Conference, Plymouth State College, Plymouth, New Hampshire

Symposium, Molecular Structure and Biological Activity of Steroids, VII International Congress on Hormonal Steroids, Madrid, Spain

Institute of Pharmacology and Toxicology, University of Würzburg, Würzburg, West Germany

Institute of Chemistry and Pharmacology, University of Regensburg, Regensburg, West Germany

Invited Presentations and Lectures (continued):

Institute for Interdisciplinary Research, Laboratory of Cytology and Experimental Cancer, Free University of Brussels Faculty of Medicine, Brussels, Belgium

Department of Pediatric Endocrinology, Endocrine Seminar Series, University of North Carolina Medical School, Chapel Hill, North Carolina

Wadsworth Center for Laboratories and Research, State of New York Department of Health, Albany, New York

Session Chairman, Hormone Action Gordon Conference, Kimball Union Academy, Meridan, New Hampshire

Department of Comparative Medicine, Bowman Gray School of Medicine, Winston Salem, North Carolina

Consultant Reviewer (Journals):

Endocrinology
Journal of Theoretical Biology
Journal of Biological Chemistry
American Journal of Physiology
Science
Biology of Reproduction
Journal of Clinical Endocrinology and Metabolism
Biochim Biophysica Acta
Biochemical Pharmacology

Consultant Reviewer (Grants):

National Science Foundation
March of Dimes
National Institutes of Health

Research Interests:

1. Basic biochemical and physiological research in the field of endocrinology.

2. Investigation of the influence of the steroid-receptor complex on the induction and/or stimulation of proteins and enzyme systems in hormonally responsive tissues.

3. Studies on the role of the estrogen receptor in stimulating uterine tissue responses.

4. Special interest in studying steroid-protein interactions using steroid receptors and steroid metabolizing enzymes as model systems.

Research Interests (continued):

5. Elucidation of the topography of the substrate binding sites of steroid receptors and enzymes using affinity and photoaffinity labeling techniques.

6. Hormonal carcinogenesis in reproductive tract tissue.

7. Studies on the effects of environmental chemicals and xenobiotics on reproductive tract tissue and endocrine organs.

BIBLIOGRAPHY

1. Korach, K. S. and Muldoon, T. G: Comparison of specific 17β-estradiol receptor interactions in the anterior pituitary of male and female rats. Endocrinology 92: 322-326, 1973.

2. Korach, K. S. and Muldoon, T. G.: Studies on the nature of hypothalamic estradiol concentrating mechanism in the male and female rat. Endocrinology 94: 785-793, 1974.

3. Korach, K. S. and Muldoon, T. G.: Characterization of the interaction between 17β-estradiol and its cytoplasmic receptor in the rat anterior pituitary gland. Biochemistry 13: 1932-1938, 1974.

4. Muldoon, T. G., Cidlowski, J. A., and Korach, K. S.: Control of estrogen receptors in male and female rat anterior pituitary and hypothalamus. J. Steroid Biochem. 5: 392-393, 1974.

5. Korach, K. S.: Identification and characterization of the interaction between 17β-estradiol and its cytoplasmic receptor in the anterior pituitary and hypothalamus of the male and female rat. Dissertation Abstracts International, Ann Arbor, Michigan, 1974.

6. Korach K. S. and Muldoon, T. G.: Inhibition of anterior pituitary estrogen-receptor complex formation by low-affinity interaction with 5α-dihydrotestosterone. Endocrinology 97: 231-236, 1975.

7. Mahesh, V. B., Muldoon, T. G., Eldridge, J. C., and Korach, K. S.: The role of steroid hormones in the regulation of gonadotropin secretion. J. Steroid Biochem. 6: 1025-1036, 1975.

8. Watson, G. H., Korach, K. S., and Muldoon, T. G.: Obstruction of estrogen receptor formation. Further analysis of the nature and steroidal specificity of the effect. Endocrinology 101: 1733-1743, 1977.

9. Korach, K. S., Metzler, M., and McLachlan, J. A.: Estrogenic activity *in vivo* and *in vitro* of some diethylstilbestrol metabolites and analogs. Proc. Natl. Acad. Sci. USA 75: 468-471, 1978.

10. Korach, K. S. and Ford, E. B.: Estrogen action in the mouse uterus: An additional nuclear event. Biochem. Biophys. Res. Comm. 83: 827-833, 1978.

11. Korach, K. S.: Estrogen action in the mouse uterus: Characterization of the cytosol and nuclear receptor systems. Endocrinology 104: 1324-1332, 1979.

12. McLachlan, J. A., Baucom, K., Korach, K. S., Levy, L., and Metzler, M.: A novel fluorinated derivative of diethylstilbestrol. Steroids 33: 543-547, 1979.

13. Korach, K. S., Metzler, M., and McLachlan, J. A.: Diethylstilbestrol metabolites and analogs: New probes for the study of hormone action. J. Biol. Chem. 254: 8963-8968, 1979.

14. Korach, K. S., Fox-Davies, C., and Baker, V.: Differential response to estriol and estradiol in the mouse uterus: Correlation to an additional nuclear event. Endocrinology 106(6): 1900-1906, 1980.

15. Korach, K. S., Harris, S. E., and Carter, D. B.: Uterine proteins influenced by estrogen exposure: Analysis by two-dimensional gel electrophoresis. Mol. Cell. Endo. 21: 243-254, 1981.

16. Korach, K. S. and Lamb, J. C.: Estrogen action in the mouse uterus: Differential nuclear localization of estradiol in uterine cell types. Endocrinology 108(5): 1989-1991, 1981.

17. Quarmby, V. E., Fox-Davies, C., Swaisgood, M. H., and Korach, K. S.: Estrogen action in the mouse uterus: Adrenal modulation of receptor levels. Endocrinology 110(4): 1208-1216, 1982.

18. Quarmby, V. E. and Korach, K. S.: An ovarian independent population of uterine estrogen receptors. Life Science 33: 1205-1212, 1983.

19. Quarmby, V. E., Fox-Davies, C., and Korach, K. S.: Estrogen action in the mouse uterus: The influence of the neuroendocrine/adrenal axis. Endocrinology 114: 108-115, 1984.

20. Quarmby, V. E. and Korach, K. S.: The influence of 17β-estradiol on patterns of cell division in the uterus. Endocrinology 114: 694-702, 1984.

21. Quarmby, V. E. and Korach, K. S.: Differential regulation of protein synthesis by estrogens in uterine component tissues. Endocrinology 115: 687-697, 1984.

22. Duax, W. L., Swenson, D. C., Strong, P. D., Korach, K. S., McLachlan, J. A., and Metzler, M.: Molecular structures of metabolites and analogues of diethylstilbestrol and their relationship to receptor binding and biological activity. Mol. Pharmacol. 26: 520-525, 1984.

23. McLachlan, J. A., Korach, K. S., Newbold, R. R., and Degen, G. H.: Diethylstilbestrol and other estrogens in the environment. Fund. Appl. Tox. 4: 686-691, 1984.

24. Luster, M. I., Boorman, G. A., Korach, K. S., Dieter, M. P., and Hong, L.: Myelotoxicity resulting from estrogens: Biomodal mechanism of action. Int. J. Immune Pharmacol. 6: 287-297, 1984.

25. Korach, K. S. and McLachlan, J. A.: The role of the estrogen receptor in diethylstilbestrol toxicity. Archives of Toxicology 8: 33-42, 1985.

26. Luster, M. I., Hayes, H. T., Korach, K. S., Tucker, A. W., Dean, J. H., Greenlee, W. F., and Boorman, G. A.: Estrogen immunosuppression is regulated through estrogen responses in the thymus. J. Immunol. 133: 110-116, 1984.

27. Parker, C. E., Levy, L. A., Smith, R. W., Yamaguchi, K., Gaskell, S. J., and Korach, K. S.: Separation and detection of enantiomers of stilbestrol analogues by combined liquid chromatography/thermospray mass spectrometry. J. Chromatog. 344: 378-384, 1985.

28. Korach, K. S., Fox-Davies, C., Quarmby, V. E., and Swaisgood, M. H.: Diethylstilbestrol metabolites and analogs: biochemical probes for differential uterine estrogen responses. J. Biol. Chem. 261: 15420-15426, 1985.

29. Isenhower, W. D., Newbold, R. R., Cefalo, R. C., Korach, K. S., and McLachlan, J. A.: Absence of estrogen activity in some drugs commonly used during pregnancy. Biol. Res. in Pregnancy 7: 6-10, 1986.

30. Korach, K. S., Levy, L. A., and Sarver, P. J.: Estrogen receptor stereochemistry: receptor binding and hormonal responses. J. Steroid Biochem. (In Press).

31. Horigome, T., Golding, T., Quarmby, V. E., Lubahn, D., McCarty Sr., K. S., and Korach, K. S.: Purification and characterization of mouse uterine estrogen receptor under conditions of varying hormonal status. Endocrinology (In Press).

32. Grove, R. I. and Korach, K. S.: Estrogen stimulation of phosphatidyl-inositol metabolism in mouse uterine tissue. Endocrinology (In Press).

33. Quarmby, V. E., Fox-Davies, C., Newbold, R. R., and Korach, K. S.: Response of the mouse uterus to nafoxidine stimulations: agonism and antagonism. Biol. Reprod. (Submitted).

34. Golding, Thomas S. and Korach, Kenneth S.: Nuclear estrogen receptor molecular heterogeneity in the mouse uterus. Proc. Natl. Acad. Sci. USA (In Press).

35. DiAugustine, R. P., Petrusz, P., Bell, G. I., Brown, C. F., Korach, K. S., McLachlan, J. A., and Teng. C. T.: Influence of estrogens on mouse uterine epidermal growth factor precursor protein and mRNA. Endocrinology (Submitted).

36. Korach, K. S., Sarver, P., Chae, K. McLachlan, J. A., and McKinney, J. D.: Estrogen receptor binding activity of polychlorinated hydroxybiphenyls: Conformationally restricted structural probes. J. Mol. Pharmacol. (Submitted).

37. Yamashita, Shuji and Korach, Kenneth S.: A modified immunohistochemical procedure for the detection of estrogen receptor in mouse tissues. Histochemistry (Submitted).

MANUSCRIPTS IN PREPARATION

1. Korach, Kenneth S., Horigome, Tsuneyoshi, Tomooka, Yasuhiro, Yamashita, Shuji, Newbold, Retha R., and McLachlan, John A.: Immunodetection of estrogen receptor in epithelial and stromal tissues of the neonatal mouse uterus.

2. Horigome, Tsuneyoshi, Ogata, Fusahioro, Golding, Thomas S., and Korach, Kenneth S.: Estradiol stimulated proteinase activity responsible for cleavage of the estrogen receptor in mouse uterine tissue.

3. Stack, Gary, Korach, Kenneth, and Gorski, Jack: Relative mitogenic activities of various estrogens and anti-estrogens.

4. Newbold, Retha R., Korach, Kenneth S., Mangum, James B., Bullock, Bill C., Gladen, Beth, and McLachlan, John A.: Uterine response to estrogen is permanently altered in the mouse following prenatal diethylstilbestrol exposure.

BOOK CHAPTERS, CONFERENCE PROCEEDINGS, AND MONOGRAPHS

1. Mahesh, V. B., Muldoon, T. G., Eldridge, J. C., and Korach, K. S.: Studies on the regulation of FSH and LH secretion by gonadal steroids. In Saxena, B. B., Beling, C. G., and Gandy, H. M. (eds.): Gonadotropins. New York, Wiley and Sons, 1972, p. 730.

2. Mahesh, V. B., Muldoon, T. G., Eldridge, J. C., and Korach, K. S.: Regulation of FSH and LH secretion by gonadal steroids. Symposium of the 4th International Congress on Hormonal Steroids, Mexico City, 1974.

3. McLachlan, J. A., Korach, K. S., and Metzler, M.: Bioavailability as a determinant in the transplacental toxicology of diethylstilbestrol. In Neubert, D., Merker, H. J., Nau, H., Langman, J. (eds.): Role of Pharmacokinetics in Prenatal and Perinatal Toxicology. Stuttgart, George Thieme, 1978, p. 149.

4. Korach, K. S.: Biochemical and estrogenic activity of some diethylstilbestrol metabolites and analogs in the mouse uterus. In Leavitt, W. W. (ed.): Hormones and Cancer. New York, Plenum Press, 1982, p. 39.

5. McLachlan, J. A., Newbold, R. R., Korach, K. S., Lamb, J. C., and Suzuki, Y.: Transplacental toxicology: Prenatal factors influencing postnatal fertility. In Kimmel, C. and Buelke-Sam, J. (eds.): Developmental Toxicity. New York, Raven Press, 1981, p. 213.

6. Korach, K. S.: Selected biochemical actions of ovarian hormones. Target Organ Toxicity: Endocrine System Conference, Environ. Health Perspect., 38: 39-45, 1981.

7. Luster, M. I., Boorman, G. A., Hayes, H. T., Dean, J. H., Hong, L., Pfeifer, R., Korach, K. S., and Rhodes, L.: Environmental estrogens and their effects on immune responses. In Mullen P. W. (ed.): NATO Advance Study Institute Series. New York, Plenum Press, 1983, p. 37.

8. Thomas, J. A., Korach, K. S., and McLachlan, J. A.: Toxicology of the Endocrine System. New York, Raven Press, 1985.

9. Korach, K. S. and Quarmby, V. E.: Morphological, physiological and biochemical aspects of female reproduction. In Dixon, R. L. (ed.): Target Organ Toxicity: Reproductive Toxicology. New York, Raven Press, 1985, p. 47.

10. Duax, W. L., Griffin, J. F., Weeks, C. M., and Korach, K. S.: Molecular conformation, receptor binding and hormone action of natural and synthetic estrogens and antiestrogens. In McKinney, J. D. (ed.): Environmental Health Perspectives - Structure Activity Correlations in Mechanism Studies in Predictive Toxicology 61: 111-121, 1985.

11. Gray, T. K., Korach, K., Nabell, L. M., Flynn, T. C., Gary, K. M., Dodd, R. C., Sivam, G., Williams, M. E., and Cogen, M. S.: Mechanisms of Estradiol's Actions on Bone. 1987, In Press.

11. Korach, K. S. and McLachlan, J. A.: The role of the estrogen receptor in diethylstilbestrol toxicity. Proceedings of the International Congress of Toxicology. Archives of Toxicology (Suppl) 1985, p 33.

12. Korach, K. S., Levy, L. A., and Sarver, P. J.: Stereochemical analysis of stilbene estrogens: Receptor binding and hormone responsiveness. In McLachlan, J. A. (ed.): Estrogens in the Environment: Influences on Development. New York, Elsevier/North Holland, 1985, p 43.

13. McLachlan, J. A., Newbold, R. R. Korach, K. S., and Hogan, M. D.: Risk assessment considerations for the reproductive and developmental toxicity of estrogenic xenobiotics. In Roloff, V. and Wilson, A. W. (eds.): Human Risk Assessment: The Roles of Animal Selection and Extrapolation. London, Taylor and Francis, Ltd., (in press).

ABSTRACTS

1. Korach, K. S. and Muldoon, T. G.: Sex-independent binding of estradiol in the cytosol of rat anterior pituitary and hypothalamus. Fed. Proc. 30: 1213, 1971.

2. Korach, K. S. and Muldoon, T. G.: Physiochemical parameters of estradiol-receptor interactions in cytosol of rat anterior pituitary and hypothalamus. Program, Fifty-fifth Endocrine Society, A237, 1973.

3. Groman, E. V., Korach, K. S., and Engel, L. L.: The inactivation of human placental estradiol 17β-dehydrogenase by haloacetates of estrone, estradiol, and some derivatives. No. 50, Program, Fifty-eighth Endocrine Society, 1976.

4. Korach, K. S., Metzler, M., and McLachlan, J. A.: Estrogenic activity *in vivo* and *in vitro* of some diethylstilbestrol metabolites and analogs. No. 386, Program, Fifty-ninth Endocrine Society, 1977.

5. Korach, K. S.: Depletion and replenishment patterns of estrogen receptors in the mouse uterus. J. Toxicol. Environ. Health 4: 486, 1978.

6. Harris, S. E., Silverberg, A. B., Gipson, S., Korach, K. S., and Willis, W.: Isolation and characterization of poly (A)-containing RNA from the mouse uterus. J. Toxicol. Environ. Health 4: 480, 1978.

7. Korach, K. S.: The translocation pattern of estrogen receptors in the mouse uterus. Gordon Research Conference on Hormone Action, February 1978.

8. Korach, K. S., Fox-Davies, C. L., Mydlow, P. K., and Baker, V. B.: Differential response of estriol and estradiol in the mouse uterus: Correlation to an additional nuclear event. Symposium on Receptor Hormone Systems. Worcester Foundation Experimental Biology, October 1978.

9. Korach, K. S., Fox-Davies, C., and Newbold, R. R.: Biochemical/histological effect of nafoxidine in the mouse uterus. No. 809, Program, Sixty-first Endocrine Society, 1979.

10. Lamb, J. C. and Korach, K. S.: Differential nuclear uptake of labeled estradiol by various cell types of the mouse uters. Sixty-second Endocrine Society, 1980.

11. Swenson, D. C., Duax, W. L., Strong, P. D., Korach, K. S., Metzler, M., and McLachlan, J. A.: The crystal structure of a DES analog, indestrol. No. PB-11, Program, American Crystallographic Association Meeting, 1981.

12. Quarmby, V. E., Fox-Davies, C., and Korach, K. S.: Adrenal regulation of uterine estrogen receptor cyclicity. No. 239, Program, Society for the Study of Reproduction, 1981.

13. Korach, K. S., Fox-Davies, C., Quarmby, V. E., and Swaisgood, M. H.: Induction of differential uterine estrogen responses by DES analogs. Second Meadowbrook Conference on Molecular Mechanisms of Hormone Action. September 1981.

14. Quarmby, V. E., Fox-Davies, C., and Korach, K. S.: Adrenal regulation of estrogen receptor levels in the mouse uterus. No. 851, Program, Sixty-third Endocrine Society, 1981.

15. Korach, K. S., Fox-Davies, C., Quarmby, V. E., and Swaisgood, M. H.: Induction of differential uterine estrogen responses by DES analogs. No. 913, Program, Sixty-third Endocrine Society, 1981.

16. Isenhower, W. D., McLachlan, J. A., Cefalo, R. C., Newbold, R. R., and Korach, K. S.: Estrogenicity testing for drugs and other common environmental chemicals. Program, Society of Gynecologic Investigation, 1982.

17. Korach, K. S. and Fox-Davies, C.: Uterine growth stimulation in the mouse uterus requires multiple nuclear receptor interactions. No. 622, Program, Sixty-fourth Endocrine Society, 1982.

18. Quarmby, V. E. and Korach, K. S.: Estrogen stimulation of differential protein synthesis in individual tissue compartments of the mouse uterus. No. 650, Program, Sixty-fourth Endocrine Society, 1982.

19. Korach, K. S. and Quarmby, V. E.: Estrogen stimulation of differential protein synthesis in individual uterine tissue compartments. Gordon Research Conference on Mammalian Genital Tract, 1982.

20. Quarmby, V. E. and Korach, K. S.: Estradiol-stimulated hyperplasia: The development of differential uterine cell responsiveness. No. 857, Program, Sixty-fifth Endocrine Society, 1983.

21. Korach, K. S. and Duax. W.: Receptor interactions and x-ray crystal analysis of DES compounds. No. 1047, Program, Sixty-fifth Endocrine Society, 1983.

22. Korach, K. S., Sarver, P. J., McLachlan, J. A., and Leihr, J.: Receptor binding and hormonal activity of the catechols of diethylstilbestrol (DES) and other active metabolites. No. 1049, Program, Seventh International Congress of Endocrinology, 1984.

23. Newbold, R. R., Maier, D. B., Korach, K. S., and McLachlan, J. A.: Atypical uterine response to estrogen in mice treated prenatally with diethylstilbestrol (DES). No. 1739, Program, Seventh International Congress of Endocrinology, 1984.

24. Golding, T., Gully, J., and Korach, K. S.: Multiple nuclear estrogen receptor peaks: salt resistance and appearance in different target tissues. No. 1149, Program, Sixty-seventh Endocrine Society, 1985.

25. Korach, K. S., Levy, L. A., and Sarver, P. J.: Estrogen receptor stereochemistry: chiral recognition using high affinity nonsteroidal ligand enantiomers. No. 1160, Program, Sixty-seventh Endocrine Society, 1985.

26. Horigome, T., Golding, T., McCarty, K. S. Sr., Lubahn, D., Quarmby, V. E., and Korach, K. S.: Purification of mouse uterine estrogen receptor: analysis of multiple molecular forms. Program, Symposium on Estrogens in the Environment, Raleigh, N.C., 1985.

27. Sarver, P. J., Ruehle, P., McLachlan, J. A., and Korach, K. S.: Receptor binding interactions of DES-p-quinone. Program, Symposium on Estrogens in the Environment, Raleigh, N.C., 1985.

28. Parker, C. E., Levy, L. A., Smith, R. W., Yamaguchi, K., Gaskell, S. J., and Korach, K. S.: Combined liquid chromatography/mass spectrometry of stilbestrol analogues. Program, Symposium on Estrogens in the Environment, Raleigh, N.C., 1985.

29. Newbold, R. R., Mangum, J. B., Bullock, B. C., Korach, K. S., DiAugustine, R. P., and McLachlan, J. A.: Estrogen-induced growth of the mouse uterus is permanently altered by prenatal exposure to diethylstilbestrol. Program, Society for the Study of Reproduction, 1985.

30. Golding, T. and Korach, K.S.: Molecular processing of the mouse uterine estrogen receptor. No. 729, Program, Sixty-eighth Endocrine Society, 1986.

31. Korach, K. S., Chae, K., and Akkerman, J.: Estrogen receptor stereochemistry: receptor binding and hormonal responsiveness. Environmental Health Perspectives, 1986.

32. Beckman, Jr., W. C., Hudspeth, D. A., Golding, T. S., Hubbert, L., and Korach, K. S.: Synchrony of bimodal estrogen receptor binding and DNA synthesis in athymic mouse uterus and human breast tumors xenografts. Program, 69th Annual Meeting of the Endocrine Society, 1987.

33. Golding, T. S. and Korach, K. S.: Heterogeneous forms of nuclear estrogen receptor in the mouse uterus. Program, 69th Annual Meeting of the Endocrine Society, 1987.

DR. VOELKER

Training for Use of Radioactive Materials

- A number of genetics and cell biology courses were taken during undergraduate and graduate training which emphasized the biological effects of radiation, with particular emphasis on the induction of mutations by exposure to ionizing radiation.

- Took the NIEHS Radiation Safety Course.

- Periodic use of X-rays and ^{137}Cs to induce mutations in Drosophila.

- Six years of laboratory experience using radioactive nucleotides (^{3}H, ^{32}P and ^{35}S) in molecular biology work.

CURRICULUM VITAE

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Education and Training:

1965 - B.S. (Education) with high distinction, Concordia Teachers College, Seward, Nebraska
1967 - M.S. (Zoology and Physiology), University of Nebraska, Lincoln
1970 - Ph.D. (Zoology) University of Texas, Austin

Brief Chronology of Employment:

1965 - 1966 Teaching Assistant, University of Nebraska
1966 - 1967 Research Assistant, University of Nebraska
1967 - 1970 NIH Predoctoral Trainee, University of Texas
1970 - 1971 Teaching General Biology, one quarter, University of Oregon
1971 - 1973 Research Associate, North Carolina State University
1973 - 1976 Visiting Assistant Professor in Genetics, North Carolina State University, Raleigh, North Carolina
1976 - 1980 Senior Staff Fellow, Population Genetics Section, Laboratory of Animal Genetics, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina
1980 - Date Research Geneticist, Laboratory of Genetics, National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina.

Societies:

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1967 - 1970 NIH Predoctoral Trainee, University of Texas

1970 - 1971 NSF Postdoctoral Fellowship at the University of Oregon

Research Interests:

Drosophila genetics, cytogenetics, population genetics, and evolution.
Salivary gland chromosome phylogeny and evolution of XY sex determination mechanism in Drosophila affinis subgroup species.
Meiotic drive in Drosophila affinis and its relatives.
Analysis of male recombination and "unique" inversions in D. melanogaster.
X-Y interactions in "sex ratio" form of meiotic drive in D. affinis.

Surveying of salivary gland chromosome polymorphisms in Drosophila melanogaster populations.

Studies of inversion and isozyme variation and disequilibria in natural populations of Drosophila melanogster.

Determination of spontaneous mutation rates at enzyme loci in Drosophila melanogaster.

Genetic and cytological localization of new allozyme loci in Drosophila melanogaster.

Determination of the frequency and nature of null alleles at allozyme loci in natural populations of D. melanogaster.

Genetic and molecular analyses of the RpII215 locus which codes for the largest subunit of RNA polymerase II in Drosophila melanogaster.

Molecular and genetic analysis of transposon-mediated suppression in Drosophila, specifically the suppressor of sable system.

BIBLIOGRAPHY

1. Miller, D. D. and Voelker, R. A.: Salivary gland chromosome variation in the Drosophila affinis subgroup. I. The C chromosome of "western" and "eastern" Drosophila athabasca. Journal of Heredity 59: 86-98, 1968.

2. Millier, D. D. and Voelker, R. A.: Salivary gland chromosome variation in the Drosophila affinis subgroup. III. The long arm of the X chromosome in "western" and eastern" Drosophila athabasca. Journal of Heredity 60: 231-238, 1969.

3. Miller, D. D. and Voelker, R. A.: Salivary gland chromosome variation in the Drosophila affinis subgroup. IV. The short arm of the X chromosome in "western" and "eastern" Drosophila athabasca. Journal of Heredity 60: 307-311, 1969.

4. Voelker, R. A. and Kojima, K.: Fertility and fitness of XO males in Drosophila. I. Qualitative study. Evolution 25: 119-128, 1971.

5. Miller, D. D. and Voelker, R. A.: Salivary gland chromosome variation in the Drosophila affinis subgroup. V. The B and E chromosomes of "western" and "eastern" Drosophila athabasca. Journal of Heredity 63: 3-10, 1972.

6. Voelker, R. A. and Kojima, K.: Fertility and fitness of XO males in Drosophila. II. Quantitative study. Evolution 26: 560-573, 1972.

7. Voelker, R. A.: Preliminary characterization of "sex ratio" and rediscovery and reinterpretation of "male sex ratio" in Drosophila affinis. Genetics 71: 597-606, 1972.

8. Voelker, R. A.: The genetics and cytology of a mutator factor in Drosophila melanogaster. Mutation Res. 22: 265-276, 1974.

9. Mukai, T. and Voelker, R. A.: The genetic structure of natural populations of Drosophila melanogaster. XIII. Further studies on linkage disequilibrium. Genetics 86: 175 - 185, 1977.

10. Voelker, R. A., Mukai, T., Johnson, F. M.: Genetic variation in populations of Drosophila melanogaster from the Western United States. Genetica 47: 143-148, 1977.

11. Langley, C. H., Ito, K. and Voelker, R. A.: Linkage disequilibrium in natural populations of Drosophila melanogaster. Seasonal variation. Genetics 86: 447-454, 1977.

12. Mettler, L. E., Voelker, R. A., and Mukai, T: Inversion clines in populations of Drosophila melanogaster. Genetics 87: 169-176, 1977.

13. Voelker, R. A., Cockerham, C. C., Johnson, F. M., Schaffer, H. E., Mukai, T., and Mettler, L. E.: Inversions fail to account for allozyme clines. Genetics 88: 515-527, 1978.

14. Voelker, R. A. and Langley, C. H.: Dipeptidase A: A polymorphic locus in Drosophila melanogaster. Genetica 49: 233-236, 1978.

15. Ohnishi, S. and Voelker, R. A.: Comparative studies of allozyme loci in Drosophila simulans and D. melanogaster. II. Gene arrangement on the third chromosome. Japanese J. Genet. 54: 203-209, 1979.

16. Voelker, R. A., Ohnishi, S., and Langley, C. H.: Genetic and cytogenetic studies of four glycolytic enzymes in Drosophila melanogaster: Aldolase, triosephosphate isomerase, 3-phosphoglycerate kinase and phosphoglucomutase. Biochemical Genetics 17: 769-783, 1979.

17. Voelker, R. A., Ohnishi, S., and Langley, C. H.: Genetic and cytogenetic studies of the malate dehydrogenases of Drosophila melanogaster. Biochemical Genetics 17: 947-956, 1979.

18. Voelker, R. A., Langley, C. H., Leigh Brown, A. J., Ohnishi, S., Dickson, B. and Smith, S.: Enzyme null alleles in natural populations of Drosophila melanogaster: Frequencies in a North Carolina population. PNAS, USA 77(2): 1091-1095, 1980.

19. Leigh Brown, A. and Voelker, R. A.: Genetic and biochemical studies in glutamate pyruvate transaminase from Drosophila melanogaster. Biochemical Genetics 18: 303-309, 1980.

20. Voelker, R. A., Schaffer, H. E., and Mukai, T.: Spontaneous allozyme mutations in Drosophila melanogaster: Rate of occurrence and nature of the mutants. Genetics 94: 961-968, 1980.

21. Racine, R. R., Langley, C. H., and Voelker, R. A.: Enzyme mutants induced with low dose-rate γ-irradiation in Drosophila: Frequency and characterization. Environmental Mutagenesis 2: 167-177, 1980.

22. Greenleaf, A. L., Weeks, J. R., Voelker, R. A., Ohnishi, S., and Dickson, B.: Genetic and biochemical characterization of mutants at an RNA polymerase II locus in Drosophila melanogaster. Cell 21: 785-792, 1980.

23. Ohnishi, S. and Voelker, R. A.: Comparative studies of allozyme loci in Drosophila simulans and Drosophila melanogaster. I. Three dipeptidase loci. Biochemical Genetics 19: 75-85, 1981.

24. Voelker, R. A., Ohnishi, S., Langley, C. H., Gausz, J., and Gyurkovics, H.: Genetic and cytogenetic studies of malic enzyme in Drosophila melanogaster. Biochemical Genetics 19: 525-534, 1981.

25. Langley, C. H., Voelker, R. A., Leigh Brown, A. J., Ohnishi, S., Dickson, B., and Montgomery, E.: Null allele frequencies at allozyme loci in natural populations of Drosophila melanogaster. Genetics 99: 151-156, 1981.

26. Ohnishi, S., Leigh Brown, A. J., Voelker, R. A., and Langley, C. H.: Estimation of genetic variability in a natural population of Drosophila simulans by two-dimensional electrophoresis. Genetics 100: 127-136, 1982.

27. Searles, L. L., Jokerst, R. S., Bingham, P. M., Voelker, R. A., and Greenleaf, A. L.: Molecular cloning of sequences from a Drosophila RNA polymerase II locus by P element transposon tagging. Cell 31: 585-592, 1982.

28. Burkhart, B. D., Montgomery, E., Langley, C. H., and Voelker, R. A.: Characterization of allozyme null and low activity alleles from two natural populations of Drosophila melanogaster. Genetics 107: 295-306, 1984.

29. Voelker, R. A., Greenleaf, A. L., Gyurkovics, H., Wisely, G. B., Huang, S.-M., and Searles, L. L.: Frequent imprecise excision among reversions of a P element-caused lethal mutation in Drosophila. Genetics 107: 279-294, 1984.

30. Voelker, R. A., Wisely, G. B., Huang, S.-M., and Gyurkovics, H.: Genetic and molecular variation in the RpII215 region of Drosophila melanogaster. Molecular and General Genetics 201: 437-445, 1985.

31. Searles, L. L. and Voelker, R. A.: Molecular characterization of the Drosophila vermilion locus and its suppressible alleles. Proc. Nat'l. Acad. Sci. U.S.A. 83: 404-408, 1986.

32. Chang, D.-Y., Wisely, B., Huang, S.-M., and Voelker, R. A.: Molecular cloning of suppressor of sable, A Drosophila transposon-mediated suppressor. Molecular and Cellular Biology (6: 1520-1528), May, 1986.

33. Searles, L. L., Greenleaf, A. L., Kemp, W. E., and Voelker, R. A.: Sites of insertion and structures of reversions of P element-caused mutations in the 5' region of Drosophila RpII215. Molecular and Cellular Biology 6: 3312-3319, October 1986.

PUBLICATIONS SUBMITTED OR IN PREPARATION

1. Voelker, R. A., Huang, S.-M., Wisely, G. B., and Sterling, J.: Genetic and molecular analysis of the *suppressor of sable* region in Drosophila. (In preparation).

ABSTRACTS AND NOTES

1. Voelker, R. A.: Further studies on the genetics of Drosophila affinis. Genetics 56: 593, 1967.

2. Miller, D. D., Westphal, N. J., and Voelker, R. A.: A preliminary note on gene sequence variation reinvestigation in the C chromosome of Drosophila athabasca. Drosophila Information Service 42: 91-92, 1967.

3. Voelker, R. A. and Kojimi, K.: Relative fitnesses of XO and XY males in D. affinis. Drosophila Information Service 45: 79, 1970.

4. Voelker, R. A.: On the possible identity of the factor(s) giving rise to male recombination and to unique chromosome aberrations in Drosophila melanogaster. Drosophila Information Service 49: 79, 1973.

5. Voelker, R. A.: An analysis of the genetic control of crossing over and recombinational products of male crossing over in Drosophila melanogaster. Genetics 74: 286, 1973.

6. Voelker, R. A., Langley, C. H., Leigh Brown, A. J., and Ohnishi, S.: New data on allozyme loci in Drosophila melanogaster. Drosophila Information Service 53: 200, 1978.

7. Voelker, R. A. and Langley, C. H.: Cytological localization of Roi (Rough Eye). Drosophila Information Service 53: 185, 1978.

8. Ohnishi, S. and Voelker, R. A.: Genetic mapping of Hexokinase-C in D. simulans. Drosophila Information Service 55: 119, 1980.

9. Ohnishi, S., Leigh Brown, A. J., Voelker, R. A., and Langley, C. H.: Estimation of genetic variability in a natural population of Drosophila simulans by two-dimensional and starch gel electrophoresis. Japanese Journal of Genetics 55: 483, 1980.

10. Greenleaf, A. L., Coulter, D., Weeks, J., and Voelker, R. A.: RNA polymerase II mutants of Drosophila. Federation Proceedings 39: 2111, 1980.

11. Voelker, R. A. and Wisely, G. B.: Corrected and new information on $1(1)E12^{ts}$. Drosophila Information Service 58: 150-151, 1982.

12. Voelker, R. A., Chang, D.-Y., Huang, S.-M. and Wisely, G. B.: Cloning and molecular characterization of the suppressor of sable gene from Drosophila. Genetics 107: s111-112, 1984.

13. Sherald, A. F. and Voelker, R. A.: Cytogenetics of suppressor of black. Drosophila Information Service 61: 155, 1985.

14. Voelker, R. A. and Wisely, G. B.: Suppressor of sable transcript mapping in Drosophila melanogaster. Abstract. Genetics 110: s53, 1985.

STATEMENT OF TRAINING
AND EXPERIENCE FOR USE OF
HAZARDOUS CHEMICALS, RADIOISOTOPES, OR BIOLOGICAL AGENTS

Name Lawrence R. Boone

Laboratory/Branch CGTB Bldg./Room 101/E-456 Ext. 3987

Circle Highest Attained Academic Degree

High School Technical School B.S. M.S. Ph.D./M.D./D.V.M.

Academic, general, or specialized training in laboratory safety, safe handling of hazardous compounds, radiation safety, use of radioisotopes, biohazard safety, etc.

Course Title	Institution/Location	Date
Radiation Safety	Roche Inst. Molecular Biolrgy, Nutley, New Jersey	1977
Laboratory Safety	Oak Ridge National Laboratory, Oak Ridge, Tennessee	1980

Experience in handling hazardous compounds/radioisotopes/biological agents

Date	Agent/ Compound/Radioisotope	Activity (mCi)	Type of Study	Institution/Location
1974-Present	^{32}P & ^{3}H Nucleic acids	<2 mCi/month	Molecular biology	ORNL; Roche; ORNL; NIEHS
1974-Present	Oncogenic viruses	---	" "	" "
1978-Present	Recombinant DNA Cloning	P3 level in 1978/79 P2 level	" "	Roche; ONRL; NIEHS
1984-Present	5-Azacytidine		Carcinogenesis	NIEHS

CURRICULUM VITAE

Name: Dr. Lawrence R. Boone

Business Address: Cellular and Genetic Toxicology Branch (E4-02)
National Institute of Environmental Health Sciences
P. O. Box 12233
Research Triangle Park, NC 27709

Business Telephone: (919) 541-3343
FTS 629-3343

Home Address: 101 Trelawney Lane
Apex, NC 27502
(919) 362-1306

Date & Place of Birth: April 21, 1948, Memphis, TN

Citizenship: United States

Marital Status: Married, 1 Child

Education:

1970 - B.S. Memphis State University, Memphis, TN
1977 - Ph.D. Microbiology Department, University of Tennessee, Knoxville, TN

Brief Chronology of Employment:

1971 - 1972	Graduate Teaching Assistant - Department of Microbiology, University of Tennessee
1972 - 1977	Public Health Service Predoctoral Trainee of the National Institute of Allergy and Infectious Disease: Major Professor, Dr. Arthur Brown
1974 - 1977	Dissertation research conducted off-campus at Biology Division, Oak Ridge National Laboratory, Oak Ridge, TN Research Supervisor, Dr. R. W. Tennant, ORNL
1977 - 1979	Postdoctoral Fellow, Roche Institute of Molecular Biology, Nutley, NJ: Reseach Supervisor, Dr. A. M. Skalka
1980 - 1981	Research Associate III, Biology Division, Oak Ridge National Laboratory, Oak Ridge, TN
1981 - Date	Senior Staff Fellow, Cellular and Genetic Toxicology Branch, National Institute of Environmental Health Sciences, Research Triangle Park, NC

Research Interests:

Molecular biology of retroviruses

Molecular mechanisms of carcinogenesis

Recombinant DNA/genetic engineering/Retrovirus vectors

Professional Activities and Membership:

Scientific Advisory Committee on Microbiology and Virology, American Cancer Society (1984-1988)

American Society for Microbiology

Ad hoc reviewer for National Science Foundation research grant proposals

Ad hoc reviewer for North Carolina Biotechnology Center Competitive Small Grants Program

Ad hoc reviewer for J. Virology, Gene, Chemico-Biological Interactions, Mutation Research

Professional References:

Dr. R. W. Tennant, Chief, Cellular and Genetic Toxicology Branch, National Institute of Environmental Health Sciences, Research Triangle Park, NC 27709 (919) 541-4141

Dr. W. K. Yang, Biology Division, Post Office Box Y, Oak Ridge National Laboratory, Oak Ridge, TN 37830 (615) 574-0700

Dr. A. M. Skalka, Director, Fox Chase Cancer Institute, Fox Chase Cancer Center, 7701 Burholme Avenue, Philadelphia, PA 19111

Dr. Arthur Brown, Head, Department of Microbiology, University of Tennessee, Knoxville, TN 37916 (615) 974-3441

PUBLICATIONS

Boone, L. R., and A. Brown (1976). Variants of the HR strain of Sindbis Virus lethal for mice. J. Gen. Virol. 31: 261-263.

Boone, L. R., and A. M. Skalka (1980). Two species of full length cDNA are synthesized in high yield by melittin treated avian retrovirus particles. Proc. Natl. Acad. Sci. USA 77: 847-851.

Ju, G., L. R. Boone, and A. M. Skalka (1980). Isolation and characterization of recombinant DNA clones of avian sarcoma virus: Size heterogeneity and instability of the terminal repeat. J. Virol. 33: 1026-1033.

Boone, L. R., and A. M. Skalka (1981). Viral DNA synthesized in vitro by avian retroviral particles permeabilized with melittin. I. Kinetics of synthesis and size of minus and plus strand transcripts. J. Virol. 37: 109-116.

Boone, L. R., and A. M. Skalka (1981). Viral DNA synthesized in vitro by avian particles permeabilized with melittin. II. Evidence for a strand displacement mechanism in plus strand synthesis. J. Virol. 37: 117-126.

Junghans, R. P., L. R. Boone, and A. M. Skalka (1982). Products of reverse transcription in avian retrovirus analyzed by electron microscopy. J. Virol. 43: 544-554.

Junghans, R. P., L. R. Boone, and A. M. Skalka (1982). Retrovrial DNA H-structures: Displacement/assimilation model of recombination. Cell 30: 53-62.

Boone, L. R., F. E. Myer, D. M. Yang, J. O. Kiggans, C. Koh, R. W. Tennant, and W. K. Yang (1983). Analysis of recombinant DNA clones of the endogenous Balb/c leukemia virus WN1802N: Variation in Long Terminal Repeat Length. J. Virol. 45: 484-488.

Liou, R. S., L. R. Boone, J. O. Kiggans, D. M. Yang, T. W. Wang, and W. K. Yang (1983). Molecular cloning and analysis of the endogenous virus chemically induced from RFM/Un mouse cell cultures. J. Virol. 46: 288-292.

Ou, C-Y., L. R. Boone, and W. K. Yang (1983). A novel sequence segment and other nucleotide structural features in the long terminal repeat of BALB/c mouse genomic leukemia-virus-related DNA clone. Nucleic Acid Research 11: 5603-5602.

Boone, L. R. , F. E. Myer, D. M. Yang, C-Y. Ou, C. K. Koh, L. E. Roberson, R. W. Tennant, and W. K. Yang (1983). Reversal of Fv-1 host range by in vitro restriction endonuclease fragment exchange between molecular clones of N- and B-tropic murine leukemia virus genomes. J. Virol. 48: 110-119.

PUBLICATIONS (Cont'd.)

Ou, C-Y., L. R. Boone, C-K. Koh, R. W. Tennant, and W. K. Yang (1983). Nucleotide sequences of gag-pol regions that determine the Fv-1 host range property of BALB/c N- and B-tropic murine leukemia viruses. J. Virol. 48: 779-784.

Nikbakht, K. N., C-Y. Ou, L. R. Boone, P. L. Glover, and W. K. Yang (1985). Nucleotide sequence analysis of endogenous murine leukemia virus-related proviral clones reveals primer-binding sites for glutamine tRNA. J. Virol. 54: 889-893.

Boone, L. R., G. S. Boone, C. L. Innes, W. K. Yang, and R. W. Tennant (1986). Hematopoietic neoplasias of the RFM/Un mouse contain somatic reintegration of the restricted endogenous ecotropic provirus. Carcinogenesis 7: 529-534.

Nikbakht, K. N., L. R. Boone, P. L. Glover, F. E. Myer, and W. K. Yang (1987). Characterization of a molecular clone of RFM/Un mouse chromosomal DNA that contains a full-length endogenous murine leukemia virus-related proviral genome. J. Gen. Virol. 68: 683-693

Stowers, S. J., P. L. Glover, S. H. Reynolds, L. R. Boone, R. R. Maronpot, and M. W. Anderson (1987). Activation of the K-ras oncogene in lung tumors from rats and mice chronically exposed to tetranitromethane, Cancer Res. 47: 3212-3219.

Kuemmerle, N. B., L. Y. Ch'ang, C. K. Koh, L. R. Boone, and W. K. Yang (1987). Characterization of two solitary long terminal repeats of murine leukemia virus type that are conserved in the chromosome of laboratory inbred mouse strains. Virology 160 (In Press)

Yang, W. K., L. R. Boone, C.-Y. Ou, D.-M. Yang, F. E. Myer, and R. W. Tennant (1987). A distinct p30-gag-targeted inhibition of viral DNA formation by endogenous murine leukemia viruses in RFM/Un mouse strain. In Preparation.

Boone, L. R., P. L. Glover, C. I. Innes, L. Niver, And W. K. Yang (1987). Analysis of FV-1 N- and B-tropic specific sequences in murine leukemia virus genomes. In preparation.

CONFERENCE PROCEEDINGS AND REVIEW ARTICLES

Skalka, A. M., L. Boone, R. Junghans, and D. Lu (1982). Genetic recombination in avian retroviruses. J. Cell. Biochem. 19: 293-304.

Yang, W. K., L. R. Boone, R. W. Tennant, and A. Brown (1983). Fv-1 Restriction of murine leukemia viruses: A model for studying host genetic control of retrovial gene movement and leukemogenesis. Progress in Nucleic Acid Research and Molecular Biology 29: 175-192.

Tennant, R. W., L. R. Boone, P. Lalley, and W. K. Yang (1983). Endogenous retrovirus and radiation-induced leukemia in the RFM mouse. Progress in Nucleic Acid Research and Molecular Biology 29:

Boone, L. R., F. E. Myer, D. M. Yang, J. O. Kiggans, C. Koh, R. W. Tennant, and W. K. Yang (1983). Variation of LTR size in molecular clones of the BALB/c endogenous ecotropic murine leukemia virus. Progress in Nucleic Acid Research and Molecular Biology 29: 205-213.

INVITED PRESENTATIONS/COURSE LECTURES

Use of Recombinant DNA Techniques in Cancer Research. (ORAU Traveling Lecture): Southwestern at Memphis, Memphis, TN., October 1980; SCUU/Oak Ridge Science Semester Program, Oak Ridge, TN, March 1981; West Virginia Wesleyan College, Bukhannon, WV, April 1981; Maryville College, Maryville, TN, May, 1981.

Analysis of Avian and Murine Retrovirus DNA Synthesis in vitro (ORAU Traveling Lecture). The University of Oklahoma Health Sciences Center, Oklahoma City, OK, March, 1981.

RNA Tumor Viruses I: Endogenous Viruses, Natural History and Genetics. University of Tennessee, Knoxville/BMS Oncogenic Viruses course lecture, March 1981.

Cancer and Differentiation. University of Tennessee, Knoxville. Two lectures for Cellular and Molecular Biology Course. May/June 1982.

Principles of Gene Cloning and Charcterization. UT/Oak Ridge Graduate School of Biomedical Sciences. Two lectures for Techniques of Modern Biology course. September 1982.

Use of Recombinant DNA in Biomedical Research. ORAU Science Minimester Program. Oak Ridge, TN, January 1983.

RNA Tumor Viruses I: Endogenous Viruses, Natural History and Genetics. Univesity of Tennessee, Knoxville/BMS Oncogenic viruses course lecture. March 1983.

Studies on the Fv-1 Gene Restriction of Murine Leukemia Virus. St. Jude Childrens Research Hospital, Memphis, TN, April 1983.

Oncogenes. Co-presented Program with S. J. Stowers and M. Anderson, North Carolina Regional Chapter of the Society of Toxicology, Durham, NC, October 1985.

ABSTRACTS

Yang, W. K., I. C. Hsu, L. R. Boone, R. W. Tennant, and A. Brown (1977). Mechanisms of Fv-1 locus inhibition of murine leukemia viruses: Studies by DNA transfection Abstract, 68th Annual Meeting of the American Association for Cancer Research, Denver, Colorado.

Yang, W. K., L. R. Boone, I. C. Hsu, D. M. Yang, R. W. Tennant, and A. Brown (1977). DNA transfection of N- and B-tropic murine leukemia viruses in cell cultures of Fv-1 permissive and non-permissive genotypes. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses. Cold Spring Harbor, L. I. New York.

Boone, L. R. (1977). Studies of murine leukemia provirus synthesis in Fv-1 permissive and restrictive cells. Ph.D. Dissertation, University of Tennessee, Knoxville.

McClements, W., L. Boone, H. Hanafusa, and A. S. Skalka (1978). Analysis of endogenous and infecting avian oncornavirus provial DNAs. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York

Boone, L., and A. M. Skalka (1981). Kinetics of synthesis and structure of proviral DNA made in vitro by melittin permeabilized RAV-2 virus. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Junghans, R. P., L. Boone, and A. M. Skalka (1981). Models for reverse transcription and recombination for electron microscope analysis of in vitro synthesized products. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Ou, C. Y., L. R. Boone, F. E. Myer, and W. K. Yang (1982). Sequence characterization of a cloned proviral DNA endogenous of BALB/c mouse. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Boone, L. R., F. E. Myer, M. Yang, J. O. Kiggans, C. Koh, R. W. Tennant, and W. K. Yang (1982). Analysis of recombinant DNA clones of the endogenous BALB/c murine leukemia virus WN1802N: Variation in LTR size. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Ou, C. Y., L. R. Boone, and W. K. Yang (1983). Sequence characterization of the genetic determinants of N- and B-tropism in murine leukemia viruses. Abstract, ASBC meeting.

ABSTRACTS (Cont'd.)

Boone, L. R., and R. W. Tennant (1983). Fine structrue analysis of retroviral long terminal repeats: Implications for induced gene transpositions in mammalian cells. Abstract. Environmental Health Perspectives 52 "1982 NIEHS Science Open House Poster Session," Page 281.

Boone, L. R., F. E. Myer, D-M. Yang, R. W. Tennant, and W. K. Yang (1983). Analysis of the Fv-1 gene target in N-tropic and B-tropic MuLV by restriction fragment exhange and nucleotide sequence analysis. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Ou, C-Y., L. R. Boone, G. Boone, and W. K. Yang (1983). A novel mouse-specific interdispersed short repetitive sequence found in the LTR of mouse MuLV-related proviral sequences of mouse genome. Abstract, Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Boone, L. R., G. S. Boone, W. K. Yang, and R. W. Tennant (1984). Hematopoietic neoplasias of the RFM/Un mouse contain additional copies of the endogenous ecotropic provirus. AACR Annual Meeting, Toronto, Ontario, Canada.

Stowers, S. J., P. L. Glover, S. H. Reynolds, L. R. Boone, R. R. Maronpot, and M. W. Anderson (1986). Characterization of the activating lesions of oncogenes in chemically-induced rat and mouse lung tumors. Abstract. UCLA Symposium on Molecular and Cellular Biology. J. Cell Biochem. Suppl. 10C: 173.

Kuemmerle, N. B., L.-Y. Ch'ang, C. K. Koh, L. R. Boone, and W. K. Yang. (1986) Solitary LTRs of the MuLV type in chromosomal DNA of laboratory mouse strains. Abstract. Annual Cold Spring Harbor Laboratory Meeting on RNA Tumor Viruses, Cold Spring Harbor, L.I., New York.

Boone, L. R., P. L. Glover, C. L. Innes, and R. W. Tennant. (1987) Development of a retrovirus packaging/vector system to study host control of retrotransposon replication/integration. Abstract. Environ. Health Perspec. "NIEHS 20th Anniversary" (in press).

Yang, W. K., L. R. Boone, R. W. Tennant, S. Goebel, D. M. Yang, and K. Nikbakht. (1987) Rearrangement of endogenous ecotropic proviral gene and Interleukin-3 gene in radiation-induced myeloid leukemias of RFM/Un mice. Abstract, DOE Contractors' Workshop on Cellular and Molecular Aspects of Radiation-induced DNA Damage and Repair. Albuquerque, NM.

CURRICULUM VITAE

John M. Dement, Ph.D.

I. General

Date of Birth:	August 5, 1949
Place of Birth:	Henderson, North Carolina
Social Security Number:	246-86-4718
Current Home Address:	1206 Lane Drive Cary, North Carolina 27511
Telephone:	Home: 919-467-9474 Office: Commercial 919-541-7933 FTS: 629-7933

II. Education

A. Academic

1) Bachelor of Science in Mechanical Engineering,
North Carolina State University,
Raleigh, North Carolina, 1971

2) Master of Science in Environmental Health - Industrial Hygiene,
Harvard University School of Public Health,
Boston, Massachusetts, 1974

3) Doctor of Philosophy
School of Public Health
University of North Carolina
Chapel Hill, North Carolina, 1980

Dissertation: Estimation of Dose and Evaluation of Dose-Response in a Retrospective Cohort Mortality Study of Chrysotile Asbestos Textile Workers"

B. Continuing Education Courses/Seminars

1) Industrial Ventilation: North Carolina State University, March 26-31, 1971.

2) Industrial Hygiene Engineering, DHEW, NIOSH, Cincinnati, Ohio, August 16-27, 1971.

3) Basic Environmental Statistics, Environmental Protection Agency, Cincinnati, Ohio, June 26-30, 1972.

4) Microscopic Methods for Identification of Asbestos, McCrone Research Associates, Chicago, Illinois, 1974.

5) Program Officials Guide to Contracting, Columbus, Ohio, November 4-8, 1974.

6) Introduction to Supervision, Columbus, Ohio, December 1-5, 1975.

7) Incineration of Low-Level Radioactive Wastes, North Carolina State University, September 30 - October 2, 1981.

8) Hazardous Wastes Management Under RCRA, North Carolina State University, June 2-3, 1982.

9) Recognition and Control of Chemical Hazards in the Laboratory, National Institutes of Health, January 12, 1982.

III. Professional Experience

1. Dates of Employment: July 1981 - Present

Position:

Health and Safety Manager
Office of the Director
National Institute of Environmental Health
Sciences (NIEHS)
Research Triangle Park, N.C. 27709

Supervisory Responsibilities:

Health physicists, industrial hygienists, safety professionals and occupational health nurses involved in developing health and safety programs.

Supervisor:

David P. Rall, M.D., Ph.D.
Director, NIEHS

Description of Duties:

The Health and Safety Office plans, conducts, coordinates and supports programs to create and maintain a safe and healthful environment for NIEHS employees, visitors and guest workers. The Health and Safety Office provides expertise and specialized assistance to NIEHS in the areas of biological safety, chemical safety, physical safety,

radiation safety, safety engineering, industrial hygiene and toxicology, personal protective equipment, occupational health surveillance, workman's compensation and environmental protection.

The Health and Safety Manager is charged with the interpretation, review, evaluation, and recommendation of acceptance or rejection of program proposals regarding the implementation of compliance programs in response to regulatory initiatives of Federal, state and local environmental protection and pollution control initiatives and regulations. Plans, develops, and directs research hazard assessment activities including identifying potentially hazardous factors and risks and developing means to eliminate or control potentially hazardous factors and risks associated with biomedical research. Provides methodology for the identification and assessment of occupational hazards and environmental effects that may be caused by biomedical research. Conducts and supports research to develop means for assuring that biomedical research is performed in a manner that protects employee health, protects the quality of the environment and conserves natural resources; reviews engineering design projects to ensure conservation methods are in accordance with employee safety and environmental protection objectives. Responsible for management of chemical, radiologic, and biologic and other hazardous wastes from the activities of the NIEHS. Responsible for the development and implementation of safety and health related training activities for NIEHS employees. Prepares or assists in the preparation of original material for publication in various media including locally produced material, national publications, professional journals, etc. Serves as the focal point for Laboratory Safety Manual development and publication; coordinates the development of audiovisual training materials. Reviews and evaluates environmental protection and pollution control activities.

2. Dates of Employment: September, 1979 - July, 1981

Position:

Deputy Director
Division of Respiratory Disease Studies
National Institute for Occupational Safety and Health
Morgantown, West Virginia 26505

Supervisory Responsibilities:

147 full-time employees including physicians, engineers industrial hygienists, statisticians, and epidemiologists.

Supervisor:

James A. Merchant, M.D., Dr. P.H.
Director
Division of Respiratory Disease Studies

Description of Duties:

The Division of Respiratory Disease Studies (DRDS) serves as the focal point for NIOSH clinical and epidemiological research concerning occupational respiratory disease, mining, agricultural health, and occupational safety and health aspects of new energy technologies. The Division's emphasis is multidisciplinary research including industrial hygiene, engineering, biostatistics, toxicology, physiology and epidemiology.

Under the general supervision of the Director, DRDS, the Deputy Director (1) participated with the Division Director in the overall management, supervision and direction of the Division and in the absence of the Division Director served as Acting Division Director; (2) conceived and developed research programs and projects to achieve the goals of the Institute and the mission of DRDS, utilizing information provided from the entire scientific and medical community as well as from the Branches of DRDS and other components of the Institute; (3) assisted with the review and coordination of the activities of the individual Branches within the Division; (4) provided expert consultation to the Institute in the areas of occupational health epidemiological and industrial hygiene research; (5) served as a liaison between the Division and other Institute Division and Offices, and other Federal agencies, State agencies, and nongovernmental groups; (6) engaged in meetings, seminars and in-service and out-of-service training courses; and (7) testified at the Direction of the Director before public, state, congressional and other hearings on matters of interest to the Division and the Institute.

In addition to supervisor and research management responsibities, also served as principal investigator for DRDS epidemiological research concerning asbestos and other fibrous minerals.

3. Dates of Employment: June, 1975 - August, 1977 (Doctoral research August, 1977 - September, 1979)

Position:

Assistant Chief
Industrial Hygiene Section
Industrywide Studies Branch
Division of Surveillance, Hazard Evaluation and Field Studies
National Institute for Occupational Safety and Health
Cincinnati, Ohio 45226

Supervisory Responsibilities:

25 full-time employees including industrial hygienists, engineers, and chemists.

Supervisor:

Ronald D. Dobbin, Chief
Industrial Hygiene Section

Description of Duties:

The Industrywide Studies Branch, Division of Surveillance, Hazard Evaluation and Field Studies is responsible for epidemiological research and industrywide research studies concerning occupational disease including occupational carcinogenesis and reproductive hazards. The Industrial Hygiene Section is charged with the collection, evaluation, interpretation and reporting of industrial hygiene exposure data including analyses of dose-response in conjunction with epidemiological studies.

As Assistant Branch Chief, Industrial Hygiene Section, provided technical, administrative and supervisory direction for conducting industrywide studies and epidemiological research. Specifically, (1) assisted in planning, developing and operating this program; (2) was responsible for input to program planning, initiating monthly reports outlining the activities and progress of the Section; (3) had the responsibility for providing guidance to new employees regarding administrative and technical procedures to be followed in conducting comprehensive industrial hygiene evaluations in the work place; (4) made periodic reviews of active projects to identify those which needed to be expedited to complete projects in a timely manner; (5) conducted initial reviews of final reports; and (6) assisted in periodic review of completed projects.

In addition to technical and supervisory responsibilities, served as project officer for the epidemiological studies of talc, asbestos, fibrous glass, and mineral wool. In conjunction with these studies was responsible for development of an analytical electron microscopy laboratory for analyses of small particles using electron diffraction, energy dispersive X-ray analyses and various petrographic microscopic methods.

4. Dates of Employment: June, 1971 - July, 1975

Position:

Industrial Hygienist
Environmental Investigations Branch
Division of Field Studies and Clinical Investigations
National Institute for Occupational Safety and Health
Cincinnati, Ohio 45226

Supervisory Responsibilities

2 engineering technicians, plus other industrial hygienist assigned to officer's projects.

Supervisor:

Philip J. Bierbaum, Chief
Environmental Investigations Branch

Description of Duties:

Under the general supervision of the Chief, Environmental Investigations Branch, was responsible for formulating and guiding industrywide studies, surveys and comprehensive analyses to determine environmental exposures of the working populations. This included the characterization, quantification and control of exposures to airborne dusts, gases, solvents, etc. Specifically, (1) provided input for the development of criteria dealing with toxic materials and harmful physical agents; (2) developed and implemented appropriate sampling schemes for monitoring and measuring chemical and biological agents in the work environment; (3) identified potential hazardous materials in the work environment; (4) conducted literature searches to obtain information related to particular industries, health hazards, etc.; (5) supervised the reduction and tabulation of data; (6) selected and recommended control measures to reduce hazards found during industrywide studies; and (7) prepared appropriate technical reports. Responsibilities also included (1) supervising two engineering technicians and other Branch engineers that were working on the officer's assigned projects;

and (2) maintaining close liaison with other investigators (governmental, industrial, and academic), who were engaged in allied studies.

5. Dates of Employment: June, 1969 - June, 1971

Position:

Engineering Technician
Division of Economics Effects Research
Environmental Protection Agency
Wade Avenue
Raleigh, North Carolina

Supervisory Responsibilities: None

Supervisor:

John R. O'Connor
Branch Chief

Description of Duties:

The Division of Economic Effects Research was responsible for developing control cost estimates for various stationary pollutant control strategies and estimating the associated economic impact of such strategies. As an Engineering Technician, responsibilities included (1) developing control strategies for steam electric power plants, stationary combustion sources, cement and lime plants and coal cleaning plants; (2) selecting appropriate control equipment for each source; (3) using engineering methods, sizing this equipment for the various pollutant streams; and (4) developing equipment capitol and annual operating cost estimates for each source. This data was utilized to develop the EPA Annual Congressional Report, "The Cost of Clean Air".

IV. Honors and Awards

1) Alexander Powell Scholarship in Mechanical Engineering, 1970.

2) U.S. Public Health Service Commendation Medal for Exemplary Service, April 1977.

3) U.S. Public Health Service Exceptional Capability Promotion (0-4), January 1, 1977.

4) NIOSH Nominee for Cincinnati Area Federal Employee of the Year, Scientific/Professional Category, June 14, 1977.

5) U.S. Public Health Service Exceptional Capability Promotion (0-5), June 1980.

6) U.S. Public Health Service Outstanding Service Medal for Exemplary Performance of Duty, August, 1986.

V. Professional Memberships/Committees

1) American Industrial Hygiene Association.

2) American Academy of Industrial Hygiene.

3) National Research Council, Safe Drinking Water Committee, Particulate Contaminants Sub-committee.

4) American Industrial Hygiene Association, Epidemiology Committee, 1983-Present, Vice-Chairman, 1985-1986, Chairman, 1986-87.

5) American Academy of Industrial Hygiene, AAIH Peer Review Committee, 1982-1983.

6) Editorial Review Board, Environmental Health Perspectives, 1985-Present.

7) Editorial Board, Applied Industrial Hygiene, 1985-Present.

8) Participant, Workshop on the Contribution of Airborne Pollutants to Respiratory Cancer, Task Force on Environmental Cancer and Heart and Lung Disease, Snowbird, Utah, July 1985.

9) Member, Melanoma Task Force, Lawrence Livermore National Laboratory, July 1985-Present.

10) American Conference of Governmental Industrial Hygienist, Vice-Chair Elect 1987-88.

11) Member of Federal Asbestos Task Force, 1986-Present.

VI. Professional Certification

Certified by examination in the Comprehensive Practice of Industrial Hygiene by the American Board of Industrial Hygiene, Certification No. 1067, 1976.

VII. Publications

1) Ayer, H. E., Dement, J., et al. A Monumental Study-Reconstruction of a 1920 Granite Shed. Amer. Ind. Hyg. Assoc. J., pp. 206-211, May, 1973.

2) Dement, J. M., Preliminary Results of the NIOSH Industry-wide Study of the Fibrous Glass Industry. Transactions of the Thirty-Fifth Annual Meeting of the ACGIH, May 20-25, 1973.

3) Dement, J. M., Fibrous Glass - Environmental Aspects, Transactions of the NIOSH Symposium on Occupational Exposure to Fibrous Glass, June 26-27, 1974.

4) Dement, J. M., Environmental Aspects of Fibrous Glass Production and Utilization. Env. Research, Vol. 9, pp. 295-312, 1975.

5) Dement, J. M., Zumwalde, R. D., and Wallingford, K. M., Asbestos Fiber Exposures in a Hard Rock Gold Mine. Ann. N. Y. Acad. Sci., Vol 271, pp. 345-352, 1976.

6) Gilliam, J. D., Dement, J. M., et al. Mortality Patterns Among Hard Rock Gold Miners Exposed to an Asbestiform Mineral. Ann. N. Y. Acad. Sci., Vol. 277, pp. 336-344, 1976.

7) Bayliss, D. L., Dement, J. M., Wagoner, J. K., and Blejer, H. P., Mortality Patterns Among Fibrous Glass Production Workers. Ann. N. Y. Acad. Sci., Vol. 271, pp. 324-335, 1976.

8) Zumwalde, R. D. and Dement, J. M., Review and Evaluation of Analytical Methods for Environmental Studies of Fibrous Particulate Exposures. In: Proceedings of the First FDA Office of Science Summer Symposium on Electron Microscopy of Microfibers, pp. 139-150, August 23-25, 1976.

9) Dement, J. M., Asbestiform Minerals in Industrial Talcs. Commercial Definitions Versus Industrial Hygiene Reality. In: Workshop on Asbestos: Definitions and Measurement Methods, National Bureau of Standards Special Publication 506, pp. 313-323, 1978.

10) Dement, J. M. and Zumwalde, R. D., Occupational Exposures to Talcs Containing Asbestiform Minerals. In: Dusts and Disease, Society for Occupational and Environmental Health, Pathotox Publishers Inc., Illinois, 1979.

11) Brown, D. P., Dement, J. M., and Wagoner, J. K., Mortality Patterns Among Miners and Millers Occupationally Exposed to Asbestiform Talc. In: Dusts and Disease , Society for Occupational and Environmental Health, Pathotox Publishers Inc., Illinois, 1979.

12) Ness, G. O., Dement, J. M., Waxweiler, R., and Wagoner, J. K., Mortality Patterns and Occupational Exposures Among Mineral Wool Production Workers. In: Dusts and Disease, Society for Occupational and Environmental Health, Pathotox Publishers Inc., Illinois, 1979.

13) Selevan, S. G., Dement, J. M., Wagoner, J. K., and Froines, R. J., Mortality Patterns Among Miners and Millers of Non-Asbestiform Talc. In: Dusts and Disease, Society for Occupational and Environmental Health, Pathotox Publishers Inc., Illinois, 1979.

14) Dement, J. M., and Harris, R. L., Estimates of Pulmonary and Gastrointestinal Deposition for Occupational Fiber Exposures, DHEW-NIOSH Publication No. 79-135, 1979.

15) Lemen, R. A. and Dement, J. M., Ed., Dust and Disease, Pathotox Publishers Inc., Park Forest South, Illinois, 1979.

16) Dement, J. M., Gamble, J. F., Brown, P., et al. Occupational Exposure to Talc Containing Asbestos. DHEW-NIOSH Publication No. 80-115. 1980.

17) Dement, J. M., Estimation of Dose and Evaluation of Dose-Response in a Retrospective Cohort Mortality Study of Chrysotile Asbestos Textile Workers, Doctoral Dissertation, University of North Carolina, School of Public Health, Chapel Hill, North Carclina, 1980.

18) Dement, J. M., Harris, R. L., Symons, M. J., and Shy, C. Estimates of Dose-Response for Respiratory Cancer Among Chrysotile Asbestos Textile Workers. Ann. Occup. Hyg., Vol. 26, Nos. 1-4, pp. 869-887.

19) Dement, J. M., Merchant, J. A., and Green, F.H.Y., Asbestosis, Chapter In: Occupational Respiratory Disease, NIOSH, 1986.

20) Robinson, C. F., Dement, J. M., Ness, G. O., and Waxweiler, R., Mortality Patterns of Rock and Slag Mineral Wool Production Workers. Brit. Journal of Ind. Med., Vol. 39, pp. 45-53, 1982.

21) Lemen, R. A., Dement, J. M., and Wagoner, J. K., Epidemiology of Asbestos Related Disease. Env. Hlth. Persp., Vol. 34, pp. 1-11, 1980.

22) Dement, J. M., Epidemiology of Asbestos Diseases. In: Asbestos Related Diseases: Clinical, Epidemiologic, Pathologic and Radiologic Characteristics and Manifestations, American College of Radiology, Chicago, Ill., 1982.

23) Dement, J. M., Talc and Asbestos Mortality Studies. Proceedings of the 4th Annual Park City Environmental Health Conference: Health Issues Related to Metal and Nonmetallic Mining, Butterworth Publishers, Woburn, MA, 1983.

24) Dement, J. M., Harris, R. L., Symons, M. J., and Shy, C. M., Exposures and Mortality Among Chrysotile Asbestos Workers. Part I: Exposure Estimates. Amer. J. Ind. Med., Vol. 4, No. 3, pp. 399-419, 1983.

25) Dement, J. M., Harris, R. L., Symons, M. J., and Shy, C. M., Exposures and Mortality Among Chrysotile Asbestos Workers. Part II: Mortality. Amer. J. Ind. Med., Vol. 4, No. 3, pp. 421-433, 1983.

26) Dement, J. M., Measurement of Latency in Asbestos Studies. Amer. J. Indus. Med., Vol. 5, pp. 408-410, 1984.

27) Dement, J. M Smith, N. D., Hickey, J.L.S. and Williams, T.D., An Evaluation of Formaldehyde Sources, Exposures and Possible Remedial Actions in Two Office Environments. In: Proceedings of the 3rd International Conference on Indoor Air Pollutants, Stockholm, Sweden, Sept. 1984,

28) Gaynor, J. J., Symons, M. J. and Dement, J. M.: Parametric Modeling of the Effect of Cummulative Exposure to Chrysotile Asbestos on the Hazard of Death from Lung Cancer. Biometrics, Vol. 41, No. 1, p. 331, 1985.

29) Abrams, D. S., Reist, P. C. and Dement, J. M., An Evaluation of the Effectiveness of a Recirculating Laboratory Hood. Amer. Ind. Hyg. Assoc. Journal, Vol. 47, No. 1, pp. 22-26, 1986.

30) Adkins, B., O'Connor, R.W. and Dement, J.M., Inhalation Exposure System Used for Acute and Repeated Dose Methyl Isocyanate Exposures of Laboratory Animals. Env. Hlth Persp., In Press.

31) Omenn, G.S., Merchant, J., Boatman, E., Dement, J.M., Kushner, M., Nicholson, W., Peto, J. and Rosenstock, L. Contribution of Environmental Fibers to Respiratory Cancer. Env. Health Perspectives. Vol 70, December 1986.

32) Green, F.H.Y., Harley, R., Vallyathan, V., Dement, J., Pooley, F. and Althouse, R. Pulmonary Fibrosis and Asbestos Exposure in Chrysotile Asbestos Textile Workers. In: Biological Effects of Chrysotile, Wagner, J.C. Editor, 1987 (in press).

33) Pearce, N., Checkoway, H. and Dement, J. Exponential Models for Time Related Analyses of Studies Based on an Occupational Cohort. Scand. J. Work Env. and Health (in press).

34) Green, F.H.Y., Harley, R., Vallyathan, V., Althouse, R., Dement, J. and Pooley, F. Asbestos Exposure, Pulmonary Fibrosis, and Lung Fiber Burden in Chrysotile Asbestos Textile Workers. Am. Review of Resp. Disease (in Press).

VIII. Professional Presentations

1) Dement, J. M., Sampling and Evaluation of the Work Environment. Presented at the Southern California Section of AIHA Symposium on Asbestos and Asbestos Related Diseases, November 16, 1972.

2) Dement, J. M., Preliminary Results of the NIOSH Industrywide Study of the Fibrous Glass Industry. Presented at the Thirty-Fifth Annual Meeting of the ACGIH/AIHA, Boston, May 20-25, 1973.

3) Dement, J. M., Fiber Exposures in Rockwool and Slagwood Production Workers. Presented at American Industrial Hygiene Association Conference, Minneapolis, June 1-6, 1975.

4) Dement, J. M., Airborne Asbestos Fiber Size Distributions for Various Production Facilities. Presented at the American Industrial Hygiene Association Conference, Minneapolis, June 1-6, 1975.

5) Dement, J. M., Inhalation Anesthetic Practices and Methods for Eliminating Anesthetic Gases and Vapors from Operating Rooms. Presented at the 23rd Association of Operating Room Nurses Congress, Miami, March 11, 1976.

6) Dement, J. M., Occupational Exposures During Manufacture and use of Asbestos Friction Products. Presented at the American Industrial Hygiene Association Conference, New Orleans, 1977.

7) Dement, J. M., Overview of NIOSH Mining Surveillance Initiative. Presented at the Sixth Institute on Mine Health and Safety, Golden, Colorado, November 12-14, 1980.

8) Symons, M. J. and Dement, J. M., Alternative Calculations of Expected Deaths for an SMR. Presented at the American Industrial Hygiene Conference, Portland, June, 1981.

9) Dement, J. M., Lung Cancer Dose-Response Among Chrysotile Asbestos Textile Workers. Presented at the American Industrial Hygiene Conference, Portland, June, 1981.

10) Dement, J. M. Other Fibers and the Potential for Disease. Presented at the Symposium on New Developments in Asbestos-Related Disease, University of California, Irvine, January 12-13, 1984.

11) Dement, J. M. Low-Level Asbestos Exposure Studies. Presented at the Workshop on the Monitoring and Evaluation of Airborne Asbestos Levels Following an Abatement Program, National Bureau of Standards, Gaithersburg, MD, March 12-13, 1984.

12) Dement, J. M. Planning the Use of an Occupational Health System in a Research and Development Environment, Presented at the Seminar Addressing Critical Occupational Health and Safety Information Management Problems, Boston, Jan. 17, 1985.

13) Dement, J. M. Worksite Assessment for Occuapational Exposures, Presented at the Federal Employee Occupational Health Conference, July 30, 1985.

14) Dement, J. M. Overview of the NIEHS Hazardous Waste Worker Health and Health and Safety Training Grants Program, Presented at the Environmental/Occupational Health Training Workshop, University of Cincinnati, Ohio, April, 1987.

IX. Academic Appointments

1) Adjunct Assistant Professor
Department of Industrial Engineering
West Virginia University
Morgantown, WV - 1979-1981

2) Adjunct Associate Professor of Industrial Hygiene
School of Public Health
Department of Environmental Sciences and Engineering
University of North Carolina
Chapel Hill, N. C. - 1981 - Present

Masters Thesis Reports as Research Advisor

1) Shropshire, V. A Solvent Use Inventory and Air Sampling of NIEHS Laboratories, 1982

2) Abrams, David S. An Evaluation of the Effectiveness of a Recirculating Laboratory Hood, 1983.

3) Smith, Neolon D. Formaldehyde Source Materials in Mobile Homes: Characterization of Sources and Reduction of Emissions by Ammonia Fumigation, 1983.

4) Chronister, Barbara An Evaluation of Methoxyfurane Delivery Techniques and Exposures by Laboratory Personnel at a Biomedical Research Institute, 1983.

5) Drews, Bert Potential Chemical Contamination During Animal Feeding Studies: Evaluation of A Ventilated Animal Rack, 1984.

6) Dreher, Roberta M. Initial Implementation of an Occupational Health Data Base at the National Institute of Environmental Health Sciences, 1984.

7) Chalk, Lindsey J. Laboratory Animal Allergy: Industrial Hygiene Groundwork for a Prospective Epidemiologic Study, 1986.

8) Hanley, Kevin W. Design of a Hazard Communication Program for the National Institute of Environmental Health Sciences, 1986.

9) Lilley, David B. Using a Tracer Gas Technique to Evaluate Laboratory Hood Effectiveness, 1987.

CURRICULUM VITAE

Name Christopher L. Hunt, Jr.

Date & Place of Birth: June 17, 1945, St. Louis, Missouri

Citizenship: United States

Marital Status: Divorced

Education:

May 1975 - M.S.P.H. (Industrial Hygiene), University of North Carolina, Chapel Hill, NC

May 1972 - B.S. (Chemistry) summa cum laude, St. Augustine's College, Raleigh, NC

Board Certification: Certified by examination in the comprehensive practice of Industrial Hygiene by the American Board of Industrial Hygiene, October 31, 1979.

Brief Chronology of Employment:

January 1977 - Present
Safety Officer, Health and Safety Office, National Institute of Environmental Health Sciences, Research Triangle Park, NC

July 1974 - January 1977
Associate Industrial Hygienist, Industrial Hygiene Department, Health Division, Oak Ridge National Laboratory, Oak Ridge, TN

Military Service: U.S. Army, 1965-1968
Honorable Discharge

Professional Affiliations:

American Academy of Industrial Hygiene
American Biological Safety Association
American Chemical Society
  Division of Chemical Health and Safety, ACS
American Conference of Governmental Industrial Hygienists
American Industrial Hygiene Association
  Biohazards Committee, AIHA (1977-1981)
  Hygienic Guides Committee, AIHA (1979-1982)
  Research and Development and Campus Industrial Hygiene Committee, AIHA (1984-Present)
American Society of Safety Engineers
North Carolina Field Federal Safety and Health Council

Outside Activities:

1975-Present Visiting Lecturer, Industrial Hygiene and Safety Program, St. Augustine's College

1979-1982 Member, National Urban League's Occupational Safety and Health Program Advisory Board

1979-1982 Member, Durham Citizen's Task Force on Toxic Wastes

Publications:

Hunt, C.L., Jr., D.B. Walters, and E. Zieger. "Approaches for Safe Handling Procedures and Design of a High Hazard Laboratory for Life Scientists." in Walters, D.B. (ed.): Safe Handling of Chemical Carcinogens, Mutagens and Teratogens: A Chemist's Viewpoint. Ann Arbor MI, Ann Arbor Science Publishers, Inc., 1980, vol. 1, pp. 31-47.

Bolton, N.E., E.E. Ketchen, W.E. Porter, and C.L. Hunt. Material Safety Data Sheets: The Basis for Control of Toxic Chemicals, Vol. 1 (ORNL/TM-5721, 1977).

Bolton, N.E., E.E. Ketchen, W.E. Porter, and C.L. Hunt. Material Safety Data Sheets: The Basis for Control of Toxic Chemicals, Vol. 2 (ORNL/TM-5722, 1977)

Bolton, N.E., C.L. Hunt, T.A. Lincoln, and W.E. Porter, "Health Protection Must be a Part of Planning", Occ. Health and Safety 46(2): 30-32, 39 (1977).

Porter, W.E., C.L. Hunt, and N.E. Bolton, "A System for Labeling and Control of Toxic Materials in a Large Research Facility," Am. Ind. Hyg. Assoc. J. 38(1): 51-56 (1977).

Abstracts:

Hunt, C.L., Jr., D.B. Walters, and E. Zieger: Guidelines and Approaches for Safe Handling Procedures and Design of a High Hazard Laboratory for Life Scientists. 177th American Chemical Society National Meeting, Honolulu, Hawaii, April 2-6, 1979.

Hamrick, P.E., D.B. Walters, and C.L. Hunt: Integration of Radiation and Chemical Hazard Safety at NIEHS. 178th American Chemical Society National Meeting, Washington, D.C., September 10-14, 1979.

Walters, D.B., C.L. Hunt, and P.E. Hamrick: Training Program Concepts in Chemical Health and Safety in Federal Research Laboratories. 181st American Chemical Society National Meeting, Atlanta, Georgia, March 29-April 3, 1981.

Hunt, C.L., Jr.: Experimental Protocol System. American Industrial Hygiene Conference, Portland, Oregon, May 25-29, 1981.

Hunt, C.L., Jr., P.E. Hamrick, and J.M. Dement: Health and Safety Evaluation of Experimental Research via a Combined Hazardous Chemical/Radioisotope Protocol System. 187th American Chemical Society National Meeting, St. Louis, Missouri, April 8-13, 1984.

ITEM 8 - TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

Refer to item 10

Item 9 _ Facilities and equipment

X The facilities and equipment are the same as under the previous license. See attachments 2,3,4 and 6 of the previous submission along with additional documents submitted through amendment 29(license number 32-12358-01)

Additional equipment that has been purchased and is now being used is a Packard liquid scintillation counter(Model Tri-Carb 4530), a Canberra portable multichannel analyzer(Series 10), and several additional Geiger counters(either Ludlum Model 2 or Johnson Model GSM 10S).

The Packard liquid scintillation counter is being used in place of the Beckman LS8100 shown in attachment 3 of the previous application. The Beckman is now being used primarily as backup to the Packard. The portable multichannel analyzer is a basic piece of laboratory equipment useful for a variety of tasks from identification of unknown gamma emitters to use in our thyroid monitoring program. Over 50 Geiger counters are available for use by individual users and by the radiation safety staff.

Item 11- Waste Management

Waste management procedures are essentially unchanged from Attachment 8 of the previous application (License number 32-12358-01) for disposal, treatment and segregation. Both hazardous chemical and radioactive waste is handled under contract(present contractor is GSX Services and they in turn subcontract the radioactive waste disposal to Radiation Services Organization). The waste that is destined for land burial goes to Barnwell, S.C. Incineration procedures and facilities remain unchanged except for the addition of another model C1000(Consumat) incinerator on the south campus. Current air quality permits are attached. NIEHS is in the process of applying for a part B permit under RCRA for incineration of hazardous chemical waste in one of the pathological incinerators on south campus.

State of North Carolina
Department of Natural Resources and Community Development
Raleigh Regional Office

James G. Martin, Governor — DIVISION OF ENVIRONMENTAL MANAGEMENT — S. Thomas Rhodes, Secretary

July 22, 1987

Mr. Bert Drews
Environmental Compliance Specialist
National Institute of Environmental
Health Sciences
Post Office Box 12233
Research Triangle Park, NC 27709

SUBJECT: Air Permit No. 4226R5 - National Institute of Environmental Health Sciences, Research Triangle Park/Durham County

Dear Mr. Drews:

In accordance with your application received June 12, 1987, we are forwarding herewith Permit No. 4226R5 to the National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina for the construction and/or operation of air pollution abatement facilities or emission sources.

If any parts, requirements, or limitations contained in this Permit are unacceptable to you, you have the right to request an adjudicatory hearing within thirty (30) days following receipt of this Permit, identifying the specific issues to be contended. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, Post Office Drawer 11666, Raleigh, North Carolina 27604. Unless such demand is made, this Permit shall be final and binding.

If you wish to have the hearing before a Hearing Officer with this Department, you must indicate in the petition that you waive the right to have the contested case conducted by a Hearing Officer in the Office of Administrative Hearings, and wish to have the matter conducted in the Department of Natural Resources and Community Development.

This Permit shall be effective from October 1, 1987 until September 30, 1992, is non-transferable to future owners and operators, and shall be subject to the following specified conditions and limitations.

Sincerely,

R.W. Van Tilburg

R.W. Van Tilburg
Regional Supervisor

RWVT/EF/jf
cc: Mike Sewell
enclosure

3800 Barrett Drive, P.O. Box 27687, Raleigh, N.C. 27611-7687 • Telephone 919-733-2314

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

A I R P E R M I T

To Construct and Operate, and for the Discharge of Air Contaminants into the Atmosphere

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In accordance with the provisions of Article 21B of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations,

PERMISSION IS HEREBY GRANTED TO THE

National Institute of Environmental Health Sciences
Research Triangle Park, North Carolina

FOR THE

operation of:

(a) a natural gas-fired, 2100 pounds per hour, type II waste, multiple chamber incinerator, with a 2.0 million BTU per hour (minimum) primary burner and a 2.0 million BTU per hour (minimum) secondary burner,

(b) a natural gas-fired, 2100 pounds per hour, type II waste, multiple chamber incinerator with a 2.0 million BTU per hour (minimum) primary burner and a 2.0 million BTU per hour (minimum) secondary burner, and

(c) two natural gas-fired, 350 pounds per hour each, type IV waste, multiple incinerators, each with a 1.4 million BTU per hour (minimum) primary burner and a 1.5 million BTU per hour (minimum) secondary burner, and appurtenances to remove particulate, visible, and odorous emissions,

and operation of air cleaning devices and appurtenances consisting of:

(d) two multicyclones (32 nine-inch diameter tubes each) installed one each on two natural gas/No. 2 oil/coal-fired boilers (35 million BTU per hour maximum heat input each),

(e) a baghouse (400 square feet of cloth area) installed on a woodwaste collection system,

(f) a baghouse (240 square feet of cloth area) installed on an ash storage silo vent, and

(g) a baghouse (232 square feet of cloth area) installed on an incinerator vacuum pull-off system,

to remove particulate and visible emissions, and for the discharge of the treated air and associated stack gases into the outdoor atmosphere at its facility located on Alexander Drive, Research Triangle Park, North Carolina, Durham County,

in accordance with the application received June 12, 1987, and in conformity with the plans, specifications, and other supporting data, all of which are filed with the Department of Natural Resources and Community Development and are incorporated as part of this Permit.

This Permit shall be effective from October 1, 1987 until September 30, 1992, is non-transferable to future owners and operators, and shall be subject to the following specified conditions and limitations:

1. The Permittee shall comply with applicable Environmental Management Regulations, including 15 NCAC 2D .0503, .0505, .0516, .0522, and .0521, and .0535 and in no case shall sulfur dioxide emissions from the fuel burning equipment exceed 2.3 pounds per million BTU input.

2. Reports on the operation and maintenance of the facility shall be submitted by the Permittee to the Division of Environmental Management at such intervals and in such form and detail as may be required by the Division. Information required in such reports may include, but is not limited to, process weight rates, firing rates, hours of operation, and preventive maintenance schedules.

3. As required by 15 NCAC 2D .0535, when particulate, odorous, and/or visible emissions exceed Environmental Management Regulations for more than four hours, the Regional Supervisor, Raleigh Region, (919/733-2314), of the Division of Environmental Management, shall be notified as promptly as possible, but in no case later than 24 hours of becoming aware of the occurrence. Such notice shall specify the facility name and location, the nature and cause of the excess emissions, the time when first observed, the expected duration, and the estimated rate of emissions. This reporting requirement does not allow the operation of the facility in excess of Environmental Management Regulations.

4. This Permit is issued with the stipulation that in no case shall the sulfur content of No. 2 fuel oil exceed 0.5% by weight.

5. This Permit is issued with the stipulation that in no case shall:

   (a) the two 350 pounds per hour, type IV waste incinerators be operated in excess of 2080 hours per year each,

   (b) the older 2100 pounds per hour, type II waste incinerator be operated in excess of 4100 hours per year, and

   (c) the woodwaste collection system be operated in excess of 2080 hours per year.

6. This Permit does not relieve the Permittee of the responsibility of complying with all applicable requirements of any Federal, State, or Local water quality or land quality control authority.

7. The Permittee, at least ninety (90) days prior to the expiration of this Permit, shall request its extension by letter. The letter should include the permit number and a description of modifications, if any, that have been made.

8. This Permit is subject to revocation or modification upon a determination that information contained in the application or presented in support thereof is incorrect, conditions under which this Permit was granted have changed, or violations of conditions contained in this Permit have occurred. The facility shall be properly operated and maintained at all times in such a manner to effect an overall reduction in air pollution.

9. A violation of any term or condition of this Permit shall subject the Permittee to enforcement procedures contained in North Carolina General Statutes 143-215.114, including assessment of civil penalties.

Permit issued this the 22nd day of July, 1987.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

R.W. Van Tilburg

R.W. Van Tilburg, Regional Supervisor
Division of Environmental Management
By Authority of the Environmental Management Commission

State of North Carolina
Department of Natural Resources and Community Development
Raleigh Regional Office

James G. Martin, Governor DIVISION OF ENVIRONMENTAL MANAGEMENT S. Thomas Rhodes, Secretary
July 1, 1986

Mr. Philip E. Hamrick, Health & Safety Manager
National Institute of Environmental Health Sciences
Post Office Box 12233
Research Triangle Park, North Carolina 27709

SUBJECT: Air Permit No. 5877
National Institute of Environmental Health Sciences - North Campus
Research Triangle Park/Durham County

Dear Mr. Hamrick:

In accordance with your applications received June 13 and June 18, 1986, we are forwarding herewith Permit No. 5877 to the National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina for the construction and/or operation of air pollution abatement facilities or emission sources.

If any parts, requirements, or limitations contained in this Permit are unacceptable to you, you have the right to request an adjudicatory hearing within thirty (30) days following receipt of this Permit, identifying the specific issues to be contended. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, Post Office Drawer 11666, Raleigh, North Carolina 27604. Unless such demand is made, this Permit shall be final and binding.

If you wish to have the hearing before a Hearing Officer with this Department, you must indicate in the petition that you waive the right to have the contested case conducted by a Hearing Officer in the Office of Administrative Hearings, and wish to have the matter conducted in the Department of Natural Resources and Community Development.

This Permit shall be effective from July 1, 1986 until June 30, 1991, is non-transferable to future owners and operators, and shall be subject to the following specified conditions and limitations.

Sincerely,

R.W. Van Tilburg

R.W. Van Tilburg
Regional Supervisor

RWVT/PBW/jf
cc: Mike Sewell
enclosure

1800 Barrett Drive, P.O. Box 27687, Raleigh, N.C. 27611-7687 • Telephone 919-733-2314

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT

A I R P E R M I T

To Construct and Operate and for the Discharge of Air Contaminants into the Atmosphere

---

In accordance with the provisions of Article 21B of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations,

PERMISSION IS HEREBY GRANTED TO

National Institute of Environmental Health Sciences - North Campus
Research Triangle Park, North Carolina

FOR THE

operation of a natural gas-fired, multiple chamber incinerator burning type III and IV wastes with 500,000 BTU per hour primary and 1,000,000 BTU per hour secondary burners and appurtenances, to remove particulate, visible, and odorous emissions and for the discharge of the treated air into the atmosphere at its facility located on Alexander Drive, Research Triangle Park, Durham County,

in accordance with the applications received June 13 and June 18, 1986, and in conformity with the plans, specifications, and other supporting data, all of which are filed with the Department of Natural Resources and Community Development and are incorporated as part of this Permit.

This Permit shall be effective from July 1, 1986 until June 30, 1991, is non-transferable to future owners and operators, and shall be subject to the following specified conditions and limitations:

1. The facility shall be properly operated and maintained at all times in such a manner as to effect an overall reduction in air pollution in keeping with the application and otherwise to reduce air contamination to the extent necessary to comply with applicable Environmental Management Regulations, including 15 NCAC 2D .0505, .0521, .0522, and .0535(f).

2. Reports on the operation and maintenance of the facility shall be submitted by the Permittee to the Division of Environmental Management at such intervals and in such form and detail as may be required by the Division. Information required in such reports may include, but is not limited to, process weight rates, firing rates, hours of operation, and preventive maintenance schedules.

3. As required by 15 NCAC 2D .0535(f), when particulate, visible, and/or odorous emissions exceed Environmental Management Regulations for more than four hours, the Regional Supervisor, Raleigh Region, of the Division of Environmental Management, shall be notified as promptly as possible, but in no case later than 24 hours of becoming aware of the occurrence. Such notice shall specify the facility name and location, the nature and cause of the excess emissions, the time when first observed, the expected duration, and the estimated rate of emissions. This reporting requirement does not allow the operation of the facility in excess of Environmental Management Regulations.

4. The Permittee, at least ninety (90) days prior to the expiration of this Permit, shall request its extension by letter. The letter should include the permit number and a description of modifications, if any, that have been made.

5. This Permit is subject to revocation or modification upon a determination that information contained in the application or presented in support thereof is incorrect, conditions under which this Permit was granted have changed, or violations of conditions contained in this Permit have occurred.

6. A violation of any term or condition of this Permit shall subject the Permittee to enforcement procedures contained in North Carolina General Statutes 143-215.114, including assessment of civil penalties.

Permit issued this the 1st day of July, 1986.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

R.W. Van Tilburg

R.W. Van Tilburg, Regional Supervisor
Division of Environmental Management
By Authority of the Environmental Management Commission

Item 10 - Radiation Safety Program

10.1 Previous Licenses. The radiation safety program is essentially unchanged from the last application and documents submitted through amendment 29(license number 32-12358-01). Changes are as shown below.

10.2 Radiation Safety Committee. The committee functions, policies and charter remain unchanged except for the addition of the Health and Safety Manager as an ex-officio member of the committee. The qualifications of the current members of the committee as of Oct. 1,1987 are given in item 7 of this application. An updated copy of the charter was also included in item 7.

10.3 Radiation Safety Officer. The radiation safety officer and his responsibilities have not changed since the last application for license renewal. An updated resume for the radiation safety officer is included in item 7 of this application.

10.4 Administrative Procedures. Administrative procedures are essentially unchanged from the last application for renewal. Changes are given below.

10.4.1 Control of Procurement and use. Isotopes are ordered by individual investigators either through a purchase requisition which must be approved by the radiation safety officer before going to procurement or by a blanket purchase order in which the investigator phones in the order. A copy of the order is sent to the radiation safety office the same day as the order so that a check can be made regarding quantity and authority to order. All radioisotopes are shipped to and received by the radiation safety office before delivery to individual investigators. In addition to requiring that all radioisotope shipments be made to the radiation safety office, the warehouse and mail personnel have been instructed to deliver all shipments bearing a radiation label to the radiation safety office regardless of the address.

10.4.2 Safety Evaluations of Proposed uses. These procedures are essentially unchanged from the last application for renewal. A protocol is required for each different use of radioactive material which is reviewed by the radiation safety committee. A copy of the latest revision of the protocol form and instructions for its completion are attached. Also is attached the evaluation form the radiation safety committee uses and that is returned to the radiation safety office before approval or rejection of a proposed study. Investigators are required to keep their protocols current and request for updates or cancellations of protocols is made at least every 18 months. Copies of all current protocols are kept on file for reference.

10.5 Bioassays

The bioassay procedures are essentially unchanged from the last application except for the limits at which the bioassays will be performed. In the previous license application urine assay limits were set at 1 mCi for 3H labeled nucleotide precursors for open benchtop work. Since there were no guidelines for 14C, 35S, and 32P these were set at one-half those for tritium.

Since that time a Regulatory guide for "Applications of Bioassay for Tritium" by A. Brodsky has been developed and we wish to set our limits on the basis of this guide. Since most of our investigators work with less than 10 mCi of radioactive material, they would not be required to participate in the urine assay program under the new guidance. During the past 5 years we have had a relatively large percentage of our workers on urine assay program(over 100 at present) and have never found anything of concern above background. Therefore we request that the new limits be as follows:

Isotope	Activity processed per month (labeled compounds including nucleotide precursors)	
		10 mCi
3H		5 mCi
14C		5 mCi
35S		5 mCi
32P		
	Volatile or dispersible	Bound to non-volatile agent
125I	0.1mCi	1.0mCi

Note: The activity listed may be increased by a factor of 10 if work is performed within an approved fume hood. Activity processed is the larger of (a) or (b) where (a) is the activity used and disposed of per month and (b) is the maximum activity to which a person is exposed when making dilutions from stock solutions. The limits for 125I are based on Regulatory guide 8.20.

10.6 Emergency Procedures. A copy of the emergency occupant plan for the institute as well as specific procedures for spills of radioactive material is attached. At present we have no restricted areas due to the use of radioactive material. We do not anticipate this situation to change in the near future and would never expect to have more than one or two restricted areas. Emergency procedures would be posted in these restricted areas. Individuals working in or frequenting restricted areas will be instructed in safety procedures specific to the restricted area. In particular they will be informed of the location and storage of radiation sources or the location of radiation fields and in procedures to keep exposures as low as reasonably achievable. The use of any protective equipment and special monitoring or warning devices and their responsibilities in reporting conditions that would lead to violations of NRC limits or unnecessary exposure will be explained. These instructions will be in addition to our regular training program.

NIEHS in its efforts to keep radiation workers informed and in promoting safety procedures to keep exposures as low as reasonably achievable, requires that anyone who works with radioactive material have training in its safe use regardless of the activity that is being handled. This is accomplished through the evaluation of previous training, providing training at NIEHS through a course that is offered several times a year or by testing individuals on their knowledge of radiation safety. An outline of the course offered at NIEHS is attached.

GUIDELINES FOR COMPLETING PROTOCOL FORM FOR HAZARDOUS AND/OR RADIOACTIVE CHEMICAL USE

The Health and Safety Office receives many protocols that are incomplete or not properly filled out. So that you may have your protocol reviewed with minimum delay, the following guidelines have been developed. The Health and Safety Office is available to provide assistance in developing your protocol.

* All protocols must be typewritten.

* All protocols must be signed by the appropriate Laboratory/Branch Chief. Those not signed will be returned for this signature.

(Each of the following numbers relates directly to the protocol form currently being used at NIEHS).

1. List name of the principal user. The principal user is the person directly responsible for the use of the hazardous chemical or radioisotope. He/she must have the equivalent of 40 or more hours of training in the use of radioisotopes for protocols involving radioactive materials. Additionally, sufficient course work in general laboratory safety and the use/handling of potentially hazardous chemicals must be cited. All of this information must be on the training form which must be submitted with each protocol. The title of the principal investigator (i.e., chemist, staff fellow, etc.) and the Laboratory/Branch must be given.

2. Any person participating in the experiment must be listed if they handle any potentially hazardous or radioactive material. Training forms must also be submitted for them. In order to participate in using radioisotopes, or hazardous chemicals, each person must have at a minimum attended the NIEHS courses "Introduction to Radiation Safety", and "General Laboratory Safety ", or their equivalents. All individuals must be participants in the NIEHS Medical Surveillance Program.

3. List the full chemical name. Do not use any abbreviations at this point. They can be used later for the sake of brevity.

4. List the chemical abstract number for the chemical compound. This number can be found in TOXLINE, CHEMLINE and HAZLINE (check with the Library) or in some cases The Merck Index and the Registry of Toxic Effects of Chemical Substances.

5. List radioactive nuclides that will be used, such as ^{14}C, ^{3}H. Separate protocols should be filed for gamma emitters or high energy beta materials which require different safety procedures. If no radioactive isotopes are used write N/A.

6. List the maximum quantity in grams, you expect to purchase, store or have on hand at any particular time.

7. Give the maximum activity in mCi you expect to purchase, store or have on hand at any particular time.

8. Room number where hazardous material is stored.

9. Room where material will actively be used (may include room where stored).

10. Room where animals will be housed. The Comparative Medicine Branch (CMB) is responsible for assigning the rooms and all arrangements must be made through them. Animals are not permitted to be held in a laboratory over 24 hours unless permission is granted by the Chief, CMB. Give locations the animal will be held for all phases of the study.

11. List principal organic solvents that will be used. It is not necessary to list water. This includes the solvent in which the compound is disolved and other solvents used in the protocol if used in appreciable quantities (50 ml or more). Organic solvents used for extractions or in conjunction with analytical procedures are also to be listed.

12. Data for the following physical and chemical properties should be obtained from the literature. If it is not available write "not available".

    A. Give the chemical structure if known and the locations of the radiolabel if the compound is specifically labeled rather than uniformly labeled.

    B. Physical form such as suspended solid in liquid, liquid or gas.

    C. List the vapor pressure for compounds at temperatures proposed for use. Boiling points and flash points should be listed if known.

       It is important that a compound's vapor pressure be considered when designing the experiment, as this is a good predictor of potential inhalation exposures. Compounds with elevated vapor pressures under conditions of the experiment must be handled in a laboratory hood.

    D. List solubility in water and other solvents such as the one in which the material is dissolved or which would be useful for cleanup.

    E. List properties such as stability and reactivity and other conditions that could lead to a hazardous situation.

    F. List known toxic effects and references. If little is know, this should be stated. If certain toxic effects are suspected, then this must be stated.

13. A. List the maximum amounts (mg) and activity (mCi) you expect to use per month.

    B. List the maximum expected amount and activity to be used per experiment.

C. If animals are used, give the number of animals that will be used in any one experiment. That is, what is the maximum number of animals that will be used within a 1-5 day period.

D. Give the approximate dose per animal as 50 mg/kg and/or .05 mCi.

E. Give the method of dose administration as gavage, intraperitoneal, in the feed, etc.

F. Give length of time animals will be dosed. (i.e., single dose, or dosed for 3 days, etc.)

G. Give the time the animal will be held after dosing until sacrifice or completion of study.

H. Indicate if bedding and wastes products are hazardous. Some hazardous compounds may be completely metabolized, but if this is not known, then the bedding and waste products must be considered hazardous.

I. List where the experiment will be conducted. Solution preparation, dosing and some other procedures generally must be done in an approved containment chamber such as the hood. Open laboratory bench should be used cautiously. High Hazard Rooms are available for handling high toxicity materials.

J. Give a brief summary or rational for the project. If this project involves large amounts of hazardous materials and Institute resources, additional sheets may be needed for a detailed justification.

K. This section is to contain the procedures that will be used in working with the hazardous or radioactive material. If there are many steps involved, it may be necessary to attach a copy of the experimental protocol and then list the safety precautions that will be taken for the various steps. The procedures should be detailed enough to allow the reviewing committee(s) to make their evaluation of the hazards involved and the adequacy of the safety measures. Protocols which are too brief will be returned for additional information before being approved.

In developing the protocol, each step or process of the experiment should be carefully considered for potential employee exposures. Examples of critical operations which must be considered are as follows:

- transferring and weighing of materials (closed container techniques should be used). Where and how are these performed? This operation is to be described in all cases where a chemical is weighed.

- mixing, shaking or agitation (i.e., vortexing)

- lyophilization

- centrifugation
- analytical procedures (consider method of sample introduction and possible effluents from analytical instrument)
- dosing and holding of animals (please refer to NIEHS policy and procedures concerning animal studies employing toxic and radioactive substances contained in the NIEHS Safety and Health Manual).
- animal cage and bedding handling
- necropsy, tissue preparation, histology
- hazardous waste disposal
- transportation and storage associated with the operations listed above

The safety protocol should identify safe measures to be followed during each procedure along with personal protective equipment which will be used. Specific types of personal protective equipment should be identified rather than a general statement such as "protective clothing will be worn".

14. A. Procedures for cleaning and assuring that glassware, animal cages and work surfaces are free of contamination must be given. For example, list how glassware will be washed, the detergents or solvents used and how the glassware is monitored. Glass tubes may be monitored by placing liquid scintillation counting fluid in the tube, vortexing and placing the liquid in a counting vial and counting. Swipes may also be used for monitoring surface contamination. If disposable labware is to be used, this should be stated and the method of disposal identified.

    B. Wastes should be separated into solid, liquid and burnable categories as much as possible and by isotope, unless dual labeling is used. Estimates of disposition of the hazardous chemical or radioactive material should be made. Give estimates of the volume of wastes you expect to generate. If there are known characteristics which would make the material unsuitable for incineration or other methods of disposal, these should be listed. List any in-lab methods known or that will be used by you to inactivate the hazardous compounds. The proper pick-up request must be submitted to have the waste removed from the laboratory.

15. List the emergency procedure you would follow for a spill or fire. Do not simply list that the Safety Office will be called. List the methods most useful in cleanup and what precautions have to be observed as well as the order in which you will perform the procedures. A copy of this protocol must be given to all who are involved with the project and they should be thoroughly familiar with the emergency procedures.

Safety protocols are reviewed by Health and Safety Office personnel, the Radiation Safety Committee and a Hazardous Agent Review Committee as necessary. In planning your research, you should allow two weeks for protocol review and approval.

Outline

Introduction to Radiation Safety

I. Physical Characteristics of Radiation

1. Introduction - organization of course
2. Radiation defined - alpha, Beta, gamma
3. Stability of nuclides - binding energy
4. Transformation of nuclides - Discussion of chart of nuclides
5. Decay schemes
6. Half-life - Decay chart
7. Activity, specific activity, curies
8. Relative penetrability characteristics
9. Time, shielding and distance (inverse square law).

II. Radiation Dose, Units and Permissible levels.

1. Radiation detectors
2. Radiation dose - Rad, Roentger, Rem
3. Permissible doses
4. Critical organ concept
5. Maximum permissible concentrations - water, air
6. NIEHS Policy. ALARA

III. Biological Effects of Radiation

1. Short History
2. Acute radiation effects
3. Chronic radiation effects
4. Interaction of ionizing radiation with tissue
5. Factors affecting Biological Response
6. Miscellaneous Biological Effects

7. Risks of Somatic and genetic effects

IV. Safety Procedures

1. Isotopes used at NIEHS - Discussion by isotope of hazards and handling.

2. Contamination and decontamination - level & procedures

3. Common Safety Practices

4. Laboratory Classification

5. Procedures for handling spills and emergencies

6. Discussion of Radiation Safety Manual - training, procurement, bioassay, and waste disposal

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service
National Institutes of Health

Memorandum

Date

From Radiation Safety Officer

Subject Protocols for use of Radioisotopes

To Radiation Safety Committee

Attached is the protocol for ___ _____ for use of _____. Please review and return this sheet to me by _____.

I have reviewed the attached protocol for adequacy in the following areas. (Please Check)

	Adequate	Inadequate
1. Experience and training of personnel	☐	☐
2. Facilities, techniques and containment	☐	☐
3. Procedures to minimize personnel exposures	☐	☐
4. Waste Disposal	☐	☐
5. Emergency Procedures	☐	☐

Comments:

Signed _____ Date _____

NIEHS PROTOCOL FOR HAZARDOUS AND/OR RADIOACTIVE CHEMICAL USE

(Must be Typewritten)

Approved by_____Lab/Branch Chief _____Date

Senior Tenured Investigator Responsible For The Project

Name_____Signature_____

For Office Use
Date Received_____
Date Approved_____
By_____
_____
Protocol Number_____
Date-Latest Revision_____
_____
_____

* The principal user must ensure that every person involved in the experiment or in the laboratory is made aware of the hazards, the safety procedures which should be followed and is given a copy of this protocol.
* All individuals in the experiment must be participants in the NIEHS Medical Surveillance Program and have had a recent examination.
* In order for the protocol to be complete, a training form for each person involved must be attached.

---

1. Principal User_____Title_____Lab/Branch_____

2. Others who will participate in the experiment_____

_____

3. Chemical Name_____

4. Chemical Abstract Number for the above_____

5. Radioactive nuclides_____

6. Maximum quantity to be purchased or stored_____mg

7. Maximum activity to be purchased or stored_____mCi

8. Rooms where material will be stored_____

9. Rooms where material will be used_____

10. Rooms where animals will be housed_____Type of animal(rat, etc.)_____

_____

11. Principal Solvents used (as in preparing dose solutions and in extractions)_____

_____

12. Physical, Chemical and Toxicological Properties

A. Give the chemical structure (show the location of the label if specifically radiolabeled)_____

_____

_____.

B. Physical form (solid, liquid, gas)_____.

C. Vapor pressure or boiling and flash points (if applicable)_____

_____.

D. Solubility: water_____; or other solvent_____.

E. Other properties related to stability and reactivity (e.g., corrosive, heat or shock sensitive, etc.)_____.

F. Major known toxic effects

1. Acute_____

_____.

Reference_____

_____.

2. Chronic_____.

_____.

Reference_____

_____.

13. Description of Experimental Procedure

A. Expected amounts to be used per month_____mg _____mCi

B. Expected amounts to be used per experiment_____mg _____mCi

C. Approximate number of animals per experiment_____.

D. Approximate dose per animal_____mg _____mCi

E. Method of dose administration_____.

F. How long will the animals be dosed?_____.

G. How long will animals be housed after dosing?_____.

H. Are waste products and bedding considered hazardous?_____.

I. Where will experiment be conducted? (Specify hood, open benchtop, glove box, etc. and the part of the experiment to which it applies such as solution preparation or animal dosing).

J. Give a brief summary of the rationale for the experiment

K. Outline the procedures to be followed and the safety precautions to be taken. Include information on protective clothing and on where and how the material will be stored, handled, stock solutions prepared, transfers made and recovered and/or isolated. For radioactive materials include the use of shielding, use of radiation monitors, swipe tests, etc. Also include any special procedures for handling animals.

14. SAFETY PROCEDURES FOR DECONTAMINATION OR EQUIPMENT AND DISPOSAL OF HAZARDOUS CHEMICALS

A. Give procedures for cleaning and assuring decontamination of:

1. Glassware

2. Animal cages

3. Laboratory benches and hoods

B. Give procedures for disposal of wastes (can the material be chemically converted into innocuous substances; is incineration preferable and if so, how should chemical be packaged to minimize exposure to incinerator personnel; or if neither of these two options are possible, how should waste be packaged for burial in landfills?). Consider liquid (solutions), solid wastes, wash water, left over unused chemical, and animals in your description.

15. EMERGENCY PROCEDURES

Describe emergency and decontamination procedures to be followed in the event of an accidental spill or fire involving the material or other chemicals or solvents that are part of this research program. If respirators are required check this box ☐ . If this box is checked the Safety Officer will contact you about your specific requirements and supply the proper equipment and maintenance schedules. (The Safety Officer or Radiation Safety Officer should be notified in case of an accident).

A. Specific Actions:

B. Personnel Decontamination:

C. Laboratory Decontamination:

STATEMENT OF TRAINING AND EXPERIENCE FOR USE OF HAZARDOUS CHEMICALS, RADIOISOTOPES, OR BIOLOGICAL AGENTS

NAME_____ SUPERVISOR_____

LABORATORY/BRANCH_____ BLDG./ROOM_____ EXT._____

HIGHEST ATTAINED ACADEMIC DEGREE (CIRCLE ONE)

High School Technical School B.S. M.S. Ph.D./M.D./D.V.M.

EMPLOYMENT STATUS (CIRCLE ONE)

Research Scientist	Visiting Scientist	Expert
Visiting Associate	Staff Fellow	Guest Worker/Research
Visiting Fellow	Senior Staff Fellow	Technician
Stay-in-Schooler	Graduate Student (P or Q Appointment)	IPA

YEARS OF LABORATORY EXPERIENCE PAST ACADEMIC TRAINING_____

GENERAL, OR SPECIALIZED TRAINING IN LABORATORY SAFETY, SAFE HANDLING OF HAZARDOUS COMPOUNDS, RADIATION SAFETY, USE OF RADIOISOTOPES, BIOHAZARD SAFETY, ETC.

COURSE TITLE	INSTITUTION/LOCATION	DATE

EXPERIENCE IN HANDLING HAZARDOUS COMPOUNDS/RADIOISOTOPES/BIOLOGICAL AGENTS

DATE	AGENT/ COMPOUND/RADIOISOTOPE	AMOUNT/(G/mg) ACTIVITY (μCi)	TYPE OF STUDY	INSTITUTION/ LOCATION