CURRICULUM VITAE

January 2008

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Education:

1978 B.S., Allied Health (**magna cum laude**)
Merrimack College, North Andover, Mass.

1978 Certificate of Training, Medical Technology
Boston VA Hospital, School of Medical Technology
ASCP and AMA approved program
Boston, Mass.

1995 Ph.D., Toxicology, Genetics minor
(**summa cum laude, Phi Kappa Phi**)
North Carolina State University, Raleigh, North Carolina

2002 M.H.S., Clinical Research
Duke Clinical Research Institute
Duke University, Durham, North Carolina

Professional Experience:

1998 to present Health Scientist Administrator
Clinical Research Program
National Institute of Environmental Health Sciences
Research Triangle Park, NC

As a Health Scientist Administrator in the Clinical Research Program, my prime responsibilities are two fold. First, as an administrator, I am responsible for establishing and overseeing several large resources to promote clinical research at the NIEHS. This includes establishing a large DNA registry (n=20,000) in the NC Triangle region, conducting a national twin registry feasibility study, and managing a large multi-million dollar contract that provides all types of clinical research support to other investigators within the NIEHS. Secondly, as principal or co-principal investigator (PI or co-PI) of clinical research studies, I have designed and now

manage several large clinical research programs to identify the relative contributions of genetic and environmental risk factors to the development of complex conditions including polycystic ovary syndrome (a common endocrine disorder in women) and several birth defects including anencephaly, spina bifida, and hydrocephalus. I am also co-PI on the Head-off Environmental Asthma in Louisiana (HEAL) project. This is a prospective, controlled clinical research trial conducted in collaboration with Tulane University and the New Orleans Department of Health to test the effectiveness of an asthma counselor program in Post-Katrina New Orleans. Observational aspects of the HEAL study include collecting environmental data and samples, and correlating environmental allergen exposures to blood IgE levels and asthma symptomology.

For these and other projects, I am responsible for study design and planning, and estimating the resources required to complete the projects (funding, expertise, research and administrative personnel, equipment, facilities, etc). Other tasks include establishing surveillance programs, identifying and recruiting appropriate study populations, sample and data collection, and data management and analyses. I work directly with other co-investigators, study clinicians, managers/coordinators, data entry personnel, epidemiologists, and statisticians and oversee coordination of study activities between multiple clinical research sites, core facility labs, data coordinating centers, pharmacies, and other facilities. More specific responsibilities include developing scientific protocols, IRB protocols, and developing or overseeing the development of all study materials including consent forms, patient pamphlets and comprehensive questionnaires. Several of these efforts are funded under a contract mechanism, and therefore as Project Officer for these programs, I also develop Acquisition Plans, Requests for Contracts and other contract documents, oversee all levels of review, negotiate with potential contractors, and oversee contractors in all aspects of conducting the studies.

1995 to 1998 Postdoctoral biologist
Laboratory of Environmental Carcinogenesis and Mutagenesis (LECM)
National Institute of Environmental Health Sciences
Research Triangle Park, NC

As a postdoctoral biologist in the LECM, I conducted studies to distinguish the roles of prostaglandin synthases 1 and 2 (COX-1 and COX-2) in several pathological states (inflammation, gastric toxicity and colon carcinogenesis) using mice disrupted for these genes (*Ptgs-1* or *Ptgs-2*, respectively). The prostaglandin synthases are key enzymes that catalyze the biosynthesis of eicosanoids (prostaglandins and thromboxane) and are the major targets for nonsteroidal anti-inflammatory drugs (NSAIDs). The two COX isoforms are believed to have widely diverse roles; COX-1, the constitutive form, produces eicosanoids that mediate normal housekeeping functions and COX-2, the inducible form, produces protaglandins involved in pathological responses. The specific roles of COX-1 and COX-2 in development of these pathologies are important regarding the therapeutic and toxic effects of the nonselective (acetylsalycylic acid, ibuprofen) versus selective (Celebrex, Vioxx) NSAIDs. During these studies, my most important finding was that genetic deletion of either COX-1 or COX-2 dramatically reduced the number of intestinal polyps in APC^{Min} (multiple intestinal neoplasia) mice. Previously, only COX-2 deficiency was shown to reduce polyps in the Apc^{716} mouse (similar to the APC^{Min} mouse) and was

believed to be the only COX isoform involved in the carcinogenic process. I presented other data supporting an early role for COX-1 (initiation) and later role for COX-2 (promotion) in this carcinogenesis process.

1990 – 1995 Doctural candidate
Department of Toxicology
North Carolina State University
Raleigh, NC

For my thesis research under the direction of Drs. Robert Langenbach and Earnest Hodgson, I developed and characterized mammalian cell lines that expressed constitutive (COX-1) or inducible (COX-2) isoforms of prostaglandin synthase and used them to study signal transduction pathways, whose specific activation might differentially modulate the COX isozymes. I found that the COX isozymes differentially utilized endogenous arachidonic acid pools released following ligand (TPA, Ca++ ionophore A23187, NO) stimulation. I also studied the differential inhibition of the COX isoforms by various classes of NSAIDS and their differential activation of promutagens. Concurrently, I aided in developing other cell lines that expressed flavin monooxygenase and the cytochrome P450s, 2A6 and 4B1 and used these to study promutagen activation. Finally, I helped to characterize the COX-1 and -2 KO mice and showed that COX-1 KO mice, but not COX-2 KO mice, had little ability to aggregate platelets.

1989 – 1990 Research Scientist II
Medicinal Biochemistry Division
Burroughs Welcome, Inc.
Research Triangle Park, NC

At Burroughs Welcome, my primary responsibility was to develop analytical assays for compounds of preclinical or clinical status using HPLC equipped with on-line sample cleanup capabilities (Waters Automated Valve Station-WAVS). My class of compounds included acyl-CoA:cholesterol acyl transferase (ACAT inhibitors), which are used to decrease blood cholesterol and atherosclerotic plaque formation. I was also responsible for examining and modifying the formulation of these compounds to increase their absorption through the gut and therefore maximize bioavailability and efficacy.

1982 – 1989 Supervisor
Clinical Pathology Laboratory
National institute of Environmental Health Sciences
Research Triangle Park, NC 27709

I supervised up to 5 technicians and managed all activities associated with running the clinical pathology lab at NIEHS. This included scheduling and managing daily activities, instituting and maintaining a QC program that adhered to GLP and College of American Pathologists guidelines, and developing and implementing specialized procedures relevant to the needs of NIEHS and the National Toxicology Program.

Examples include the measurement of total bile acids and sorbitol dehydrogenase, and murine bone marrow evaluations (cell enumeration and phenotyping). I was involved in several research projects to: 1) determine the changes in bile acid profiles (HPLC) by chemical disruption of the enterohepatic circulation; 2) evaluate chenodeoxycholic acid as a promoter of neoplastic lesions in the liver; 3) characterize arsine gas-induced oxidative damage to RBCs; and 4) determine the hematopoietic toxicity of anti-AIDS. As an assistant to the clinical pathology discipline leader of the NTP, I also monitored all clinical pathology activities of multiple contract laboratories and performed site visits to evaluate their performance in diverse areas such as sample and data tracking, management, quality control, proficiency testing, assay methodology, instrumentation and maintenance.

1980 – 1982 Medical Technologist
Clinical Center
National Institutes of Health
Bethesda, MD

My responsibilities at NIH were to perform routine and specialized chemistry assays on human specimens using manual and automated methods. During my last 6 months at NIH, I supervised the Radioimmunoassay (RIA) Laboratory in which all routine thyroid function testing was conducted using ^{3}H and ^{125}I RIA methods.

1978 – 1980 Medical Technologist
Clinical Chemistry Laboratory
Georgetown University Medical Center
Washington, D.C. N.W.

My responsibilities at Georgetown University were to perform routine clinical chemistry assays on human specimens using manual and automated methods. I was also responsible for training all new personnel in both general and specialized laboratory procedures. During the last year of my employment at GUMC, I was a research assistant to the head of R&D. Our objectives were to identify, modify, and integrate new laboratory procedures into the routine lab.

Awards

1977 Merrimack College - Presidential Scholar
1978 Merrimack College - Presidential Scholar
1986 NIEHS - Quality Increase
1988 NIEHS - Quality Increase
1989 NIEHS - Cash Award
1993 NCSU - Invited to join Phi Kappa Phi Honor Society
1994 Environmental Mutagen Society Student Travel Award
1996 NIEHS - NIH Award of Merit
2000 Keynote speaker, annual Scientific Symposium of the Centre of Alimentary Research and Education (CARE) Meeting. University of Hong Kong
2000 NIEHS - Cash Award

2006 NIEHS – Cash Award

Certification

1978 MT, ASCP (American Society of Clinical Pathologists in Medical Technology)

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April 2005

Patricia (Blair) Chulada

Abstracts and Posters

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2. **Blair PC,** Maronpot RR, and Thompson MB. Clinical features of mononuclear cell leukemia in the Fischer 344 rat. Environ Health Perspect 75:141, 1987 and presented at the Annual Meeting of the American Association of Laboratory Animal Sciences (District 4), Raleigh, NC, July 1987.

3. Thompson MB and **Blair PC.** The validation and application of a HPLC post-column enzymatic assay for bile acids in rats. Environ Health Perspect 75:141, 1987.

4. Fowler BA, Moorman MP, Adkins B. Bakewell BE, **Blair PC,** and Thompson MB. Arsine: toxicity data from acute and short term inhalation exposures. Proc from Semiconductor Association Symposium on "Hazard Assessment & Control Technology in Semiconductor Manufacturing", Cinncinnati, OH, October 1987.

5. Germolec D, Rosenthal G. Ackermann M, Fort M, **Blair PC,** Thompson MB, and Luster M. Effects of selected anti-AIDS therapeutics on the immune function of B6C3F1 mice. Fed Am Soc Exp Biol J 2(4):913, 1988.

6. **Blair PC,** Bechtold M, Thompson MB, Moorman CR, Moorman MP, and Fowler BA. Evidence for oxidative damage to erythrocytes in rats and mice induced by arsine gas. Toxicoiogist 8(1) :19, 1988.

7. Rosenthal GJ, Fort MM, Germolec DR, Ackermann MF, **Blair PC,** Lamm KR, and Luster Ml. Effecs of subchronic exposure to arsine gas on immune function and host resistance. Toxicologist 8(1):19, 1988.

8. **Blair PC,** Thompson MB, Wilson RE, and Riley J. Effects of different anesthetics and sampling sites on serum analutes in the rat. Clin Chem 34(6):1196, 1988.

9. Luster Ml, Munson AE, Germolec D, Rosenthai G. Ackermann M, Fort M, **Blair PC,** McKay JA, Thompson MB and White K. Immunologic and hematologic effects of antinucleosides in mice, Presented at the IV International Conference on AIDS, Stockholm, Sweden, June 1988.

10. Thompson MB, Hawke RL, **Blair PC,** Zulkoski JS. Quantitation of free and conjugated bile acids in primary cultures of rat hepatocytes using a liquid/enzymatic assay. Presented at the Aspen Cholesterol - Bile Acid Conference, Aspen Colorado, August 1988.

11. Stranahan RP, Fort MM, Germolec DR, Ackermann M, **Blair PC,** Schwab KJ, Luster Ml and Rosenthal GJ. Immunomodulation by a recombinant human alpha interferon - evidence for divergent effects on immune effector cell function, Toxicologist 9(1):290, 1989 and presented at the 3rd Annual Easten Regional Symposium on Mechanisms of Immunotoxicity, Williamsburg, VA, October 1988.

12. Ward S. **Blair PC,** Ghanayem Bl. Hematologic effects of 2-butoxyethanol (BE) in vivo and its effects on the morphology of rat erythorcytes. Toxicologist 9(1):288, 1989.

13. Myers DL, **Blair PC**, Sutphin ME, Ward SM, Wilson RE, and Thompson MB. Effects of three diets and diet restriction on clinical chemistry variables in rats. Toxicologist 1 0(1) :666, 1 990.

14. Ward SM, Miller BE, Welch, DR, Myers DL, and **Blair PC.** Effects of anti-rat neutrophil antibody on circulating PMN levels. manual leukocyte differential vs technicon H-1. Toxicologist 10(1):666, 1990.

15. **Blair PC,** Wilson RE, and Thompson MB. Evidence of *in vivo* promotional acivity of chenodeoxycholic acid in the liver of rats. Toxicologist 10(1):666, 1990.

16. Stefanski SA, McMahon TF, Wilson RE, **Blair PC,** Clark AM, and Birnbaum LS. Enzymuria as an indicator of toxicity after administration of salicylic acid (SAL), 2,3-dihydroxybenzoic acid (2,3-DIOH), and 2,5-dihydroxybenzoic acid. Toxicologist 10(1):666, 1990.

17. Wilson RE, **Blair PC**, Myers DL, Ward SM, and Thompson MB. Effects of various combinations of carbondioxide and oxygen used for short-term anesthesia during collection of blood from rats. Toxicologist 10(1):666, 1990.

18. **Blair PC** and Smart RC. Tumor promoting phorbol ester cooperates with individual growth factors to eliminate serum requirement for fibroblast mitogenesis. Presented at NCSOT and Burroughs Wellcome Symposium, NC State University, Febuary 1991.

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21. **Chulada PC**, Winn VD, Young DA, Tiano HF, Tindall KR, Loftin CD, Eling TE, and Langenbach R. Development of mammalian cell lines stably expressing murine prostaglandin synthases 1 and 2. In Vitro 30A(3):83, 1994 and presented at the National Environmental Mutagen Society Meeting, Portland, Oregon, May 1994.

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24. **Chulada PC** and Langenbach R. Selective inhibition of murine prostaglandin synthase 1 or 2 by NSAIDs using mammalian cell lines retrovirally infected with murine prostaglandin synthase cDNAs. In Vitro 31(3):41A, 1995.

25. **Chulada PC**, Lee CA, Morham SG, Tiano HF, and Langenbach R. Inflammatory responses in cyclooxygenase-deficient mice. Lipid Mediators Conference, Keystone Symposia, Feb. 1997.

26. **Chulada PC**, Thompson MB, Mahler JF, Doyle CM, Gaul BW, Lee C, Tiano HF, Morham SG, Smithies O, Langenbach R. Genetic disruption of Ptgs-1, as well as Ptgs-2, reduces intestinal tumorigenesis in Min mice. Proceedings, American Association for Cancer Research 39:324, 1998.

27. **Chulada PC**, Deficiency of COX-1 or COX-2 reduces intestinal cancer in genetically predisposed or carcinogen treated mice. Keynote speaker at the 2nd Annual Scientific Symposium of the Centre of Alimentary Research and Education (CARE) Meeting. University of Hong Kong, Dec. 2000.

28. Zhang F, Whitehead NS, Levy PS, Corey LA, Vannappagari V, **Chulada PC**, Blackshear PJ. Genetic study of human complex disorders using twins: designs and sample size issues [Abstract 1573C]. Presented at the annual meeting of The American Society of Human Genetics, October 12, 2006, New Orleans, Louisiana (http://www.ashg.org/genetics/ashg/annmeet/2006/).

29. **Chulada PC**, Corey LA, Vannappagari V, Whitehead NS, and Blackshear PJ. The Feasibility of creating a population-based national twin registry in the US. Presented at the International Congress on Twin Studies, Ghent, Belgium, June 2007.

Publications

1. Ghanayem B, **Blair PC**, Thompson MB, Maronpot RR, and Matthews HB. Effect of age on the toxicity and metabolism or ethylene glycol monobutyl ether (2-butoxyethanol) in rats. *Toxicol Appl Pharmacol* 91**:** 222-34; 1987.

2. Thompson MB, **Blair PC,** Morris RW, Neptune DA, Deyo DF, and Popp JA. Validation and application of a liquid-chromatographic/enzymatic assay for individual bile acids in the serum of rats. *Clin Chem* 33**:** 1856-62; 1987.

3. Thompson MB, Chappell JD, Knuze DJ, and **Blair PC**. Bile acid profile in a dog with cholangiocarcinoma. *Vet Path* 26**:** 75-8; 1989.

4. Rosenthal GJ, Fort MM, Germolec DR, Ackermann MF, Lamm K, Thomas PH**, Blair PC,** and Luster MI. The effect of sub-chronic arsine inhalation on immune function and host resistance. *Inhal Toxicol* 1**:** 113-27; 1989.

5. Germolec DR, Yang RS, Ackermann MF, Rosenthal GJ, Boorman GA, **Blair PC** and Luster MI. Toxicology studies of a chemical mixture of 25 groundwater contaminants: (II) immunosuppression in B6C3F1 mice. *Fundam Appl Toxicol* 13: 377-87; 1989.

6. **Blair PC**, Thompson MB, Morrissey RE, Moorman MP, Sloane RA, and Fowler BA. Comparative study of arsine gas in B6C3F1 mice, Fischer 344 rats, and Syrian Golden hamsters: system organ studies and comparison of clinical indices of exposure. *Fundam Appl Toxicol* 14: 776-87; 1990.

7. **Blair PC**, Bechtold M, Thompson MB, Wilson RE, Moorman MP and Fowler BA. Evidence for oxidative damage to red blood cells in mice and rats induced by arsine gas. *Toxicology* 63**:** 25-34; 1990.

8. Rosenthal GJ, Stranahan RP, Thompson MB, **Blair PC**, Germolec DR, Comment CE, Schwab K, and Luster MI. Organ specific hematopoietic changes induced by a recombinant human alpha interferon in mice. *Fundam Appl Toxicol* 14: 666-75; 1990.

9. Luster MI, Germolec DR, White KL Jr., Fuchs BA, Fort MM, Tomaszewski JE, Thompson MB, **Blair PC**, McCay JA, Munson AE, and Rosenthal GJ. A comparison of three nucieoside analogs with anti-retroviral activity on immune and hematopoietic functions in mice: in vitro toxicity to precursor cells and microstromal environment. *Fundam Appl Toxicol* 101: 328-39; I 989.

10. Birnbaum LS, McDonald MM, **Blair PC**, Clark AM, and Harris MW. Differential toxicity of 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in C57BL/6J mice congenic at the Ah locus. *Fundam Appl Toxicol* 15: 186-200; 1990.

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12. **Blair PC**, Thompson MB, Wilson RE, Esber H. and Maronpot RR. Correlation of changes in serum analytes and hepatic histopathology in rats exposed to carbon tetrachloride. *Tox Letters* 55: 149-59; 1991.

13. **Blair PC**, Popp JA, Bryant-Varela BJ, and Thompson MB. Promotion of hepatocellular foci in female rats by chenodeoxycholic acid. *Carcinogenesis* **12:** 59-63; 1991.

14. McMahon TF, Stefanski SA, Wilson RE, **Blair PC,** Clark AM and Birnbaum LS. Comparative acute nephrotoxicity of salicylic acid, 2,3-dihydroxybenzoic acid in young and middle aged Fischer 344 rats. *Toxicology* 66: 297-311; 1991.

15. Tiano HF, Hosakawa M, **Chulada PC,** Smith PB, Wang R. Gonzalez FJ, Crespi CL, and Langenbach R. Retroviral mediated expression of human cytochrome P450 2A6 in C3H10T1/2 cells confers transformability by 4-(methyinitrosamino)-1-(3-pyridyl)-1-butanone (NNK) . *Carcinogenesis* 14: 1421–27; 1993.

16. **Chulada PC**, Loftin CD, Winn VD, Young DA, Tiano HF, Eling TE, and Langenbach R. Relative activities of retrovirally expressed murine prostaglandin synthase-1 and -2 depend on source of arachidonic acid. *Arch. Biochem Biophys* 330: 301-13; 1996.

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31. **Chulada PC**, Corey LA, Vannappagari V, Whitehead NS, and Blackshear PJ. The Feasibility of creating a population-based national twin registry in the United States. *Twin Res Hum Genet* 9: 919-926; 2007.

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