

March, 2010

CURRICULUM VITAE

Jonathan Daniel Heck, Ph.D., DABT

EMPLOYMENT ADDRESS

Lorillard Tobacco Company
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EDUCATION

- The University of North Carolina, Greensboro, NC
 - B.A., Biology; December, 1975
- The University of Texas Health Sciences Center, Houston, TX
 - Graduate School of Biomedical Sciences, 1978-83
 - Ph.D. Pharmacology/Toxicology, December, 1983
 - NIH-NRSA Training grant ESO 7090, 1979-1983

EMPLOYMENT

- Lorillard Tobacco Company
A. W. Spears Research Center
420 N. English St.
P.O. Box 21688
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 - **Biologist:** 3/1976 – 9/1978
 - (Graduate School) 9/1978 – 12/1983
 - **Toxicologist:** 1/1984 – 1/1986
 - **Manager, Life Sciences:** 1/1986 - 5/1996
 - **Scientist:** 5/1996 – 6/2003
 - **Principal Scientist:** 6/2003 - present

PROFESSIONAL ACTIVITIES

- **Local**
 - **Guilford County Hazardous Substances Task Force**, 1987 - 1990
 - **Invited guest lectures** “An Introduction to Toxicology”, 3 hours, presented in Chemistry 252 course, The University of North Carolina, Greensboro, 1988
 - **Invited guest lecture** “Animals in Biomedical Research”, Guilford College, Greensboro, NC, 1992
- **National**
 - **ad hoc grant reviewer**, NIH Pharmacology Study Section, 1990.
 - **Member, Board of Directors**, The Center for Indoor Air Research, Linthicum, MD, 1993 - 1999
 - **Manuscript peer reviewer**, *Tobacco Science, Life Sciences, Food and Chemical Toxicology, Beiträge zur Tabakforschung International/Contributions to Tobacco Research, Inhalation Toxicology, Toxicological Sciences, Regulatory Toxicology and Pharmacology*
 - **Member, Anethole Task Force/Working Group**, Flavor and Extract Manufacturers Association of the United States; 1995 - 1998

- **Member, Safety Evaluation Coordinating Committee**, Flavor and Extract Manufacturers Association of the United States, 2001 - present
- **Editorial Advisory Board, *Beiträge zur Tabakforschung International / Contributions to Tobacco Research***, 2003 - present
- **Editorial Board, *Inhalation Toxicology***, December, 2003- present
- **Session Chairman**, 63rd Tobacco Science Research Conference, September, 2009
- **Industry**
 - **Cigarette Ingredients Scientific Panel**, 1991- present
 - **Board Member, N.C.S.U. Research and Extension Committee**, Tobacco Foundation, 1996 - 2001
 - **Member, CORESTA Task Forces** on Nicotine Intake, Smoking Behavior, and *in vitro* Toxicity Testing of Tobacco Smoke
 - **Annual Cigarette Ingredients Reporting** to the C.D.C. Office on Smoking and Health
 - **Presentation to Dr. Gregory A. Connolly & the scientific advisory panel of the Massachusetts Department of Health** in regard to proposed cigarette testing requirements: “A physiological & pharmacological perspective on proposed *Cigarette Free Nicotine Reporting Requirements*, 105 CMR 660.104”; Boston, MA; October 27, 2003
 - **Formal comment submitted to the California Air Resources Board (CARB)** in response to proposal to regulate environmental tobacco smoke in outdoor air. [J. Daniel Heck, Ph.D., DABT, Patricia Martin, Ph.D., DABT and Carr J. Smith, Ph.D., DABT, *Scientific Affairs, for the Lorillard Tobacco Company*; March, 2004]

PROFESSIONAL MEMBERSHIPS

- Society of Toxicology 1985 - present
- American College of Toxicology 1984 - 1994
- Environmental Mutagen Society 1985 - 2008
- Diplomate, American Board of Toxicology, 1987. Recertified in 1993, 1998, 2003, 2008 (through 2013).

ADDITIONAL TRAINING AND CONTINUING EDUCATION

- **Workshop on Mammalian Mutagenesis Assays**; Bethesda, MD, April 8-9, 1986

- **Genetic Toxicology Workshop**, Microbiological Associates; Bethesda, MD , Dec.2-4, 1986
- **Mid-America Toxicology Course**, K. D. Klaassen, Director; Kansas City, KS, April 27-May 1, 1987
- **Good Laboratories Practices Short Course**, Argus Laboratories; May 11, 1988
- **Society of Toxicology Continuing Education Courses:**
 - *Respiratory Tract Toxicology by Classes of Agents*; Dallas, TX, February, 1988
 - *Statistics for Toxicologists*; Atlanta, GA, February 27, 1989
 - *Carcinogen Risk Assessment and Free Radical Toxicology*; Miami, FL, February 12, 1990
 - *Risk Communication and Novel Techniques in Inhalation Toxicology*; Dallas, TX, February 25, 1991
 - *Case Studies in Risk Assessment: Emphasis on Exposure*; Seattle, WA, February 22, 1992
 - *Pulmonary Immune Responses*; Dallas, TX, March 13, 1994
 - *Advanced Methods in Molecular Biology for Toxicologists*; Baltimore, MD, March 5, 1995
 - *Epidemiology for Toxicologists*; Anaheim, CA, March 10, 1996
 - *International Harmonization of Non-Clinical Toxicology Requirements: Regulation vs. Practice and Integration of Mechanistic, Pathologic, and Toxicokinetic Data in Safety Assessment*; Seattle, WA, March 1, 1998
 - *Target Organ Toxicology: Respiratory Tract Dosimetry and Response to Inhaled Toxicants*; New Orleans, LA, March 14, 1999
 - *Toxicokinetics and Physiologically-Based Toxicokinetics in Toxicology and Risk Assessment and Environmental Epidemiology and Toxicology: The Interface and the Interactions*; Philadelphia, PA, March 19, 2000
 - *Development and Use of Transgenic Animal Models in Toxicology*; San Francisco, CA, March 25, 2001

- *Basic Principles and Protocols in Molecular Toxicology and Internal Dosimetry: Measurement of DNA Damage as an Indicator of Internal Exposure*; Nashville, TN, March 17, 2002
- *Fundamentals of Risk Assessment and Applications of Recent Methodologies to Difficult Problems and Epigenetics of Cancer*, Salt Lake City, UT, March 9, 2003
- *Tools for Functional Genomics*, Baltimore, MD, March 21, 2004
- *Assessing Airway Injury and Remodeling Induced by Inhaled Pollutants Using MRI, Microscopy and Modeling*; San Diego, CA, March 5, 2006
- *Epidemiology for Toxicologists*; Seattle, WA, March 16, 2008
- *Principles and Applications of Toxicokinetics*; Baltimore, MD, March 15, 2009.
- **Statistical Analysis of Laboratory Data**, ACS Short course; November 6-8, 2001, Greensboro, NC

Attachment: bibliography

PUBLICATIONS

Jonathan Daniel Heck, Ph.D., DABT

ABSTRACTS & PRESENTATIONS

1. **Heck, J. D.**, Mehta, C. S., and Murphy, S. D. Hydrolysis of Phthalate Esters by the Intestinal Mucosa of the Rat and its Inhibition by a Carboxylesterase Inhibitor. The Society of Toxicology, 19th Annual Meeting, 1980.
2. Abbracchio, M. P., Bonura, J., Caprioli, R., **Heck, J. D.**, and Costa, M. Surface Charge of Amorphous and Crystalline Metal Sulfide Particles May Relate to Their Phagocytic and Toxic Activity in Tissue Culture. American Society for Pharmacology and Experimental Therapeutics, 1981.
3. **Heck, J. D.**, Abbracchio, M. P., and Costa, M. Potentiation of Phagocytic Uptake of Noncarcinogenic Amorphous Nickel Sulfide Particles Results in Morphological Transformation of S.H.E. Cells. The Toxicologist 2(1), 47, 1982.
4. **Heck, J. D.** and Costa, M. Factors Which Modulate the Phagocytosis of Potentially Carcinogenic Nickel Sulfide Particles. The American Association for Cancer Research Proceedings, 1982.
5. Costa, M., Robison, S. H., **Heck, J. D.**, Evans, R. M., and Abbracchio, M. P. Sequential Events in the Induction of Transformation in Cell Culture by Specific Nickel Compounds. The American Association for Cancer Research Proceedings, 1982.
6. **Heck, J. D.**, Wang, D. S., and Costa, M. The Role of Zeta Potential in the Interaction of Particulates and Cells. The Toxicologist 3, 1983.
7. **Heck, J. D.** and Costa, M. Contribution of Particle Dissolution to Differential Uptake Among Nickel-Containing Particulates. The American Society for Pharmacology and Experimental Therapeutics, 1983.
8. Ratajczak, H., Thomas, P., Vollmuth, T., **Heck, J. D.**, Sothern, R., and Hrushesky, W. Seasonal Variation of Antibody Formation and Host Resistance in the Mouse. Midwest Autumn Immunology Conference, Nov. 16, 1987.
9. Ratajczak, H., Thomas, P., Vollmuth, T., **Heck, J. D.**, Sothern, R., and Hrushesky, W. Seasonal Variation of Murine Antibody Formation and Host Resistance. Federation Proceedings 2(6), 1988.

10. Vollmuth, T. A., **Heck, J. D.**, Ratajczak, H. V., and Thomas, P. T. Immunotoxicity Assessment of Flavoring Ingredients Using a Rapid and Economical Screen. The Toxicologist 9(1), 206, 1989.
11. **Heck, J. D.**, Vollmuth, T. A., Cifone, M. A., Jagannath, D. R., Myhr, B., and Curren, R. D. An Evaluation of Food Flavoring Ingredients in a Genetic Toxicity Screening Battery. The Toxicologist 9(1), 257, 1989.
12. **Heck, J. D.**, Wenk, M. L., and Bennett, M. B. Mouse Skin Painting Bioassay of Cigarette Smoke Condensates for Promoting Activity in ICR Swiss and SENCAR Mice. The Toxicologist 10(1), 234, 1990.
13. Ratajczak, H. V., Thomas, P.T., Sothorn, R. B., Vollmuth, T. and **Heck, J. D.** Evidence for Genetic and Seasonal Differences in Antibody Formation and Host Resistance Between Two Mouse Strains. FASEB Journal, A1003, 1991.
14. **Heck, J. D.**, Gaworski, C. L., Lake, R. S., Dozier, M. M., Deaton, A. P. and Vollmuth, T. A. Application of a System for the Direct *in vitro* Exposure of Mammalian Cells to Cigarette Smoke in Studies of DNA Strand Breaks. The Toxicologist 12(1), 58, 1992.
15. Lake, R. S., Gaworski, C. L., Deaton, A. P., Dozier, M. M., and **Heck, J. D.** Antioxidant Modulation of DNA Strand Breaks in Chinese Hamster Ovary Cells Exposed Directly to Cigarette Smoke. The Toxicologist 12(1), 57, 1992.
16. Lake, R. S., Gaworski, C. L., Crouse, E. W. and **Heck, J. D.** Phenotypic Instability of Salmonella Strain YG1024 During Mutagenicity Assays of Arylamine Promutagens. Environmental Mutagen Society, April 17-22, 1993.
17. Deaton, A.P., Dozier, M.M., Lake, R.S., and **Heck, J. D.** Acute DNA Strand Breaks Induced by Acrolein are Distinguished from Those Induced by Other Aldehydes by Modulators of Active Oxygen. Environmental Mutagen Society, April 17-22, 1993.
18. Gaworski, C.L., Vollmuth, T.A., **Heck, J. D.**, Ledbetter, A., Johnson, W.D., Aranyi, C., and Brenneke, L.H. Subchronic Inhalation Studies with Citral in F344/N Rats. The Toxicologist 13(1), #523, March, 1993.
19. Dozier, M. M.; Gaworski, C. L.; **Heck, J. D.**; Ratajczak, H. V.; Thomas, P.T. Local and systemic humoral immune response in rats exposed to mainstream cigarette smoke as assessed by a plaque-forming cell assay. Found. Immunotoxicol. Ann. Symp., 9th, Sep 1-2, 1994.
20. Ratajczak, H. V.; Sothorn, R. B.; Thomas, P. T.; **Heck, J. D.**; Gaworski, C. L.; Dozier, M. M. Influence of Gavage on Systemic Immunity in the Mouse. The FASEB Journal, 8, A256, 1994.

21. Ratajczak, H. V.; Sothorn, R. B.; Thomas, P. T.; **Heck, J. D.**; Gaworski, C. L.; Dozier, M. M. Influence of Gavage on Seasonality of Systemic Immunity and Organ Weights in the B6C3F1 Mouse. The FASEB Journal, **8**, 1994.
22. Ratajczak, H. V.; Sothorn, R. B.; Thomas, P. T.; **Heck, J. D.**; Gaworski, C. L.; Dozier, M. M. Influence of of Vehicle Gavage on Seasonality of Systemic Immunity and Organ Weights in the B6C3F1 Mouse. International Conference of Chronopharmacology and Chronotherapeutics, 1994.
23. Gaworski, C. L., Dozier, M. M., **Heck, J. D.**, Gerhart, J. M., Rajendran, N., Aranyi, C. and Brennecke, L.H. A 13-Week Inhalation Toxicity Study of Menthol Cigarette Smoke. International Congress of Toxicology-VII, July 2-6, 1995.
24. Lake, R. S.; Gaworski, C. L.; Crouse, E. W.; **Heck, J. D.** Fresh whole smoke mutagenicity assay with YG *Salmonella* strains. Environmental and Molecular Mutagenesis, **25**, Abstract #29, 1995.
25. Lake, R. S.; Crouse, E. W.; Leverette, R. D.; Gaworski, C. L.; **Heck, J. D.** Cigarette Smoke Mutation Profile Determined with Base Substitution-Specific *Salmonella* Strains. Environmental and Molecular Mutagenesis, **27**(Supp. 27), 39, 1996.
26. Gaworski, C. L., **Heck, J. D.**, and Rajendran, N. Toxicologic Evaluation of Glycerin and Propylene Glycol Added to Cigarette Tobacco: 13-Week Inhalation Studies in Fischer-344 Rats. 53rd Tobacco Science Research Conference, poster #5, Montreal, September 12-15, 1999.
27. Gaworski, C. L., **Heck, J. D.**, Bennett, M. B., and Wenk, M. L. Toxicologic Evaluation of Flavor Ingredients Added to Cigarette Tobacco- SENCAR Mouse Skin Painting Assays. 53rd Tobacco Science Research Conference, poster #6, Montreal, September 12-15, 1999.
28. Misra, M., **Heck, J. D.**, Gaworski, C.L., Rajendran, N. Toxicologic Evaluation of Diammonium Phosphate Added to Cigarette Tobacco: 13-Week Smoke Inhalation Studies in Rats. 55th Tobacco Science Research Conference, poster #18, Greensboro, NC, September 9-12, 2001.
29. Misra, M., **Heck, J. D.**, Gaworski, C. L., Rajendran, N., Morrissey, R. L. Diammonium phosphate employed as a cigarette ingredient: 13-week cigarette smoke inhalation study in the rat. The Toxicologist **66**(1) abstract #1311, 2002.
30. Yee, S., Misra, M., Leverette, R. D. Vulimiri, S.V. and **Heck, J. D.** Differentiating initiating from promoting effects of cigarette mainstream smoke in the production of lung

tumors in a mouse inhalation bioassay. 58th Tobacco Science Research Conference, paper #58, Winston-Salem, NC, Sept.19-22, 2004.

31. M. Misra, R. D. Leverette, J. T. Hamm, M. B. Bennett, **J. D. Heck**, R. Morrissey, N. and N. Rajendran. Toxicological evaluation of a cigarette paper with reduced ignition propensity: in vitro and in vivo tests. *The Toxicologist*, 84 (S-1), 1186, 2005.

32. S. F. Yee, M. Misra, R.D. Leverette, S.V. Vulimiri, **J. D. Heck**, N. Rajendran, and J.T. Hamm. Differentiating initiating from promoting effects of cigarette mainstream smoke in the production of lung tumors in a mouse inhalation bioassay. *The Toxicologist*, 84 (S-1), 1517, 2005.

33. **J. D. Heck**, K. H. Reinert and P. Martin. A Pilot Study Comparing Biomarkers of Exposure in Smokers of Menthol and Non-Menthol Cigarettes. *The Toxicologist*, 102 (S-1), Abstract #1737, 2008.

34. M. H. Hughes and **J. D. Heck**. Black and White Smokers of Cigarettes Exhibit Similar Levels of Smoke Biomarkers. *The Toxicologist* abstract #1189, 2009.

SCIENTIFIC PAPERS

1. Abbracchio, M. P., **Heck, J. D.**, Caprioli, R. M., and Costa, M. Differences in Surface Properties of Amorphous and Crystalline Metal Sulfides May Explain Their Toxicological Potency. *Chemosphere* 10(8), 897-908, 1981.
2. **Heck, J. D.** and Costa, M. Surface Reduction of Amorphous NiS Particles Potentiates Their Phagocytosis and Subsequent Induction of Transformation of Syrian Hamster Embryo Cells. *Cancer Letters* 15, 19-26, 1982.
3. Abbracchio, M. P., **Heck, J. D.**, and Costa, M. The Phagocytosis and Transforming Activity of Crystalline Metal Sulfide Particles is Related to Their Surface Charge. *Carcinogenesis* 3(2), 175-180, 1982.
4. Costa, M. and **Heck, J. D.** Specific Nickel Compounds as Carcinogens: Overloading by Selective Phagocytosis of Nickel Sulfide Particles Results in DNA Damage and Transformation. *Trends in Pharmacological Sciences* 3, 408-410, 1982.
5. Costa, M., **Heck, J. D.**, and Robison, S. H. Selective Phagocytosis of Crystalline Metal Sulfide Particles and DNA Strand Breaks as a Mechanism for the Induction of Cellular Transformation. *Cancer Research* 42, 2757-2763, 1982.

6. **Heck, J. D.** and Costa, M. Extracellular Requirements for the Endocytosis of Carcinogenic Nickel Sulfide Particles by Facultative Phagocytes. Toxicology Letters **12**, 243-250, 1982.
7. Abbracchio, M. P., Evans, R. M., **Heck, J. D.**, Cantoni, O., and Costa, M. The Regulation of Ionic Nickel Uptake and Cytotoxicity by Specific Amino Acids and Serum Components. Biological Trace Element Research **4**, 319-330, 1982.
8. **Heck, J. D.** and Costa, M. The In Vitro Assessment of the Toxicity of Metal Compounds, I. Mammalian Cell Transformation. Biological Trace Element Research **4**, 71-82, 1982.
9. **Heck, J. D.** and Costa, M. The In Vitro Assessment of the Toxicity of Metal Compounds, II. Prokaryotic and Eukaryotic Mutagenesis. Biological Trace Element Research **4**, 289-301, 1982.
10. **Heck, J. D.**, and Costa, M. 1982. Surface reduction of amorphous NiS particles potentiates their phagocytosis and subsequent induction of transformation of Syrian hamster embryo cells. Cancer Letters **15**:19-26.
11. Robison, S. H., Cantoni, O., **Heck, J. D.**, and Costa, M. Soluble and Insoluble Nickel Compounds Induce DNA Repair Synthesis in Cultured Mammalian Cells. Cancer Letters **17**, 273-279, 1983.
12. **Heck, J. D.** and Costa, M. Influence of Surface Charge and Dissolution on the Selective Phagocytosis of Potentially Carcinogenic Particulate Metal Compounds. Cancer Research **43**, 5652-5656, 1983.
13. Ratajczak, H., Thomas, P., Vollmuth, T., **Heck, J. D.**, Sothern, R., and Hrushesky, W. Seasonal Variations of Host Resistance and In Vitro Antibody Formation of Spleen Cells from the B6C3F1 Mouse. In: Annual Review of Chronopharmacology (A. Reinberg, M. Smolensky and G. Labrecque (eds.), Pergamon Press, Oxford, 49-52, 1988.
14. Ratajczak, H. V., Thomas, P. T., Sothern, R. B., Vollmuth, T., and **Heck, J. D.** Reproducibility of Seasonal Effects in Antibody Formation and Host Resistance in the Outbred Mouse. Chronobiology International **8**(1), 44-55, 1991.
15. Gaworski, C. L., Vollmuth, T. A., York, R. B., **Heck, J. D.**, and Aranyi, C. Developmental Toxicity Evaluation of Inhaled Citral in Sprague-Dawley Rats. Food and Chemical Toxicology **30**(4), 269-275, 1992.
16. Lake, R. S., Gaworski, C. L., Crouse, E. L., and **Heck, J. D.** Phenotypic Instability of Salmonella Strain YG1024 During Mutagenicity Assays of Arylamine Mutagens. Mutation Research **301**, 157-163, 1993.

17. Ratajczak, H. V., Thomas, P. T., Sothorn, R. B., Vollmuth, T. and **Heck, J. D.** Evidence for Genetic Basis for Seasonal Differences in Antibody Formation Between Two Mouse Strains. Chronobiology International 10(5), 383-394, 1993.
18. Gaworski, C. L., Vollmuth, T. A., Dozier, M. M., **Heck, J. D.**, Dunn, L. T., Ratajczak, H. V. and Thomas, P. T. An Immunotoxicity Assessment of Food Flavoring Ingredients. Food and Chemical Toxicology 32(5), 409-415, 1994.
19. Gaworski, C. L., Dozier, M. M., Gerhart, J. M., Rajendran, N., Brennecke, L. H., Aranyi, C. and **Heck, J. D.** 13-Week Inhalation Toxicity Study of Menthol Cigarette Smoke. Food and Chemical Toxicology 35, 683-692, 1997.
20. Gaworski, C. L., Dozier, M. M., **Heck, J. D.**, Gerhart, J. M., Rajendran, N., David, R. M., Brennecke, L.H. and Morrissey, R. Toxicologic evaluation of flavor ingredients added to cigarette tobacco: 13 week inhalation exposures in rats. Inhalation Toxicology 10, 357-381, 1998.
21. Gaworski, C. L., **Heck, J. D.**, Bennett, M. B. and Wenk, M. L. Toxicologic evaluation of flavor ingredients added to cigarette tobacco: skin painting bioassay of cigarette smoke condensate in SENCAR mice. Toxicology 139, 1-17, 1999.
22. **Heck, J. D.**, Misra, M. and Coggins, C. R. E. The toxicological assessment of tobacco products: in vivo approaches. Recent Advances in Tobacco Science 28, 137-165, 2002.
23. **Heck, J. D.**, Gaworski, C.L., Rajendran, N. and Morrissey, R. L. Toxicologic evaluation of humectants added to cigarette tobacco: 13-week smoke inhalation study of glycerol and propylene glycol in Fischer-344 rats. Inhalation Toxicology 14, 1135-1152, 2002.
24. **Heck, J. D.** Smokers of Menthol and Nonmenthol Cigarettes Exhibit Similar Levels of Biomarkers of Smoke Exposure. Cancer Epidemiology, Biomarkers and Prevention 18(2), 622-629, 2009.
25. **Heck, J. D.** A Review and Assessment of Menthol Employed as a Cigarette Flavoring Ingredient. Food and Chemical Toxicology 48, S1-S38, 2010.

BOOK CHAPTERS

1. Costa, M. and **Heck, J. D.** Perspectives on the Mechanism of Nickel Carcinogenesis. Chapter 8 in: Advances in Inorganic Biochemistry (G. L. Eichorn and L. G. Marzilli, eds.), Vol. 6, Elsevier, New York, pp 285-309, 1984.
2. Costa, M. and **Heck, J. D.** Metal Ion Carcinogenesis: Mechanistic Aspects. Chapter 9 in: Metal Ions in Biological Systems (Helmut Sigel, ed.), Vol. 20, Marcel Dekker, New York, pp 259-278, 1986.
3. **Heck, J. D.** and Costa, M. Methods for the In Vitro Assessment of Metal Ion Toxicity. Chapter 10 in: Metal Ions in Biological Systems (Helmut Sigel, ed.), Vol. 20, Marcel Dekker, New York, pp 279-303, 1986.
4. Ratajczak, H., Thomas, P., Gibbons, R., **Heck, J. D.** and Vollmuth, T. Seasonal Influence on Murine Immune Function. in Chronobiology: Its Role in Clinical Medicine, General Biology, and Agriculture, Part A (D. K. Hayes, J. E. Pauly, and R. J. Reiter, eds.), Wiley-Liss, Inc., pp 493-501, 1990.

PUBLISHED LETTER

1. **Heck, J. D.** Industry affiliations and scientific conclusions. [Letter to the Editor]. Journal of the American Medical Association, 280(13), October 7, 1998, p. 1141.