

L. Earl Gray, Jr.

Education

- B.S., Cornell University, Ithaca, NY; Biology, 1967.
- Ph.D., North Carolina State University, Raleigh, NC; Zoology, 1976.

Professional Experience

- 1979-present: Research Biologist, EPA.

Research Interests

- Cellular and molecular mechanisms of toxicant-induced alterations of morphological and behavioral sexual differentiation in male and female rodents.

Professional Activities

- Editorial Boards: Journal of Toxicology and Environmental Health, Biology of Reproduction.
- Undergraduate, graduate, and postdoctoral trainee research advisor: University of Florida, North Carolina State University, and University of North Carolina at Chapel Hill.
- Member, Organizing Committee, Ten Year Review of Endocrine Disrupting Chemicals Research for meeting at the Finnish Academy of Science. 2006.
- Symposium organizer and co-chair, International Toxicology Association, meeting on sexually dimorphic behavior and nervous system development. 2007.
- Member, Expert Science Panel for Bisphenol A, Center for the Evaluation of Risks to Human Reproduction. 2007.
- Member, Organizing Committee, Copenhagen meetings on endocrine disrupting chemicals and reproductive health. 2004 and 2007.
- Chair, Workshop on Mechanisms of EDC Action, Finland Academy of Science. 2006.
- Two EPA bronze medals, 2005.
- Member of organizing committee, and speaker, Copenhagen Workshop on the Environment, Reproductive Health and Fertility. 2005.
- Instructor, Teratogens Update Course, Massachusetts General Hospital, Boston, MA. 2005.
- Member, Endocrine Disrupting Chemicals Research Planning Committee, National Health and Environmental Effects Research Laboratory, EPA. 2000-present.
- Member, Endocrine Disruptors Research Strategy Committee, Office of Research and Development, EPA. 1996-present.

Invited Lectures/Symposia

- International Neurotoxicology Association Symposium: Effects of EDCs on sexually dimorphic behavioral and nervous system development. 2007.
- 4th Copenhagen Workshop on Endocrine Disruptors (organizer, session chair, and speaker): Cumulative reproductive effects on in utero administration of mixtures of anti-androgens in male SD rats: Synergy or additivity? 2007.
- British Toxicology Society, Annual Congress, Symposium on Chemical Interactions and Implications for Risk Assessment: Cumulative effects of antiandrogens in male rat sexual differentiation: Synergy or additivity? 2007.
- Workshop on Phthalate Effects on Reproductive Health II. Paris, France. 2006.
- Center for Alternatives to Animal Testing, Developmental Neurotoxicity Testing Symposium: Strategies to reduce or replace the use of animals in endocrine screening and testing studies. 2006.
- United Kingdom Food Safety Committee Meeting on Endocrine Disrupting Chemicals: Mixtures of antiandrogens. 2006.
- California legislative subcommittee hearing: Testimony on reproductive toxicity of phthalates. 2006.
- National Institute of Diabetes and Digestive and Kidney Diseases/National Institutes of Health, Meeting, Bethesda, MD: Research needs in pediatric urology. 2005.
- Phthalate Esters and Reproductive Health European Workshop, Mello, France: Mechanism of phthalate-induced developmental reproductive toxicity: Inhibition of testosterone and insulin-like hormone 3 production by fetal and pubertal Leydig cells. 2004.
- Gordon Conference, New London, NH, Endocrine Disrupting Chemicals. 2004.
- EPA, Endocrine Disruptor Methods Validation Subcommittee Meeting presentations for Endocrine Disruptors Screening Program. 2002, 2003.
- Continuing education course on Children's Health Issues, North Carolina State University, Raleigh, NC. 2003.
- Society of Environmental Toxicology and Chemistry Pellston Workshop on Pharmaceuticals in the Environment, Snowbird, UT. 2003.
- International Symposium on Endocrine Active Substances, Scientific Committee on Problems of the Environment/International Union of Pure and Applied Chemistry, Yokohama, Japan. 2002.
- Symposium on Hypospadias, Urology Department, University of San Francisco, CA. 2002.

Selected Publications

Owens W, Gray LE, Zeiger E, Walker M, Yamasaki K, Ashby J, Jacob E. 2007. The OECD program to validate the rat Hershberger bioassay to screen compounds for *in vivo* androgen and antiandrogen responses: Phase 2 dose-response studies. *Environ Health Perspect.* 115:671-8. [Abstract](#)

Kato K, Silva MJ, Wolf C, Gray LE, Needham LL, Calafat AM. 2007. Urinary metabolites of diisodecyl phthalate in rats. *Toxicology.* 236:114-22. [Abstract](#)

Howdeshell KL, Furr JR, Lambright CS, Wilson VS, Gray LE. 2007. Cumulative effects of dibutyl phthalate and diethylhexyl phthalate on male rat reproductive tract development: Altered fetal steroid hormones and genes. *Toxicol Sci.* 99:190-202.

[Abstract](#)

Gray LE, Furr J, Ostby, JS. 2007. Hershberger assay protocol to investigate the effects of endocrine disrupting compounds (EDCs) with androgenic or antiandrogenic activity in castrate-immature male rats. In: *Current Protocols in Toxicology*. Eds.: J.S. Bus, L.G. Costa, E. Hodgson, D.A. Lawrence and D.J. Reed, Wiley Publishing, Indianapolis, IN.

Ostby J, Gray LE. 2007. Transgenerational (*in utero*/lactational) exposure protocol to investigate the effects of endocrine disrupting compounds (EDCs) in rats. In: *Current Protocols in Toxicology*. Eds.: J.S. Bus, L.G. Costa, E. Hodgson, D.A. Lawrence and D.J. Reed, Wiley Publishing, Indianapolis, IN.

Blystone CR, Lambright CS, Howdeshell KL, Furr J, Sternberg RM, Butterworth BC, Durhan EJ, Makynen EA, Ankley GT, Wilson VS, Leblanc GA, Gray LE. 2007. Sensitivity of fetal rat testicular steroidogenesis to maternal prochloraz exposure and the underlying mechanism of inhibition. *Toxicol Sci.* 97:512-9. [Abstract](#)

Blystone C, Furr JR, Lambright CS, Ryan BC, Howdeshell K, Wilson VS, Leblanc GA, Gray LE. 2007. Prochloraz inhibits testosterone production at dosages below those that affect androgen-dependent organ weights or the onset of puberty in the male Sprague Dawley rat. *Toxicol Sci.* 97:65-74. [Abstract](#)

Hotchkiss AK, Lambright CS, Ostby JS, Parks-Saldutti L, Vandenberg JG, Gray LE. 2007. Prenatal testosterone exposure permanently masculinizes anogenital distance, nipple development, and reproductive tract morphology in female Sprague-Dawley rats. *Toxicol Sci.* 96:335-45. [Abstract](#)

Calafat AM, Silva MJ, Reidy JA, Gray LE, Samandar E, Preau JL, Herbert AR, Needham LL. 2006. Mono-(3-carboxypropyl) phthalate, a metabolite of di-n-octyl phthalate. *J Toxicol Environ Health A.* 69:215-27. [Abstracts](#)

Owens CV, Lambright C, Cardon M, Gray LE, Gullett BK, Wilson VS. 2006. Detection of androgenic activity in emissions from diesel fuel and biomass combustion. *Environ Toxicol Chem.* 25:2123-31. [Abstract](#)

Silva MJ, Kato K, Wolf CJ, Samandar E, Silva SS, Gray LE, Needham LL, Calafat AM. 2006. Urinary biomarkers of di-isononyl phthalate in rats. *Toxicology.* 223:101-12. [Abstract](#)

Owens W, Zeiger E, Walker M, Ashby J, Onyon L, Gray LE. 2006. The OECD program to validate the rat Hershberger bioassay to screen compounds for *in vivo* androgen and antiandrogen responses. Phase 1: Use of a potent agonist and a potent antagonist to test the standardized protocol. *Environ Health Perspect.* 114:1259-65. [Abstract](#)

Durhan EJ, Lambright CS, Makynen EA, Lazorchak J, Hartig PC, Wilson VS, Gray LE, Ankley GT. 2006. Identification of metabolites of trenbolone acetate in androgenic runoff from a beef feedlot. *Environ Health Perspect.* 114 Suppl 1:65-8. [Abstract](#)

Gray LE, Laskey J, Ostby J. 2006. Chronic di-n-butyl phthalate exposure in rats reduces fertility and alters ovarian function during pregnancy in female Long Evans hooded rats. *Toxicol Sci.* 93:189-95. [Abstract](#)

Gray LE, Wilson VS, Stoker TE, Lambright CS, Furr JR, Noriega NC, Howdeshell K, Ankley GT, Guillette L. 2006. Adverse effects of environmental antiandrogens and androgens on reproductive development in mammals. *Int J Androl.* 29:96-104; 105-8. [Abstract](#)

Calafat AM, Brock JW, Silva MJ, Gray LE, Reidy JA, Barr DB, Needham LL. 2006. Urinary and amniotic fluid levels of phthalate monoesters in rats after the oral administration of di(2-ethylhexyl) phthalate and di-n-butyl phthalate. *Toxicology.* 217:22-30. [Abstract](#)

Huggett DB, Benson WH, Chipman K, Cook JC, Gray LE, Kinter LB, Meyerhoff RD, Trudeau VL. 2005. Role of mammalian data in determining pharmaceutical responses in aquatic species. In: *Human Pharmaceuticals: Assessing the Impacts on Aquatic Ecosystems*. Ed.: R. Williams, SETAC Press, Pensacola, FL.

Stoker TE, Cooper RL, Lambright CS, Wilson VS, Furr JR, Gray LE. 2005. *In vivo* and *in vitro* anti-androgenic effects of DE-71, a commercial polybrominated diphenyl ether (PBDE) mixture. *Toxicol Appl Pharmacol.* 207:78-88. [Abstract](#)

Silva MJ, Kato K, Gray LE, Wolf CJ, Needham LL, Calafat AM. 2005. Urinary metabolites of di-n-octyl phthalate in rats. *Toxicology.* 210:123-33. [Abstract](#)

Ankley GT, Jensen KM, Durhan EJ, Makynen EA, Butterworth BC, Kahl MD, Villeneuve DL, Linnum A, Gray LE, Cardon M, Wilson VS. 2005. Effects of two fungicides with multiple modes of action on reproductive endocrine function in the fathead minnow (*pimephales promelas*). *Toxicol Sci.* 86:300-8. [Abstract](#)

Rosen MB, Wilson VS, Schmid JE, Gray LE. 2005. Gene expression analysis in the ventral prostate of rats exposed to vinclozolin or procymidone. *Reprod Toxicol.* 19:367-79. [Abstract](#)

Noriega NC, Ostby JS, Lambright CS, Wilson VS, Gray LE. 2005. Late gestational exposure to the fungicide prochloraz delays the onset of parturition and causes reproductive malformations in male rat offspring. *Biol Reprod.* 72:1324-35. [Abstract](#)

Gray LE, Wilson VS, Stoker TE, Lambright CS, Furr JR, Noriega NC, Howdeshell K, Ankley GT, Guillette L. 2006. Adverse effects of environmental antiandrogens and androgens on reproductive development in mammals. *Int J Androl.* 29:96-104; 105-8. [Abstract](#)

Ankley GT, Defoe DL, Kahl MD, Jensen KM, Makynen EA, Miracle A, Hartig P, Gray LE, Cardon M, Wilson V. 2004. Evaluation of the model anti-androgen flutamide for assessing the mechanistic basis of responses to an androgen in the fathead minnow (*pimephales promelas*). Environ Sci Technol. 38:6322-7. [Abstract](#)

Wilson VS, Cardon MC, Thornton J, Korte JJ, Welch JE, Gray LE, Hartig PC. 2004. Cloning, expression and characterization of the androgen receptor and isolation of estrogen receptor alpha from the fathead minnow (*pimephales promelas*). Environ Sci Technol. 38:6314-21. [Abstract](#)

Gray LE, Wilson VS, Noriega NC, Lambright CS, Furr JR, Stoker TE, Laws SC, Goldman JM, Cooper RL, Foster P. 2004. Use of the laboratory rat as a model in endocrine disruptor screening and testing. 42:425-37. [Abstract](#)

Hotchkiss AK, Parks-Saldutti LG, Ostby JS, Lambright CS, Furr JR, Vandenberg JJ, Gray LE. 2004. A mixture of the "antiandrogens" linuron and butyl benzyl phthalate alters sexual differentiation of the male rat in a cumulative fashion. Biol Reprod. 71:1852-1861. [Abstract](#)

Wilson VS, Bobseine K, Gray LE. 2004. Development and characterization of a cell line that stably expresses an estrogen-responsive luciferase reporter for the detection of estrogen receptor agonist and antagonists. Toxicol Sci. 81:69-77. [Abstract](#)

Gray LE, Ostby JS, Furr J, Wolf CJ, Lambright C, Wilson VS, Noriega N. 2004. Toxicant induced hypospadias in the male rat. In: *Advances in Experimental Medicine and Biology*. Ed.: L.S. Baskin. Springer: New York, NY.

Orlando EF, Kolok AS, Binzick GA, Gates JL, Horton MK, Lambright CS, Gray LE, Soto AM, Guillette LJ, 2004. Endocrine-disrupting effects of cattle feedlot effluent on an aquatic sentinel species, the fathead minnow. Environ Health Perspect. 112:3 [Abstract](#)

Wolf CJ, LeBlanc GA, Gray LE. 2004. Interactive effects of vinclozolin and testosterone propionate on pregnancy and sexual differentiation of the male and female SD rat. Toxicol Sci. 78:135-43. [Abstract](#)

Wilson VS, Lambright C, Furr J, Ostby J, Wood C, Held G, Gray LE. 2004. Phthalate ester-induced gubernacular lesions are associated with reduced INSL3 gene expression in the fetal rat testis. Toxicol Lett. 146:207-15. [Abstract](#)

Gray LE, Foster PMD. 2003. Significance of experimental studies for assessing adverse effects of endocrine-disrupting chemicals. Pure Appl Chem. 75:2125-41. [Abstract](#)

Hotchkiss AK, Ostby JS, Vandenberg JG, Gray LE. 2003. An environmental antiandrogen, vinclozolin, alters the organization of play behavior. Physiol Behav. 79:151-6. [Abstract](#)

Ankley GT, Jensen KM, Makynen EA, Kahl MD, Korte JJ, Hornung MW, Henry TR, Denny JS, Leino RL, Wilson VS, Cardon MC, Hartig PC, Gray LE. 2003. Effects of the androgenic growth promoter 17-beta-trenbolone on fecundity and reproductive endocrinology of the fathead minnow. *Environ Toxicol Chem.* 22:1350-60. [Abstract](#)

Higuchi TT, Palmer JS, Gray LE, Veeramachaneni DN. 2003. Effects of dibutyl phthalate in male rabbits following in utero, adolescent, or postpubertal exposure. *Toxicol Sci.* 72:301-13. [Abstract](#)

Gray LE, Ostby J, Wilson V, Lambright C, Bobseine K, Hartig P, Hotchkiss A, Wolf C, Furr J, Price M, Parks L, Cooper RL, Stoker TE, Laws SC, Degitz SJ, Jensen KM, Kahl MD, Korte JJ, Makynen EA, Tietge JE, Ankley GT. 2002 Xenoendocrine disrupters-tiered screening and testing: Filling key data gaps. *Toxicology.* 181-182:371-82. [Abstract](#)

Wilson VS, Lambright C, Ostby J, Gray LE. 2002. *In vitro* and *in vivo* effects of 17beta-trenbolone: A feedlot effluent contaminant. *Toxicol Sci.* 70:202-11. [Abstract](#)

Durhan EJ, Lambright CS, Makynen EA, Lazorchak J, Hartig PC, Wilson VS, Gray LE, Ankley GT. 2006. Identification of metabolites of trenbolone acetate in androgenic runoff from a beef feedlot. *Environ Health Perspect.* 114 Suppl 1:65-8. [Abstract](#)

Hotchkiss AK, Ostby JS, Vandenberg JG, Gray LE. 2002. Androgens and environmental antiandrogens affect reproductive development and play behavior in the Sprague-Dawley rat. *Environ Health Perspect.* 110 Suppl 3:435-9. [Abstract](#)

Hartig PC, Bobseine KL, Britt BH, Cardon MC, Lambright CS, Wilson VS, Gray LE. 2002. Development of two androgen receptor assays using adenoviral transduction of MMTV-LUC reporter and/or HAR for endocrine screening. *Toxicol Sci.* 66:82-90. [Abstract](#)

Wilson VS, Bobseine K, Lambright CS, Gray LE. 2002. A novel cell line, MDA-KB2, that stably expresses an androgen- and glucocorticoid-responsive reporter for the detection of hormone receptor agonists and antagonists. *Toxicol Sci.* 66:69-81. [Abstract](#)

Wolf CJ, Hotchkiss A, Ostby JS, LeBlanc GA, Gray LE. 2002. Effects of prenatal testosterone propionate on the sexual development of male and female rats: A dose-response study. *Toxicol Sci.* 65:71-86. [Abstract](#)