

CURRICULUM VITAE

Nina T. Holland, Ph.D. Adjunct Professor V
Director, Children's Environmental Health Laboratory
Director, SPH Biorepository
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RESEARCH INTERESTS

Molecular Epidemiology
Children's Environmental Health
Environmental Epigenetics and Genomics
Human Biomonitoring
Biological Repositories

EMPLOYMENT

1972-77 Center for Molecular Biology and Genetics, Kiev, Ukraine: Research Associate
1977-79 Institute for Scientific Information, Academy of Sciences of the USSR, Moscow:
Scientific Editor, Molecular Biology and Genetics
1980-90 National Research Center of Medical Genetics, Academy of Medical Sciences of
the USSR, Moscow, Russia:
Scientist, 1980-82; Senior Scientist 1982-90
1991-present Division of Environmental Health Sciences, School of Public Health, University
of California, Berkeley:
Research Toxicologist 1991-2002; Lecturer, 1993-95; Associate Adjunct
Professor, 1995-2003; Adjunct Professor, 2004-present,
Children's Environmental Health Laboratory, Director, 2003-present
SPH Biorepository, Director, 2003 – present.

EDUCATION

1967-1972 Novosibirsk University, Russia
MS (Honors) Biology
1972-1977 Center for Molecular Biology and Genetics,
Academy of Sciences of Ukraine, Kiev, PhD, Genetics

PROFESSIONAL ACTIVITIES

Advisory Committee Participation and International Cooperation

1. NIH Study Sections and other Grant Review Panels:
During 2007-2011- 5 times
During last three years 2012-2015 - 13 times:
November 2007, RFP HL-08-09
March 2010-CA09-504
July 2010, NIH-R24
September 2011, ZW11_13, European Review Panel of
Antwerp Repository for Translational and Evolutionary Research
December 2011-NIH panel, HL-12-007

November 2012, NIEHS_Superfund
February 2013 NIH-KNOD
October 2013, NIH
January 2014 NIAID
July 2014, NIEHS
October 2014, NIH Study Section
February 2014-IRA
July 2014, European Panel for Outstanding Environmental Researcher
October 2014- Special NIH Panel
February 2015 NIH-KNOD
April 2015, NIH K99
July 2015, NIH-ONES
September 15, 2015, NIH

2. National Research Council, Expert Committee on Human Biomonitoring for Environmental Toxicants, 2004-2006, a book "Human Biomonitoring for Environmental Chemicals" based on the recommendations of this panel has been published by National Academy Press, Washington, DC, 2006.

3. Children's Environmental Health Network, Science Committee, 2002-2003

4. Coordinating Committee of the International Project on Micronucleus Studies in Humans (HUMN), 1997-present.

5. Alexander Hollaender Committee for International Scientific Cooperation, EMS, 2001-2012. Environmental Mutagen Society, Council member, 2004-2010. Program Committee -2006-2013

6. International Society of Biological and Environmental Repositories, Board member, 2002-2005.

7. Genetic and Environmental Toxicology Association of Northern California (GETA), Board member, 2001-2003.

8. Member of the Campus-wide Committee of Faculty interviewers for Regents and Chancellors' Scholarship candidates, University of California, 2001-present.

9. Campus-wide Committee on Environmental Health and Safety, University of California, Berkeley, 2003-2008.

10. Member of the Committee for Protection of Human Subjects, UC Berkeley, 2008-present.

11. Reviewer and Board Member for Scientific Journals 1993-present:

Mutation Research and Mutation Research Reviews

Environmental and Molecular Mutagenesis (editorial board member from 2011-present)

Nature Genetics, American Journal of Respiratory and Critical Care Medicine- Blue,

Cancer Epidemiology, Biomarkers & Prevention

Environmental Health Perspectives

PNAS, Mutagenesis, Toxicology Letters, PLoS,

Clinical Genetics, Pediatric Research

Pediatric Obesity, International J. of Obesity etc.

12. Scientific Sessions organized and chaired:

International Conference on Environmental Mutagens in Human Populations, Brazil,
2003 Symposium on "Children's Environmental Health"

Environmental Mutagen Society Annual Meeting, 2003, Miami, Florida
"Children's Susceptibility to Environmental Agents"

International Conference on Environmental Mutagens, San Francisco, 2005
"Molecular Epidemiology of Children's Health"

5th International Conference on Environmental Mutagens in Human Populations, Turkey 2007. Session “Children’s Environmental Health”
38th Annual meeting of the EMS, Puerto Rico, October 2008. Session on “Global warming and Environmental Health”
10th International Conference on Environmental Mutagens, August 20-25, 2009: Course on “Micronucleus Cytome Assay in Lymphocytes and Buccal Exfoliated Cells”
International Conference on Environmental Mutagens, March 26-28, 2012, Doha, Qatar. Symposium on “Epigenetics and Gene-Environment interactions in Human Disease”
Annual meeting of the Environmental Mutagenesis and Genomics Society, September 2013, Monterey, CA. Session “ Epigenetics of Children’s Environmental Health”
Symposium on Biomarker Research. 4th Annual World Congress on Molecular Medicine, Haikou, China. November 2014.
Symposium on “Perinatal exposures and children's health outcomes”. Society of Toxicology 53rd Annual Meeting. Phoenix, AZ. March 2014.
Session on “New Discoveries from Birth Cohort Studies”, Annual EMGS meeting, New Orleans, 2015
Session “Reproductive Effects of air pollution”, ISEE 2015, Brazil.

13. Teaching

Principal Instructor for graduate courses:

Molecular & Genetic Epidemiology and Human Health in the 21st Century, PH 256, 1997-present, 4 unit annual course

Biomarkers in Epidemiology and Toxicology, PH 254C, 1994-96

Reproductive Hazards of Industrial Chemicals, PH271B, 2004-2007

Reproductive Toxicology and Nutrition, PH 290, 2000

Introduction to Public Health Biology, PH150C, 2001

EHS PhD Seminar, 2003-2006, 2014-2015;

EHS Masters Seminar, 2003-2005

Contributed to several other courses at UC Berkeley and UCSF

Independent Studies and Honors project Instructor (>40 graduate and undergraduate students)

Special training course “Molecular epidemiology and cytogenetics”, Chulabhorn Institute, December 2008. Thailand

Fogarty course, Kolkata, India, November 2009.

Graduate Student Trainees:

Yuri Dubrova, MS 1977, PhD 1983. Currently Professor at the Dept of Genetics, University of Leicester, United Kingdom

Anna Kowalska, Ph.D. 1991. Currently Research Fellow, Institute of Human Genetics, Poznan, Poland.

Galina Curicova, Ph.D. 1992. Currently Senior Scientist, National Center of Medical Genetics, Moscow, Russia.

Thomas R. Ahlborn, Ph.D., 1995-97. Postdoctoral Fellow with UC Berkeley and LLNL. Currently, Research Fellow with Stanford Veterans Hospital.

Michael Jeng, 1997-99. Postdoctoral fellow, UC Berkeley. Currently Associate Professor at the Medical School of Stanford University, CA

Paurene Duramad, MPH-2002, PhD 2006, UC Berkeley. Currently Senior Scientist at the Regeneron Pharmaceuticals, Tarrytown, NY

Geetha Ranmuthugala, PhD, 2001. Currently Research Fellow with the National University of Australia

Shoba Sarasvati, MPH 2005.

Nyree Bekarian, MPH 2006.

Connie Chen, MPH 2003, PhD 2007. Currently Senior Scientist at the Regeneron Pharmaceuticals, Tarrytown, NY
Karen Huen, MPH 2005, PhD 2009. Currently Assistant Researcher at the Holland Lab UC Berkeley
Rosana Hernandez Weldon, MPH 2005, PhD 2010. Currently an Adjunct Professor at the University of Pittsburg.
Jing Dong, MS 2007.
Vivien Golden, MPH 2008.
Nishat Shaikh, MPH 2009.
Veronica Gonzalez, Postdoc, 2010-2012. Currently a researcher at Stanford University.
Zhanna Dusineeva, MPH 2010.
Sean O'Connor, MS 2011
Nicoline Knudsen, MPH 2012.
Vitaly Volberg, PhD 2013, Currently with the Exponent, Oakland, CA
Raul Aguilar, postdoc, 2011-12. Currently a Senior Statistician in Palo Alto, CA
Vy Tran, MS student, 2014-current.
Gwen Tindula, MS-PhD student, 2013-current.
Veronica Dave, MS 2014. Currently accepted to the PhD Program at the University of Washington, Seattle.
Tashnia Hossain, MS student, 2015-current.
Weihong Guo, PhD student, 2012-current.
Adviser to more than 30 undergraduate student Honors and other research projects.

Membership in Professional Organizations:

Environmental Mutagen and Genomics Society, 1993-present.
American Association for Cancer Research, 1995-2009.
International Society of Environmental and Biological Repositories (ISBER), 2000-2010.
American Society of Human Genetics, 2000-present.
GETA, 1995-present
Society of Toxicology, 2011-present.
APHA, 2012-present.
Epigenetics Society, 2015-present.

Plenary lectures and Invited talks (from 2008 included)

The role of molecular epidemiology to understand the impact of global warming on human health. Molecular Epidemiology Group, EMS, Puerto Rico, 2008
Biomarkers of Air Pollution in the Age of Global Warming, EMS, Puerto Rico, 2008
Biomarkers of air pollution and other environmental pollutants in children and adults, November, 2008, Copenhagen, Denmark.
Molecular Epidemiology of Children's Environmental Health. UC Berkeley Seminar, October 2008
Collection and banking of biological samples for epidemiological studies. Seminar for O&E Med and Nursing residents at UCSF, March 2009.
Neurodevelopment and Organophosphate and Organochlorine Pesticide Exposure in Mexican-American Young Children, Pediatric Academic Societies meeting, May 4, 2009
PON1 as a Predictor of Differential Susceptibility of Children to OP pesticides, Pediatric Academic Societiy meeting, May 3, 2009
Biomarkers, Environment and Children's Health, June 24, 2009, Oakland, Annual Meeting of the Genetic and Environmental Toxicology Association, GETA

Obesity, Vitamin Supplementation and Biomarkers of Oxidative Stress and Cardiovascular Disease, 2009, St. Louis, EMS.

Human Biomonitoring using Micronucleus Assay in Exfoliated Cells, October 2009, St. Louis, EMS.

Molecular Epidemiology of Children's Environmental Health. In: Fogarty Workshop and All India Conference of Cytology and Genetics; 2009; Kolkata, India.

Biomarkers, environment and children's health. Invited talk at the Ramachandra University; 2009; Chennai, India.

Invited lecture at the EMS: Obesity, Vitamin Supplementation and Biomarkers Of Oxidative Stress, 2009.

Trans-placental Exposures and Children's Mental and Physical Health. 41th Annual meeting of the Environmental Mutagen Society, October 25, 2010, Fort Worth, Texas.

Health Effects of Prenatal Exposures to Environmental Pollutants in Mexican-American Children. 2nd Asian Conference on Environmental Mutagens, December 18, 2010. Pattaya, Thailand

New Age Methodologies: Challenges and Opportunities. Scientific Vision Workshop on the Environment. March 10, 2011. Bethesda, MD.

From Womb to Death: Challenges of Research on the Effects of the Environment. Scientific Vision Workshop on the Environment. March 11, 2011. Bethesda, MD.

Effects of Prenatal Exposures to Environmental Pollutants on DNA Methylation and Health Outcomes in Children. Keystone Symposium: Environmental Epigenomics and Disease Susceptibility. March 27, 2011, Asheville, NC.

Collection and banking of biological samples for epidemiological studies. Invited talk at the 5th Biobanking Conference, San Francisco, August 24, 2011.

Epigenetics in Children: Effects of Prenatal Exposures to Environmental Pollutants. Environmental Mutagen Society. Montreal, Canada, 2011

Genome-wide and Allele-Specific Differences in DNA Methylation in Mexican-American Children. American Society of Human Genetics. Montreal, Canada, 2011

Future Generations: Epigenetic Effects. At the meeting " Are We Poisoning Our Children? How Chemicals in the Environment Affect Children's Health" in Oakland, 2011.

Children's Environmental Health in the Age of Exposome, Genomics and Epigenetics: Lecture at the Seminar at the California Department of Toxic Substances Control, November 9, 2011, Berkeley.

Invited presentation: Epigenetic Effects of prenatal exposures to pesticides and other pollutants on puberty NIEHS Epigenetics Meeting, Jan 19, 2012.

Challenges of QAQC in the analyses of epigenetic markers in human studies Epigenetics Breakout Session Children's Centers Meeting, March 7, 2012, Washington, DC.

Effects of Age, Sex, and Prenatal Exposure on Methylation at the meeting "The Contribution of Epigenetics in Pediatric Environmental Health", San Francisco, May 2012.

Genetic and Epigenetic Mechanisms of Susceptibility to Environmental Exposures in Children. Society of Toxicology. San Antonio, TX. March 2013.

Obstacles in using surrogate tissues in Epigenetic studies. NIH Panel, Bethesda, August 2013.

Challenges of Normalization of DNA Methylation Data Generated by Illumina 450k BeadChip® for Population Studies. Environmental Mutagenesis and Genomics Society 44th Annual Meeting. Monterey, CA. September 2013.

Genetic and Epigenetic Mechanisms of Susceptibility to Exposures in Children. American Association for the Advancement of Science Annual Meeting. Chicago, IL. February 2014.

Genetic and epigenetic determinants of health outcomes in children with prenatal pesticide exposure.” Society of Toxicology 53rd Annual Meeting. Phoenix, AZ. March 2014.

PON1 as a model for integration of genetic, epigenetic, and expression data on candidate susceptibility genes. 45th Annual Meeting of the Environmental Mutagenesis and Genomics Society. Orlando, FL. September 2014.

Analysis of DNA methylation by 450K BeadChip to characterize effects of early life exposures in children. 64th Annual Meeting of the American Society of Human Genetics. San Diego, CA. October 2014.

Molecular Mechanisms of Obesity in Children Exposed to Phthalates *in Utero*, ISEE 2015, San Paulo, Brazil

Molecular Mechanisms of Obesity in Children: New Data from Minority Birth Cohort Studies, Annual EMGS meeting, New Orleans, 2015

The Case for Concern and the Major Sources of Preventable Adverse Reproductive Outcomes and Cancer, Annual EMGS meeting, New Orleans, 2015

Epigenomics and prenatal exposure to environmental pollutants: New Data from CHAMACOS Birth Cohort Study, Epigenomics 2016, Puerto Rico

Epigenetic markers of early life exposure to environmental agents and health effects in children, Society of Reproductive Investigation, March 2016, Montreal

Publications

More than 150 papers and book chapters (selected recent publications listed (complete list of earlier publications is available upon request).

Since the last review in 2012: 21 papers were published and 10 accepted and under review (marked with the star)*

Since the promotion to the Professor level in 2004: 87 papers were published (##1-87, p.7-14) and 10 more accepted and submitted (p.6-7).

1. Macher J, MJ. Mendell, K Kumagai, NT Holland, J. M. Camacho, K.G. Harley, B. Eskenazi, and A. Bradman Higher Measured Moisture in California Homes with Qualitative Evidence of Dampness. *Indoor Air*, 2016.
2. *Harley, K., Engel, S., Vedar, M., Eskenazi, B., Whyatt, R., Lanphear, B., Bradman, A., Rauh, V., Yolton, K., Hornung, R., Wetmur, J., Chen, J. Holland, N., Barr, D., Perera, F., and Wolff, M. Prenatal Exposure to Organophosphorous Pesticides and Fetal Growth: Pooled Results from Four Longitudinal Birth Cohort Studies, *Environ Health Perspect.* 2015
3. *Engel, S., Bradman, A., Wolff, M., Rauh, V., Harley, K., Yang, J., Hoepner, L., Barr, D., Yolton, K., Vedar, M., Xu, Y., Hornung, R., Wetmur, J., Chen, Jia., Holland, N., Perera, F., Whyatt, R., Lanphear, B., and Eskenazi, B. Prenatal Exposure to Organophosphorous Pesticides and Child Neurodevelopment: Pooled Results from Four Longitudinal Birth Cohort Studies, *Environ Health Perspect.* 2015.
4. *Huen, K., Yousefi, P., Street, K., Eskenazi, B., and Holland, N. *PON1* as a model for integration of genetic, epigenetic, and expression data on candidate susceptibility genes. *Environmental Epigenetics, Epigenetics* 1, 1-11, 2015.

5. *Gunier, R., Arora, M., Jerrett, M., Bradman, A., Harley, K., Mora, A., Kogut, K., Hubbard, A., Austin, C., Holland, N., and Eskenazi, B. Manganese in Teeth and Neurodevelopment in Young Mexican-American Children, *Environ Res.* 2016
6. *Davé, V., Street, K., Francis, S., Bradman, A., Riley, L., Eskenazi, B., and Holland, N. Bacterial microbiome of breast milk and child saliva from low-income Mexican-American women and children, *Pediatr Res.* 2016
7. *Sagiv, S., Kogut, K., Gaspar, F., Gunier, R., Harley, K., Sjodin, A., Holland, N., Parra, K., Villaseñor, D., and Eskenazi, B. Prenatal and childhood polybrominated diphenyl ether (PBDE) exposure and attention and executive function at 9-12 years of age, Accepted to *Neurotoxicology and Teratology*, August 5, 2015.
8. *Yousefi, P., Huen, K., Davé, V., Eskenazi, B., and Holland, N. Effects of sex on DNA methylation assessed by 450K BeadChip in newborns. *BMC Genomics* 16, 1-12, 2015.
9. *Huen, K., Harley, K., Kogut, K., Rauch, S., Eskenazi, B., Holland, N. DNA methylation of LINE-1 and Alu repetitive elements in relation to sex hormones and pubertal timing in Mexican-American children. *Pediatric Research* 2016.
10. *Holland, N., Lizarraga, D., and Huen, K. (2015) Recent progress in the genetics and epigenetics of paraoxonase: why it is relevant to children's environmental health, *Curr Opin Pediatr* 27, 240-247.
11. *Yousefi, P., Motwani, G., Hubbard, A., Quach, H., and Holland, N. Estimation of blood cellular heterogeneity in children and infants for epigenome-wide association studies, *Environ Mol Mutagen.* DOI 10.1002/em.21966, 2015.
12. *Holland, N., Dave, V., Venkat, S., Wong, H., Donde, A., Balmes, J. R., and Arjomandi, M. (2015) Ozone inhalation leads to a dose-dependent increase of cytogenetic damage in human lymphocytes, *Environ Mol Mutagen* 56, 378-387.
13. *Dave, V., Yousefi, P., Huen, K., Volberg, V., and Holland, N. (2015) Relationship between expression and methylation of obesity-related genes in children, *Mutagenesis*, doi:10.1093/mutage/gen089.
14. *Chadwick, L. H., Sawa, A., Yang, I. V., Baccarelli, A., Breakefield, X. O., Deng, H.-W., Dolinoy, D. C., Fallin, M. D., Holland, N. T., Houseman, E. A., Lomvardas, S., Rao, M., Satterlee, J. S., Tyson, F. L., Vijayanand, P., and Grealley, J. M. (2015) New insights and updated guidelines for epigenome-wide association studies, *Neuroepigenetics* 1, 14-19.
15. *Bradman, A., Quiros-Alcala, L., Castorina, R., Aguilar Schall, R., Camacho, J., Holland, N. T., Barr, D. B., and Eskenazi, B. (2015) Effect of Organic Diet Intervention on Pesticide Exposures in Young Children Living in Low-Income Urban and Agricultural Communities, *Environ Health Perspect.* DOI:10.1289/ehp.140866
16. *Thompson, L. M., Yousefi, P., Penalzoza, R., Balmes, J., and Holland, N. (2014) Genetic modification of the effect of maternal household air pollution exposure on birth weight in Guatemalan newborns, *Reprod Toxicol* 50, 19-26.
17. *Long, A. S., Lemieux, C. L., Yousefi, P., Ruiz-Mercado, I., Lam, N. L., Orellana, C. R., White, P. A., Smith, K. R., and Holland, N. (2014) Human urinary mutagenicity after wood smoke exposure during traditional temazcal use, *Mutagenesis* 29, 367-377.
18. *Kirsch-Volders, M., Bonassi, S., Knasmueller, S., Holland, N., Bolognesi, C., and Fenech, M. F. (2014) Commentary: critical questions, misconceptions and a road map for improving the use of the lymphocyte cytokinesis-block micronucleus assay for in vivo biomonitoring of human exposure to genotoxic chemicals-a HUMN project perspective, *Mutat Res Rev Mutat Res* 759, 49-58.

19. *Huen, K., Yousefi, P., Bradman, A., Yan, L., Harley, K. G., Kogut, K., Eskenazi, B., and Holland, N. (2014) Effects of age, sex, and persistent organic pollutants on DNA methylation in children, *Environ Mol Mutagen* 55, 209-222.
20. *Eskenazi, B., Kogut, K., Huen, K., Harley, K. G., Bouchard, M., Bradman, A., Boyd-Barr, D., Johnson, C., and Holland, N. (2014) Organophosphate pesticide exposure, PON1, and neurodevelopment in school-age children from the CHAMACOS study, *Environ Res* 134, 149-157.
21. *Dannemiller, K. C., Mendell, M. J., Macher, J. M., Kumagai, K., Bradman, A., Holland, N., Harley, K., Eskenazi, B., and Peccia, J. (2014) Next-generation DNA sequencing reveals that low fungal diversity in house dust is associated with childhood asthma development, *Indoor Air* 24, 236-247.
22. *Yousefi, P., Huen, K., Schall, R. A., Decker, A., Elboudwarej, E., Quach, H., Barcellos, L., and Holland, N. (2013) Considerations for normalization of DNA methylation data by Illumina 450K BeadChip assay in population studies, *Epigenetics* 8, 1141-1152.
23. *Volberg, V., Heggseth, B., Harley, K., Huen, K., Yousefi, P., Dave, V., Tyler, K., Vedar, M., Eskenazi, B., and Holland, N. (2013) Adiponectin and leptin trajectories in Mexican-American children from birth to 9 years of age, *PLoS One* 8, e77964.
24. *Volberg, V., Harley, K. G., Aguilar, R. S., Rosas, L. G., Huen, K., Yousefi, P., Dave, V., Phan, N., Lustig, R. H., Eskenazi, B., and Holland, N. (2013) Associations between perinatal factors and adiponectin and leptin in 9-year-old Mexican-American children, *Pediatr Obes* 8, 454-463.
25. *Volberg, V., Harley, K., Calafat, A. M., Dave, V., McFadden, J., Eskenazi, B., and Holland, N. (2013) Maternal bisphenol a exposure during pregnancy and its association with adipokines in Mexican-American children, *Environ Mol Mutagen* 54, 621-628.
26. *St. Helen, G., Holland, N. T., Balmes, J. R., Hall, D. B., Bernert, J. T., Vena, J. E., Wang, J. S., and Naeher, L. P. (2013) Utility of urinary Clara cell protein (CC16) to demonstrate increased lung epithelial permeability in non-smokers exposed to outdoor secondhand smoke, *J Expo Sci Environ Epidemiol* 23, 183-189.
27. *Huen, K., Harley, K., Beckman, K., Eskenazi, B., and Holland, N. (2013) Associations of PON1 and genetic ancestry with obesity in early childhood, *PLoS One* 8, e62565.
28. *Harley, K. G., Aguilar Schall, R., Chevrier, J., Tyler, K., Aguirre, H., Bradman, A., Holland, N. T., Lustig, R. H., Calafat, A. M., and Eskenazi, B. (2013) Prenatal and postnatal bisphenol A exposure and body mass index in childhood in the CHAMACOS cohort, *Environ Health Perspect* 121, 514-520.
29. *Chevrier, J., Gunier, R. B., Bradman, A., Holland, N. T., Calafat, A. M., Eskenazi, B., and Harley, K. G. (2013) Maternal urinary bisphenol a during pregnancy and maternal and neonatal thyroid function in the CHAMACOS study, *Environ Health Perspect* 121, 138-144.
30. 21. *Bradman, A., Kogut, K., Eisen, E. A., Jewell, N. P., Quiros-Alcala, L., Castorina, R., Chevrier, J., Holland, N. T., Barr, D. B., Kavanagh-Baird, G., and Eskenazi, B. (2013) Variability of organophosphorous pesticide metabolite levels in spot and 24-hr urine samples collected from young children during 1 week, *Environ Health Perspect* 121, 118-124.
31. 21. *Arora, M., Bradman, A., Austin, C., Vedar, M., Holland, N., Eskenazi, B., and Smith, D. R. (2012) Determining fetal manganese exposure from mantle dentine of deciduous teeth, *Environ Sci Technol* 46, 5118-5125.

32. 22. St Helen, G., Bernert, J. T., Hall, D. B., Sosnoff, C. S., Xia, Y., Balmes, J. R., Vena, J. E., Wang, J. S., Holland, N. T., and Naeher, L. P. (2012) Exposure to secondhand smoke outside of a bar and a restaurant and tobacco exposure biomarkers in nonsmokers, *Environ Health Perspect* 120, 1010-1016.
33. 23. Pak, S., Holland, N., Garnett, E. A., Mileti, E., Mahadevan, U., Beckert, R., Kanwar, B., and Heyman, M. B. (2012) Cytokine profiles in peripheral blood of children and adults with Crohn disease, *J Pediatr Gastroenterol Nutr* 54, 769-775.
34. 24. Huen, K., Bradman, A., Harley, K., Yousefi, P., Boyd Barr, D., Eskenazi, B., and Holland, N. (2012) Organophosphate pesticide levels in blood and urine of women and newborns living in an agricultural community, *Environ Res* 117, 8-16.
35. 25. Gonzalez, V., Huen, K., Venkat, S., Pratt, K., Xiang, P., Harley, K. G., Kogut, K., Trujillo, C. M., Bradman, A., Eskenazi, B., and Holland, N. T. (2012) Cholinesterase and paraoxonase (PON1) enzyme activities in Mexican-American mothers and children from an agricultural community, *J Expo Sci Environ Epidemiol* 22, 641-648.
36. 26. Bradman, A., Castorina, R., Sjodin, A., Fenster, L., Jones, R. S., Harley, K. G., Chevrier, J., Holland, N. T., and Eskenazi, B. (2012) Factors associated with serum polybrominated diphenyl ether (PBDE) levels among school-age children in the CHAMACOS cohort, *Environ Sci Technol* 46, 7373-7381.
37. 27. Weldon, R. H., Barr, D. B., Trujillo, C., Bradman, A., Holland, N., and Eskenazi, B. (2011) A pilot study of pesticides and PCBs in the breast milk of women residing in urban and agricultural communities of California, *J Environ Monit* 13, 3136-3144.
38. 28. Knasmueller, S., Holland, N., Wulsch, G., Jandl, B., Burgaz, S., Misik, M., and Nersesyan, A. (2011) Use of nasal cells in micronucleus assays and other genotoxicity studies, *Mutagenesis* 26, 231-238.
39. 29. Huen, K., Barcellos, L., Beckman, K., Rose, S., Eskenazi, B., and Holland, N. (2011) Effects of PON polymorphisms and haplotypes on molecular phenotype in Mexican-American mothers and children, *Environ Mol Mutagen* 52, 105-116.
40. 30. Holland, N., Fucic, A., Merlo, D. F., Sram, R., and Kirsch-Volders, M. (2011) Micronuclei in neonates and children: effects of environmental, genetic, demographic and disease variables, *Mutagenesis* 26, 51-56.
41. 31. Harley, K. G., Huen, K., Aguilar Schall, R., Holland, N. T., Bradman, A., Barr, D. B., and Eskenazi, B. (2011) Association of organophosphate pesticide exposure and paraoxonase with birth outcome in Mexican-American women, *PLoS One* 6, e23923.
42. 32. Fenech, M., Holland, N., Zeiger, E., Chang, W. P., Burgaz, S., Thomas, P., Bolognesi, C., Knasmueller, S., Kirsch-Volders, M., and Bonassi, S. (2011) The HUMN and HUMNxL international collaboration projects on human micronucleus assays in lymphocytes and buccal cells--past, present and future, *Mutagenesis* 26, 239-245.
43. 33. Eskenazi, B., Fenster, L., Castorina, R., Marks, A. R., Sjodin, A., Rosas, L. G., Holland, N., Guerra, A. G., Lopez-Carillo, L., and Bradman, A. (2011) A comparison of PBDE serum concentrations in Mexican and Mexican-American children living in California, *Environ Health Perspect* 119, 1442-1448.
44. 34. Duramad, P., and Holland, N. T. (2011) Biomarkers of immunotoxicity for environmental and public health research, *Int J Environ Res Public Health* 8, 1388-1401.

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Funding: grants in progress and completed

ACTIVE

PA-15-30(Holland) 8/31/15-9/01/16, NIEHS
Metabonomic markers of phthalate exposure in pregnant women
Targeted and untargeted metabolomics to validate novel markers of exposure

R01ES021369 6/01/13-5/31/18 NIH/NIEHS Molecular
Mechanisms of obesity in Children Exposed to Phthalates *in Utero*
Analyses of phthalate exposure will be conducted at two times during pregnancy in banked urine samples. The effects of exposure on biomarkers of obesity and epigenetic modification in children will be evaluated will be evaluated in light of their relation to obesity and MetS in children and adolescents of the CHAMACOS cohort.

1R01ES023067-01 (Holland) 7/01/14-6/30/18
NIEHS, PON Epigenetics and Neurodevelopment in Children
This proposed interdisciplinary study takes advantage of an extensive collection of biological samples and neurobehavioral data on our CHAMACOS study children and provides a unique opportunity to address knowledge gaps on the molecular mechanisms affecting susceptibility to impaired cognition in a well characterized minority birth cohort.

R01 ES007171 (Supplement) (Eskenazi) 7/01/5-6/30/16
Gene-Dioxin interaction in Seveso cohort
Assessment of genetic susceptibility to the health effects of TCDD exposure.
Holland- co-investigator

P01ES009605 / RD-83451301 (Eskenazi) 8/1/09-7/31/16 (NCE)
NIH/NIEHS & EPA
Children's Environmental Health Center
Exposures and Health of Farmworker Children in California
The major goal of this project is to assess the correlation between pesticide exposure and the health of farmworker children in California.

Holland Role - Leader of Epigenetics Project and co-Director of Biorepository Core

R01 ES020360-01 (Eskenazi)

8/25/2011-04/30/2016

NIEHS

IRS insecticides for malaria control and child development in South Africa

This study aims to evaluate the effects of prenatal exposure to dichlorodiphenyl trichloroethane (DDT), its breakdown product dichlorodiphenyl dichloroethylene (DDE), and the pyrethroid insecticides deltamethrin and cypermethrin on child neurobehavioral development in the Limpopo province of South Africa where the chemicals are used for Indore Residual Spraying (IRS) of homes for malaria control purposes.

Holland- co-investigator

R21ES021833-01A1 (Bradman)

4/01/13-

03/31/16(NCE)

NIEHS

Current-Use Flame Retardants: Maternal exposure and neurodevelopment in children.

The proposed research will generate new and valuable information about exposure to pregnant women and later neurodevelopment effects in school age children, and will determine the reliability of OPFR metabolites in young children.

Holland- co-investigator

Completed projects

R01-ES012503 (Holland)

1/1/06-12/31/11

NIH/NIEHS

PON1 and Developmental Sensitivity to OP pesticides

A study of the mechanisms of the functional genomics of paraoxonase in Latino mothers and children from CHAMACOS cohort at birth and up to 24 months of age.

Role: PI

RD-83273401 (Eskenazi)

3/20/06-2/28/11 (NCE)

EPA

PON1 as a predictor of differential susceptibility of children to organophosphates

This project evaluates whether PON1 genotype/activity in populations exposed to pesticides is an early indicator of environmentally-induced disease.

Role: Co-investigator

R01 ES015572 (Eskenazi)

8/07/07-4/30/11

NIH/NIEHS

PBDEs, DDT and Neurodevelopment in School-Aged Mexican-American Children

This project examines the relationship of PBDE/DDT exposure and neurodevelopment of exposed children.

Role: Co-investigator

R01 ES017054-01 (Eskenazi)

8/1/09-4/30/14

NIH NIEHS

DDT & PBDE exposure, puberty onset and neurodevelopment in Mexican-American girls

Role: Co-investigator

RC2ES018792 (Harley, Eskenazi)

9/30/09-7/31/11

NIH NIEHS

Bisphenol A and Children's Growth & Development

This proposal seeks to examine the health effects of developmental BPA exposure in the CHAMACOS birth cohort, a cohort of Mexican-American children living in California. The study will examine exposure to BPA and health effects including cognitive functioning, thyroid hormone levels, metabolic syndrome and Body Mass.

Role: Co-investigator

R01 DK062378 (Block) 8/11/09-6/30/12

NIH IDDKD

Obesity, Inflammation, and Oxidative Stress

The long-term objective of this project is to identify nutritional factors that can reduce the inflammatory component of obesity.

Role: Co-investigator

04-322 (Balmes) 6/1/05-5/15/10

California Air Resource Board (CARB)

Effects of Controlled Ozone Exposure on Cardiovascular responses in Healthy and Susceptible Humans (HOLON study)

Role: UC Berkeley sub-contract PI

R01 DK062378 (Block) 4/15/04-2/28/09

NIH/NIDDK

Gender, Obesity, C-Reactive Protein and Oxidative Stress

Role: Co-investigator

R03 Pathologic Markers of Genetic Damage and Disease in IBD (Heyman) NIH 12/1/04 - 11/31/06
Holland, PI for UC Berkeley subcontract

P42 EX04705-15 (M Smith) 4/1/2000-3/31/2006

NIEHS Holland - Director of Laboratory Core B

RO1 OH007400, NIOSH (PI: Eskenazi) 9/1/2001-9/29/2005

Endocrine Disruptors: Epidemiologic Approaches

Holland- co-investigator

NIH (PI: I Tager)

4/1/2000-3/31/2005(NCE)

RO1 HL60689 Supplement, Effects of Chronic Ozone

Exposure on Human Lung

N Holland -Project Leader

