

PIs:

Susan Pinney
Bob Bornschein
Frank Biro

Grant Numbers:

R21ES017176
U01ES012770
U01ES019453
EPA Star B Grant

Grant Titles:

Exposure Biomarkers of Polyfluoroalkyl Compounds in Persons Living in the Ohio River Valley
Puberty & Cancer Initiation: Environment Diet & Obesity
Continued studies of environment impact on puberty

Key Translational Milestones

- 2005 BCERP pilot project added PFCs to UC study based on CDC recommendation from NHANES results (Calafat et al. 2007; Hiatt et al. 2007)
- About half the Cincinnati girls assessed between 2005-2006 had serum concentrations >95th percentile (Pinney et al. 2014)
- Haslam lab @ MSU found a stunting of mammary development and delayed onset of puberty in female mice exposed to PFCs. (Zhao et al, 2010)
- Following encouragement from community partners, individual biomarker results were mailed to parents of the girls in 2007 (Hernick et al. 2007).
- Expanded serum concentration measurements to all Cincinnati and California puberty cohorts (6-8 year old girls) (Pinney et al., 2014)
- Identification of water as exposure pathway (Pinney et al. 2014)
- UC researchers partnered with city water treatment department between 2007-2012 to reduce exposure through water filtering (Grantee Submitted Translational Research Example)

Starting Point Description:

- 2005 BCERP pilot project added PFCs to UC study based on CDC recommendation from NHANES results

Fundamental Science Interactions Ring:

Driver: Observation

Experimental Setting: Population

Organism: Human

Timeframe: 2005

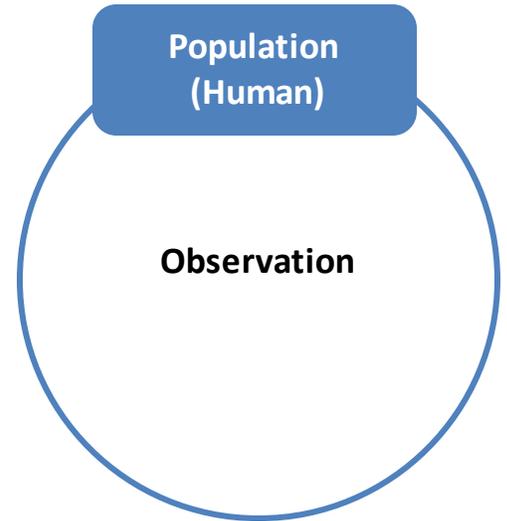
Collaborators:

- CDC; Antonia Calafat

Citations:

Calafat AM, Wong L, Kuklennyik Z, Reidy JA, Needham LL. Polyfluoroalkyl chemicals in the US population: Data from the National Health and Nutrition Examination Survey (NHANES) 2003–2004 and comparisons with NHANES 1999–2000. *Environ Health Perspect.* 2007b;115(11):1596–1602.

Hiatt RA, Haslam SZ, Osuch J. The Breast Cancer and the Environment Research Centers: Transdisciplinary research on the role of the environment in breast cancer etiology. *Environ Health Perspect.* 2009;117:1814–1822.



Translational Narrative:

What led to the next step?

How did the idea evolve?

Who was involved?

What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?

How did you know what to do next?

TRANSLATIONAL MILESTONE 2

Translational Research Description:

- About half the Cincinnati girls assessed between 2005-2006 had serum concentrations >95th percentile (Pinney et al. 2014)

Fundamental Science Interactions Ring:

Driver: Observation

Experimental Setting: Population (different population than 1st milestone)

Organism: Human

Timeframe: 2006-2008

Collaborators:

- Cincinnati BCERP
- California Department of Health
- National Center for Environmental Health, CDC
- Kaiser Permanente

Citations:

Pinney SM, Biro FB, Windham G, Herrick RL, Yaghjian L, Calafat AM, Succop P, Sucharew H, Ball KM, Kayoko K, Kushi LH, Bornschein R. Serum biomarkers of polyfluoroalkyl compounds in young girls in greater Cincinnati and the San Francisco Bay area. *Environmental Pollution* 2014 Jan 184:327-34. Epub 2013 Oct 1. PMID: 24095703.

Population
(Human)

Observation



Translational Narrative:

What led to the next step?

How did the idea evolve?

Who was involved?

What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?

How did you know what to do next?

TRANSLATIONAL MILESTONE 3

Translational Research Description:

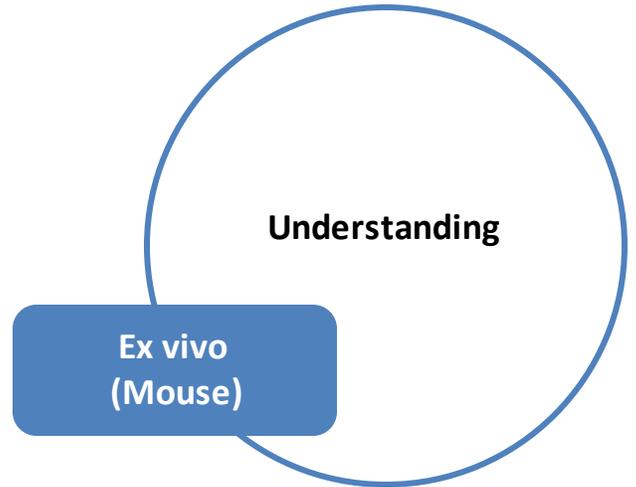
- Haslam lab @ MSU found a stunting of mammary development and delayed onset of puberty in female mice exposed to PFCs.

Fundamental Science Interactions Ring:

Driver: Understanding

Experimental Setting: Ex vivo

Organism: Mouse



Timeframe: 2006-2008

Collaborators:

- Hasslam Lab; Michigan State University
- Cincinnati BCERP

Citations:

Zhao, Y, Tan YS, Haslam, SZ, Yang C (2010). Perfluorooctanoic acid effects on steroid hormone and growth factor levels mediate stimulation of peripubertal mammary gland development on C57 BL/6 mice. *Toxicol Sci* 115:214-224. [Epub ahead of print, Jan 29] DOI: [10.1093/toxsci/kfq030](https://doi.org/10.1093/toxsci/kfq030)



Translational Narrative:

What led to the next step?

How did the idea evolve?

Who was involved?

What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?

How did you know what to do next?

TRANSLATIONAL MILESTONE 4

Translational Research Description:

- Following encouragement from community partners, individual biomarker results were mailed to parents of the girls in 2007 (Hernick et al. 2007).

Practice Ring: Public Health Practice

Timeframe: 2007

Collaborators:

- Breast Cancer Alliance of Greater Cincinnati
- Cincinnati BCERP

Citations:

Hernick A.D., Brown M.K., Pinney S.M., Biro F.M., Ball K.M., Bornschein, R.L. **Sharing Unexpected Biomarker Results with Study Participants** (commentary). *Environmental Health Perspectives*, 119(1)

DOI: [10.1289/ehp.1001988](https://doi.org/10.1289/ehp.1001988)



Public Health
Practice



Translational Narrative:

What led to the next step?

How did the idea evolve?

Who was involved?

What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?

How did you know what to do next?

TRANSLATIONAL POINT 5

Translational Research Description:

- Expanded PFC analysis to all girls aged 6-8 in the Cincinnati and California Cohorts

Science and Setting Translational Ring:

Driver: Understanding

Experimental Setting: Population

Organism: Human

Timeframe: Approximately 2007-2012

Collaborators:

- Cincinnati BCERP
- California Department of Health
- National Center for Environmental Health, CDC
- Kaiser Permanente

Citation:

Pinney SM, Biro FB, Windham G, Herrick RL, Yaghjian L, Calafat AM, Succop P, Sucharew H, Ball KM, Kayoko K, Kushi LH, Bornschein R. Serum biomarkers of polyfluoroalkyl compounds in young girls in greater Cincinnati and the San Francisco Bay area. *Environmental Pollution* 2014 Jan 184:327-34. Epub 2013 Oct 1. PMID: 24095703.



Translational Narrative:

What led to the next step?

How did the idea evolve?

Who was involved?

What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?

How did you know what to do next?

Population
(Human)

Understanding

TRANSLATIONAL POINT 6

Translational Research Description:

- Identification of water as exposure pathway

Science and Setting Translational Ring:

Driver: Identification

Experimental Setting: In situ

Organism: Water

Timeframe: Approximately 2012

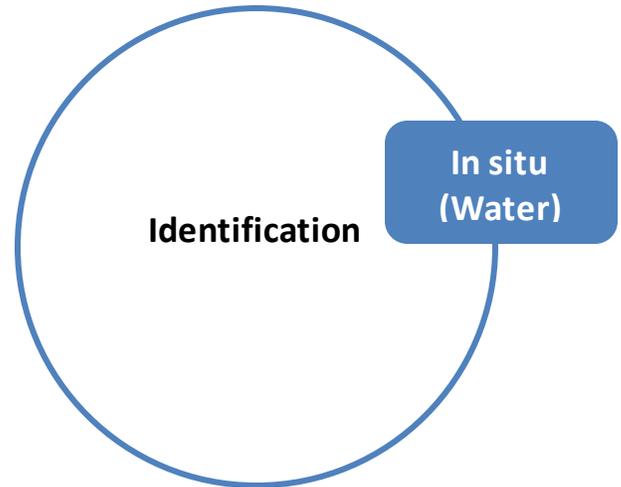
Collaborators:

- Cincinnati BCERP
- California Department of Health
- National Center for Environmental Health, CDC
- Kaiser Permanente

Citation:

Pinney SM, Biro FB, Windham G, Herrick RL, Yaghjian L, Calafat AM, Succop P, Sucharew H, Ball KM, Kayoko K, Kushi LH, Bornschein R. Serum biomarkers of polyfluoroalkyl compounds in young girls in greater Cincinnati and the San Francisco Bay area. *Environmental Pollution* 2014 Jan 184:327-34. Epub 2013 Oct 1. PMID: 24095703.

Emery, E., Spaeth, J., Mills, M., Nakayama, S., Frommel, J., 2010. A Screening Study Investigating the Presence of Emerging Contaminants within the Ohio River Basin. The Ohio River Valley Water Sanitation Commission (ORSANCO) and United States Environmental Protection Agency, Office of Research and Development, National Risk Management Research Laboratory, Cincinnati, OH. <http://www.orsanco.org/images/stories/files/publications/biological/orsanco%20screening%20study%20investigating%20emerging%20contaminants%20reduced%20.pdf> (accessed 17.05.13.).



Translational Narrative:

What led to the next step?

How did the idea evolve?

Who was involved?

What needed to happen (collaborations, tools, technologies, serendipity) to cross the translational bridge?

How did you know what to do next?

TRANSLATIONAL POINT 7

Translational Research Description:

- UC researchers partnered with citywater treatment departments between 2007-2012 to reduce exposure through granular activated carbon filtering

Practice Ring: Organizational Policy

Timeframe: 2007-2012

Collaborators:

Cincinnati BCERP, Dr. Robert Bornschein

Cincinnati Water Department

Northern Kentucky Water Department

Citation:

Translational research example provided by grantee

