DTSC Laboratory Update

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Environmental Chemistry Laboratory (ECL)

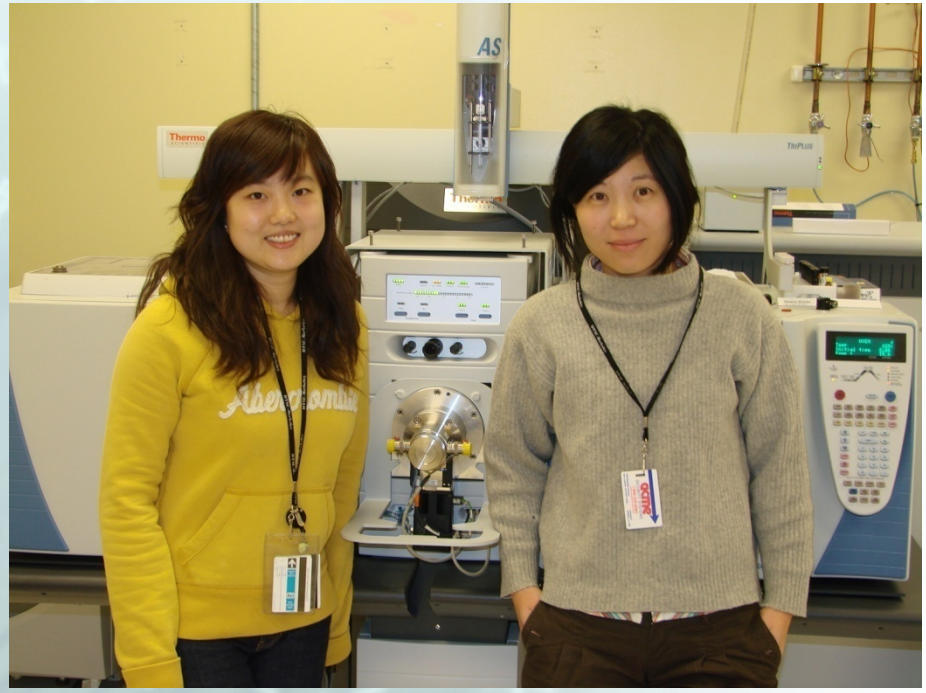
Report to Scientific Guidance Panel
Oakland
March 16, 2012

Status

- Staffing/resources
- Capabilities for analysis of chemicals on the Priority List
- Progress with FOX and MIEEP studies
- Other activities

Staffing

Both of our 2 Program-funded staff are back from leave



Staffing

DTSC Positions:

- **Permission to fill 2 of 4 vacancies:**



- **Dr. Sissy Petropoulou, RSIII**
  - **Originally hired through CDC Cooperative Agreement**
  - **Extensive expertise in LC/MS, phenols**



- **Dr. Darcy Tarrant, RSII**
  - **Originally hired through NIEHS grant**
  - **Extensive expertise in GC/MS (POPs, OH-metabolites)**

CDC Cooperative Agreement:

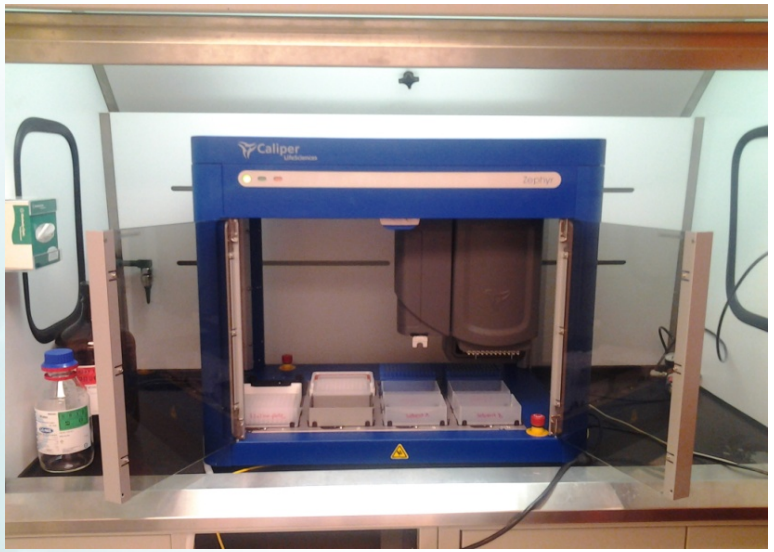
One of four positions is vacant (Environmental Lab Scientist II)

New Equipment set up

Agilent MSMS (QQQ)



Zephyr® SPE 96 well workstation



Thermo Scientific Sorvall XTR Refrigerated Centrifuge

Training

- In-house training for new Agilent GC/MS/MS
- Four-day training at Agilent (Atlanta) first week of May
- Visit NY-DPH and CDC last week of April
- Continuing education (APHL webinars, ECL Seminars, etc.)

Validated Methods and Capabilities for measuring in serum:

Polychlorinated biphenyls (PCBs)	**15 + 10 metabolites**
Organochlorine pesticides (OCPs)	**7**
Polybrominated diphenyl ethers (PBDEs)	**19 + 8 metabolites**
Other brominated or chlorinated FRs	**13 BFRs, 1 CFR**
Perfluorochemicals (PFCs)	**12**
Phenols	**6**

BPA, TBBPA, Pentachlorophenol, Triclosan, 2,4-Dibromophenol, 2,4,6-Tribromophenol

Progress on MIEEP and FOX:
Analyses are on schedule

	MIEEP (n=141)					FOX (n=106)*			
	PFC	PCB/ OCP	PBDE	BFR	OH-BDEs	PFC	PCB/ OCP	PBDE	BFR
Extraction completed	141	141	141	141	30	106	40	40	40
Instrument Analysis Completed	141	141	141	30	30	106	0	0	0
Data Review Completed	141	141	141	30	30	106	0	0	0

*FOX (n=106 samples from 101 participants)

Other Activities

DTSC-funded activities that benefit Biomonitoring California

CA Teachers Study

Longitudinal study of cancer risks in female school employees

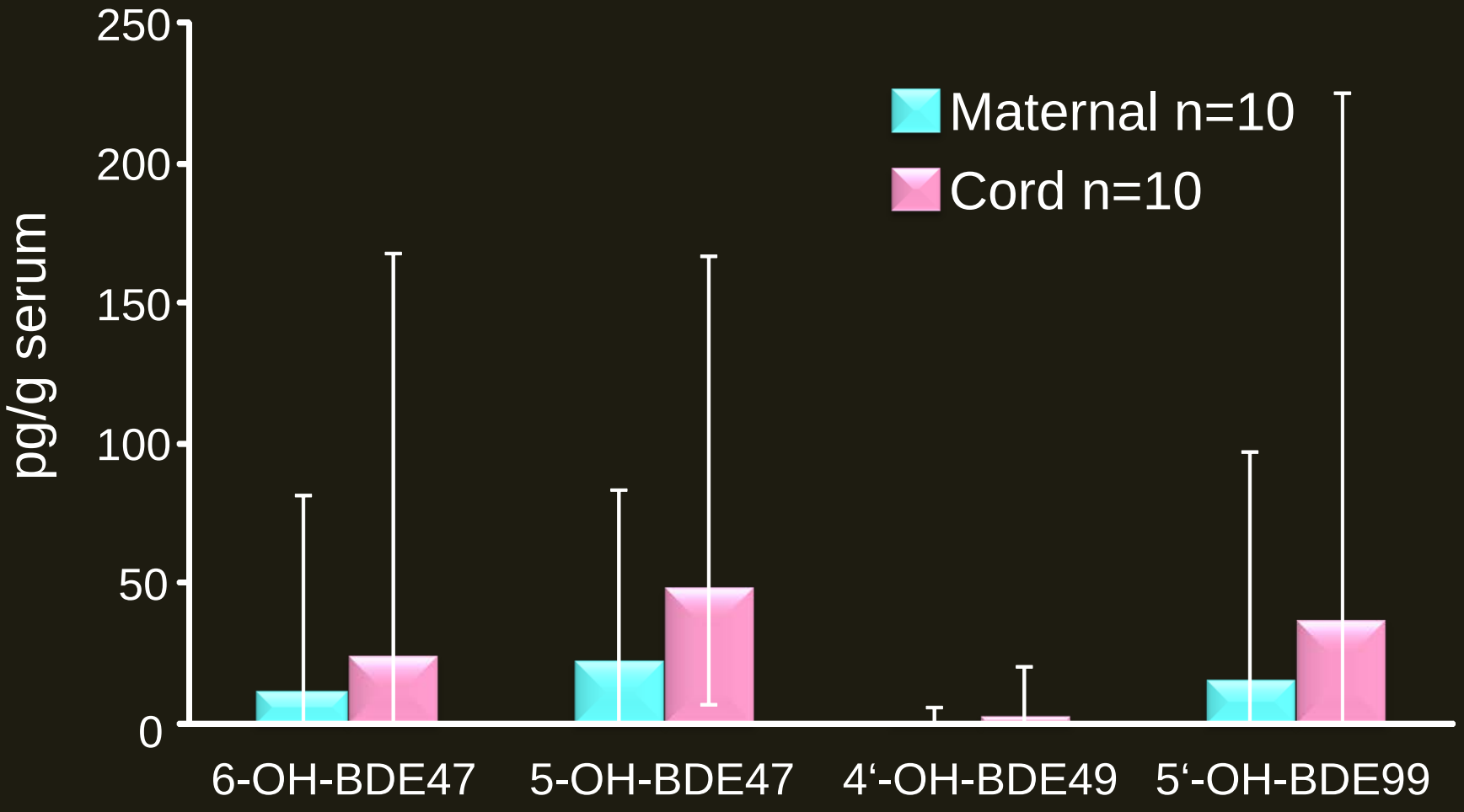
- Sub-study on environmental exposures, blood sampling
- In collaboration with Cancer Prevention Institute of California, UCI, USC, City of Hope
- Funded by CA Breast Cancer Research Program
- Blood samples from ~1,300 cases and 1,300 controls from entire State
- Approximately 800 samples collected so far
- Analysis of PCBs, PBDEs, BFRs, PFCs, Thyroid Hormones, Lipids
- Sample preparation, PFC analyses in progress

Trans-placental transfer of PBDEs, Hydroxy-PBDEs

- In collaboration with U. Cincinnati

  - PBDEs and Hydroxy-PBDEs in maternal serum and cord blood
  - **Results from 20 pairs** (Chen & Park, SETAC, Boston 2011)
  - **Methodology used with MIEEP**

Mean OH-PBDEs



(Chen & Park et al. SETAC, Boston 2011)

BPA and Bromophenols

- Highly sensitive LC-MS method validated
- LOD = 0.1 ng/mL for BPA, 2,4-DBP

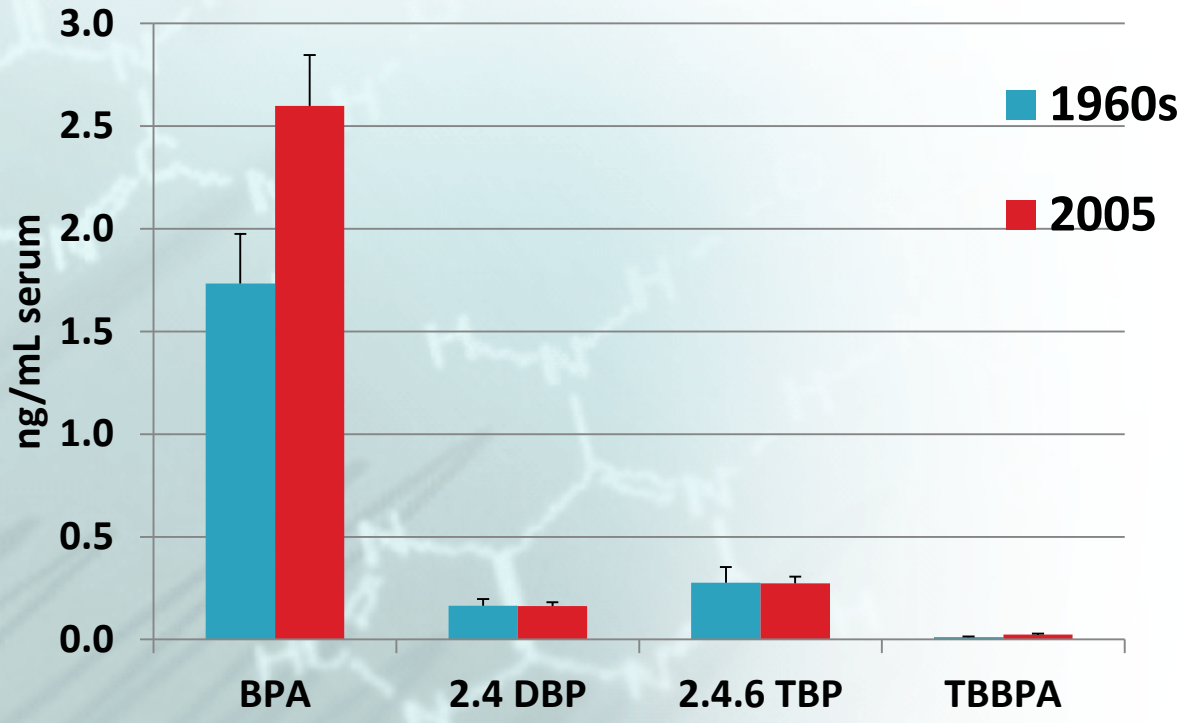
  0.01 ng/mL for TBBPA, 2,4,6-TBP
- Method tested with serum samples from contemporary and 1960's women

➢ Measurable BPA, 2,4-DBP, 2,4,6-TBP; Traces of TBBPA

➢ Blood collected with "butterfly" may show high BPA

Phenols in serum collected in the 1960s (n=25) and 2005 (n=24)

(Petropoulou et al. SOT, 2012)



Measuring POPs, PAHs, BFRs in dust

- Validated protocols for measuring PAHs, PCBs, PBDEs, BFRs in dust from vacuum cleaner bags
- House dust
- Firehouse dust (FOX)

PBDEs in Dust

Whitehead et al. 2011

Household Dust (UCB Childhood Leukemia Study)

- Vacuum cleaner dust from 204 houses sampled twice (2001-07 and 2010)
- No statistically significant decrease in Penta- or Deca-BDEs; some decrease in Octa-BDEs (preliminary data, n=52)
- Reflecting different use patterns?
- Evidence of Deca-BDE debromination

➢ **PBDEs may persist in residential dust for many years after their production has ceased**

New BFRs in Dust

- Validated method for measuring:
  - Bis(2-ethyl-1-hexyl) tetrabromophthalate (TBPH)
  - 1,2-Bis(2,4,6-tribromophenoxy)ethane (BTBPE)
  - Decabromodiphenyl-Ethane (DBDPE)
  - 2-Ethyl-1-hexyl-2,3,4,5-tetrabromobenzoate (TBB)
  - Pentabromoethylbenzene (PBEB)
  - 2,3-Dibromopropyl-2,4,6-tribromophenyl ether (DPTE)
  - Pentabromotoluene (PBT)
  - Hexabromobenzene (HBB)

- Preliminary data showing their presence in house dust and firehouse dust

QUESTIONS?