Report to Scientific Guidance Panel

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March 27, 2014

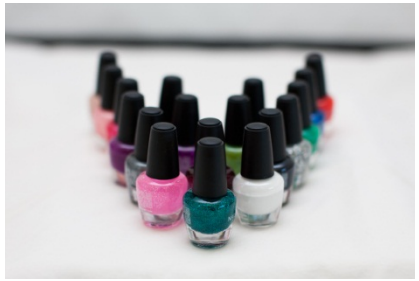
BIOMONITORING CALIFORNIA

Overview

- Laboratory collaboration with UC Berkeley: HERMOSA study
- Targeted unknown preliminary screening
- Future work

HERMOSA Study: Selected Chemicals in Personal Care Products

Phthalates (fragrance)



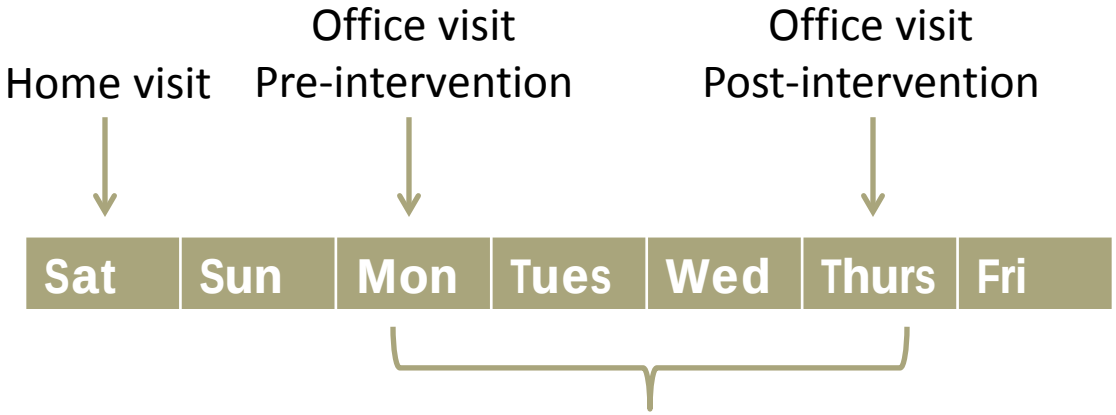
Parabens (preservative)

Triclosan (antibacterial)

Benzophenone-3 (sunscreen)

HERMOSA Study

- Enroll 100 teen girls
- Determine recent personal care products use
- Measure selected chemicals in urine
- Give low chemical products for three days
- Determine whether these chemicals have decreased



3-day intervention:

- No nail polish
- No perfume
- Only used the products provided

HERMOSA Study:

EHL Measured Analytes & Results

Phthalate Metabolites	LOD (ng/mL)	Detection Frequency (%)	Range (ng/mL) n=200
mEP	0.46	99.5	<LOD - 5470
mCPP	0.10	98.0	<LOD - 50.2
mBP	0.91	97.5	<LOD - 137
mBzP	0.20	99.5	<LOD - 80.7
mCHP	0.10	2.5	<LOD - 1.51
mECPP	0.19	99.5	<LOD - 684
mEHHP	0.19	98.5	<LOD - 370
mEOHP	0.10	99.0	<LOD - 287
mEHP	0.19	90.5	<LOD - 86.6
miBP	0.39	99.0	<LOD - 528

HERMOSA Study:

EHL Measured Analytes & Results

(continued)

Environmental Phenols	LOD (ng/mL)	Detection Frequency (%)	Range (ng/mL) n=200
BPA	0.20	81.5	<LOD - 43.8
BP-3	0.50	97.0	<LOD - 9840
Triclosan	0.20	91.5	<LOD - 2430
MP	0.50	90.0	<LOD - 6550
EP	0.50	59.0	<LOD - 411
PP	0.20	88.5	<LOD - 1000
BP	0.20	55.5	<LOD - 131

HERMOSA Collaborators

- *Principal Investigator, Kim Harley* - UC Berkeley
- *Principal Investigator, Kimberley Parra* - Clinica de Salud del Valle de Salinas
- *Co-Investigator, Asa Bradman* - UC Berkeley
- Jose Camacho, Katherine Kogut & Daniel Madrigal - CERCH (Center for Environmental Research and Children's Health) at UC Berkeley
- CHAMACOS Youth Community Council members

Targeted Unknowns Instrumentation

- High resolution: up to 140,000 at m/z 200
- Very sensitive: 500 fg buspirone on column S/N 100:1
- Simultaneously identify, quantify and confirm in one analytical run
- Post analysis data acquisition

Unknown Identification Strategy

- Start with targeted unknown screening
- Treat known compounds as targeted unknowns
- Build accurate mass & isotope profile data base for all relevant compounds: Toxic Chemical Finder (TCF)
  - Current TCF library contains over 600 compounds

Sample Preparation Workflow for Identifying Unknowns

Aliquot 200 µL urine sample into test tube

Add 10 µL internal standard & 100 µL of deconjugation enzyme solution

Incubate at 37°C for 30 minutes

Add 200 µL methanol, cool & centrifuge.
Dilute 50 µL into 950 µL water

Inject 20 µL into High Resolution Mass Spectrometer:
Exactive Plus with HPLC: Dionex Ultimate 3000

MS Workflow for Identifying Unknowns

Sample spectrum (input)

TCF library search

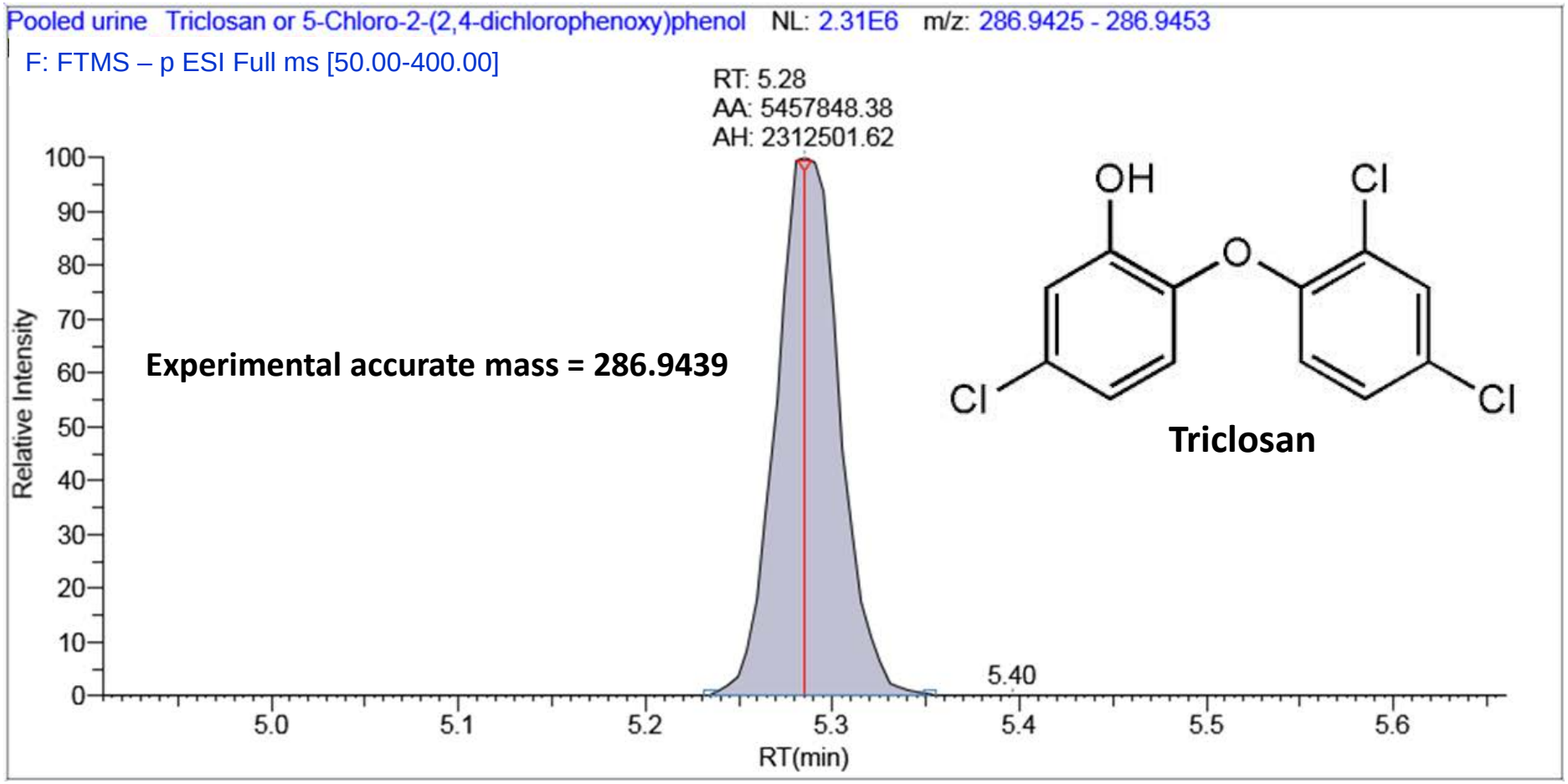
Putative hit-list generated

Further evaluation

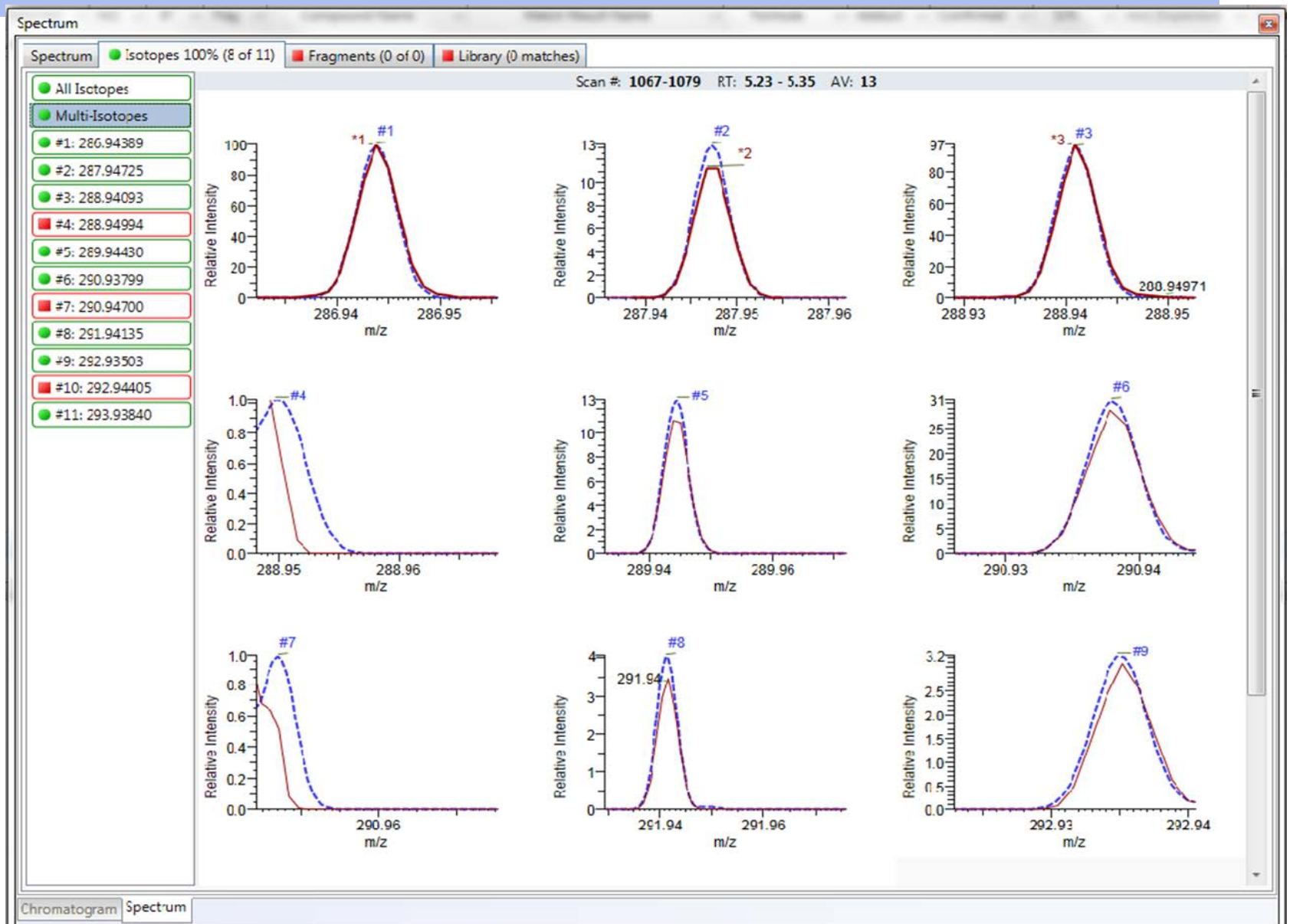
Putative Hit-List from TCF Library

	MZ	IP	Compound Name	Formula	Add	m/z (Expected	m/z (Apex)	m/z (Delta	Isotopic Pattern Score (%)
			Aa	Aa	Aa	Aa	Aa	Aa	≥ 100
1			2,2-Bis(4-hydroxycyclohexyl)propane or 4,4'-(2,2-Propanediyl)dicyclohexanol	C15H28O2	M-H	239.2016	239.2013	-1.3609	100
2			2-Methyl-2-propanyl 7,7-dimethyloctaneperoxoate	C14H28O3	M-H	243.1966	243.1962	-1.3434	100
3			2-Phenyl-2-propanyl 4,4-dimethylpentaneperoxoate	C16H24O3	M-H	263.1653	263.1652	-0.2977	100
4			3,3,3',3'-Tetramethyl-2,2',3,3'-tetrahydro-1,1'-spirobi[indene]-6,6'-diol	C21H24O2	M-H	307.1704	307.1691	-4.0762	100
5			3,6,9-Triethyl-3,6,9-trimethyl-1,2,4,5,7,8-hexoxonane	C12H24O6	M-H	263.15	263.1499	-0.2931	100
6			4,4'-Ethylidenediphenol or 1,1-Bis(4-hydroxyphenyl)ethane or 4,4'-(1,1-Ethanediyl)diphenol	C14H14O2	M-H	213.0921	213.0914	-3.0695	100
7			BADGE • 2H2O or Bisphenol A bis (2,3-dihydroxypropyl) ether	C21H28O6	M-H	375.1813	375.1814	0.2305	100
8			Bisphenol A or BPA or 4,4'-(2,2-Propanediyl)diphenol	C15H16O2	M-H	227.1078	227.1072	-2.3182	100
9			Bisphenol AF or 4,4'-(1,1,1,3,3,3-Hexafluoro-2,2-propanediyl)diphenol	C15H10F6O2	M-H	335.0512	335.0505	-2.0382	100
10			DINOSEB or 2-sec-Butyl-4,6-dinitrophenol	C10H12N2O5	M-H	239.0673	239.067	-1.2889	100
11			mBP	C12H14O4	M-H	221.0819	221.0814	-2.4408	100
12			mBzP	C15H12O4	M-H	255.0663	255.0661	-0.7015	100
13			Musk ambrette or 2-Methoxy-4-methyl-1-(2-methyl-2-propanyl)-3,5-dinitrobenzene	C12H16N2O5	M-H	267.0986	267.0984	-0.7124	100
14			Musk Tebetine or 1,2,3-Trimethyl-5-(2-methyl-2-propanyl)-4,6-dinitrobenzene	C13H18N2O4	M-H	265.1194	265.1195	0.4784	100
15			Triclosan or 5-Chloro-2-(2,4-dichlorophenoxy)phenol	C12H7Cl3O2	M-H	286.9439	286.9439	0.1715	100

Targeted Unknown: Accurate Mass



Targeted Unknown: Isotope Profile



Putative Hit-List from TCF Library *(continued)*

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Unknown Identification Highlights

- Ability to identify emerging chemicals
- Potential to build high through-put screening method
- Conduct post analysis data acquisition

Future Work

- Complete validation for BPA analogs method
- Expand current TCF database for identifying unknowns
- Analyze Expanded BEST samples
- Continue development of automation for sample preparation to increase laboratory through-put