



Knowledge that will change your world

TMPL, the Targeted Lipidomics, Metabolomics and Proteomics Laboratory – your resource for mandated NIH analytical rigor

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Abstract

The Targeted Metabolomics and Proteomics Laboratory (TMPL) offers various lipidomics, metabolomics and proteomics assays to the UAB research community. TMPL (<http://tmpl.uab.edu>) is part of the UAB Mass spectrometry consortium (<http://www.uab.edu/proteomics/>).

TMPL serves as a core laboratory for the following UAB Centers:

- Center for Free Radical Biology
- Lung Health Center
- O'Brien Acute Kidney Injury Center

Besides carrying out existing assays, TMPL is also available for the development of new assay procedures. This is proving very important in the light of NIH's demand for scientific rigor in research.

TMPL provides education on the methods and the science of metabolomics and mass spectrometry.

- January 6–April 3, 2019 – GBS 724 Graduate level course on Metabolomics - (meets Mon-Wed-Fri from 9:10:30 AM in Shelby 1015)
- <https://www.uab.edu/proteomics/massspec/classes/schedule.php>

Recent Publications from TMPL

Griesenauer B, Tran TM, Fortney KR, Janowicz DM, Johnson P, Gao H, Barnes S, Wilson LS, Liu Y, Spinola SM. Determination of an interaction network between an extracellular bacterial pathogen and the human Host. *American Society of Microbiology: MBio*. 2019 Jun 18;10(3): PMID: 31213562.

Lin VY, Fain MD, Jackson PL, Berryhill TF, Wilson LS, Mazur M, Barnes SJ, Blalock JE, Raju SV, Rowe SM. Vaporized E-Cigarette Liquids Induce Ion Transport Dysfunction in Airway Epithelia. *Am J Respir Cell Mol Biol*. 2019 Aug;61(2):162-173. PMID: 30576219.

Chumley P, Zhou J, Mrug S, Chacko B, Parant JM, Challa AK, Wilson LS, Berryhill TF, Barnes S, Kesterson RA, Bell PD, Darley-Usmar VM, Yoder BK, Mrug M. Truncating PKHD1 and PKD2 mutation alter energy metabolism. *Am J Physiol Renal Physiol*. 2019 Mar 1;316(3):F414-F425. PMID: 30566001.

White CR, Datta G, Wilson L, Palgunachari MN, Anantharamaiah GM. The ApoA-1 mimetic peptide 4F protects Apolipoprotein A-1 from Oxidative Damage. *Chem Phys Lipids*. 2019 Jan 29. pii: S0009-3084(18)30185-3. PMID: 30707910.

Yarar-Fisher C, Kulkarni A, Li J, Farley P, Renfro C, Aslam H, Bosarge P, Wilson L, Barnes S. Evaluation of a ketogenic diet for improvement of neurological recovery in individuals with acute spinal cord injury: a pilot, randomized safety and feasibility trial. *Spinal Cord Ser Cases*. 2018 Sep 21;4:88. PMID: 30275980.

Hough KP, Wilson LS, Trevor JL, Strenkowski JG, Maina N, Kim YI, Spell ML, Wang Y, Chanda D, Dager JR, Sharma NS, Curtiss M, Antony VB, Dransfield MT, Chaplin DD, Steele C, Barnes S, Duncan SR, Prasain JK, Thannickal VJ, Deshane JS. Unique lipid signatures of extracellular vesicles from the airways of asthmatics. *J Scientific Reports*. 2018 Jul 9;8(1):10340. PMID: 29985427.

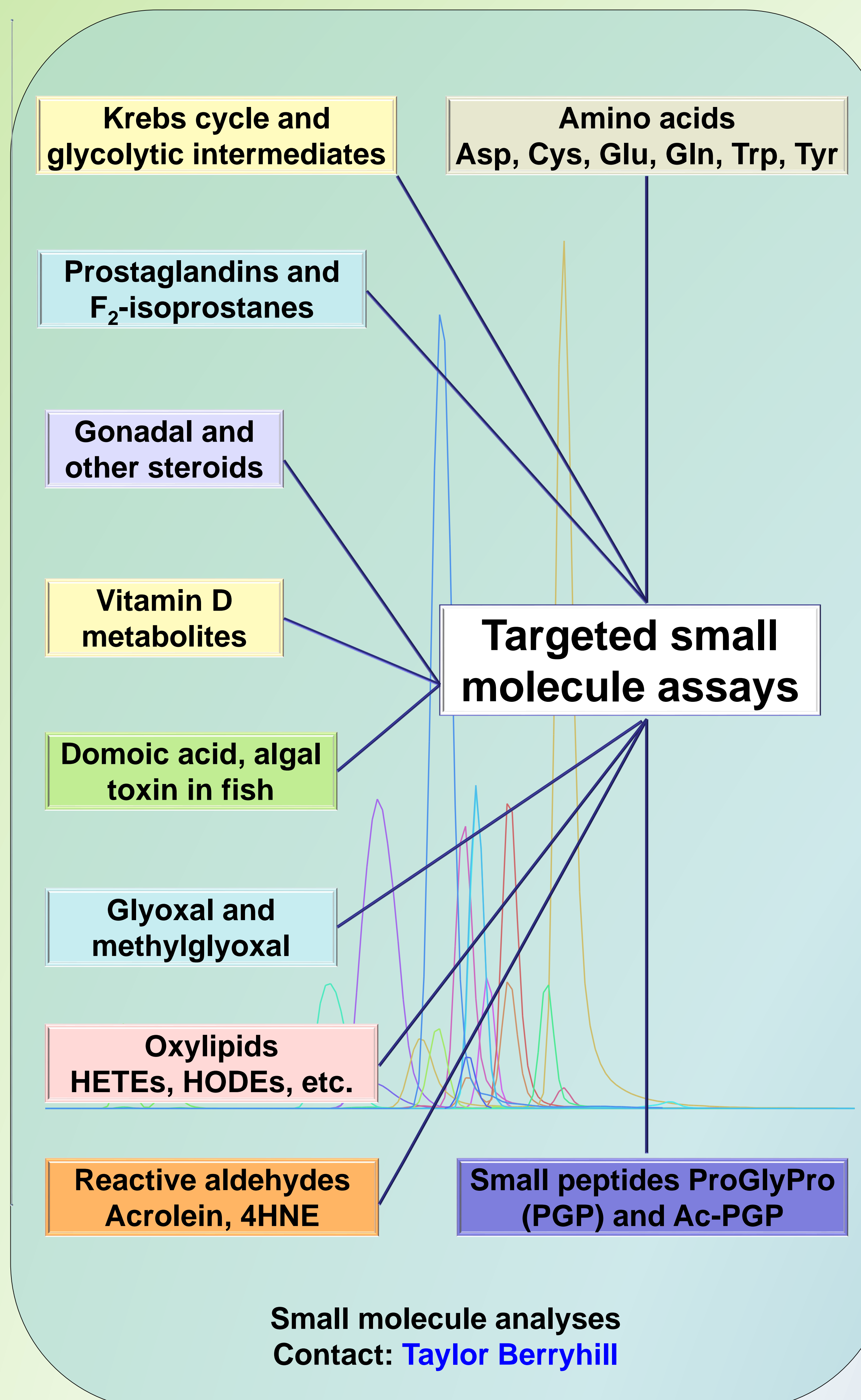
Redmann M, Benavides GA, Wani WY, Berryhill TF, Ouyang X, Johnson MS, Ravi S, Mitra K, Barnes S, Darley-Usmar VM, Zhang J. Methods for assessing mitochondrial quality control mechanisms and cellular consequences in cell culture. *Redox Biology*. 2018 Jul;17:59-69. PMID 29677567.

Kain V, Ingle KA, Kabarowski J, Barnes S, Limdi NA, Prabhu SD, Halade GV. Genetic deletion of 12/15 lipoxygenase promotes effective resolution of inflammation following myocardial infarction. *J Mol Cell Cardiol*. 2018 May;118:70-80. PMID: 2956491

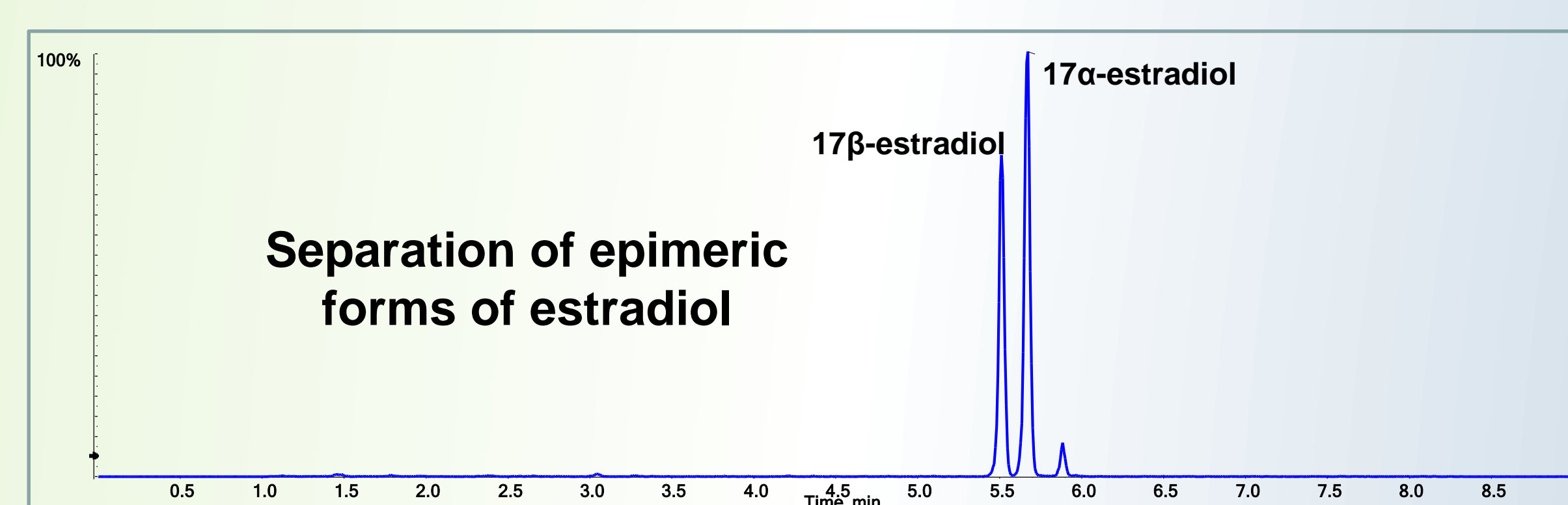
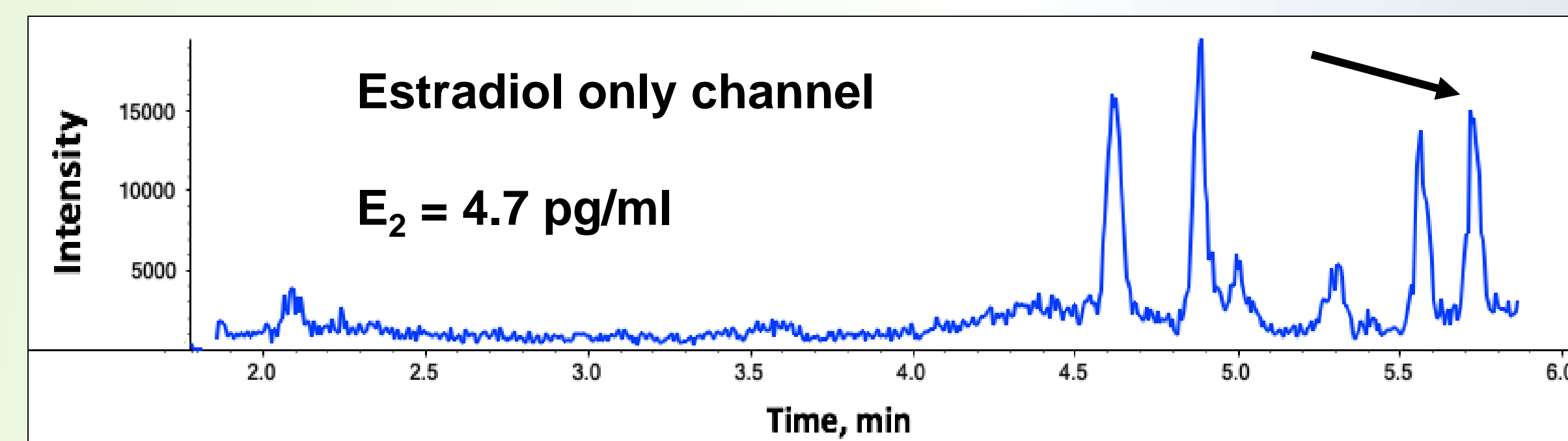
TMPL Contact Information

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 Rebeca Howell (Sample processing and lipid extraction): howell93@uab.edu (205) 934-3462
 Jeevan Prasain (prostaglandins and MSMS interpretation): jprasain@uab.edu (205) 996-2612
 Stephen Barnes (-omics and statistical analysis): sbarnes@uab.edu (205) 934-7117

Targeted Analyses

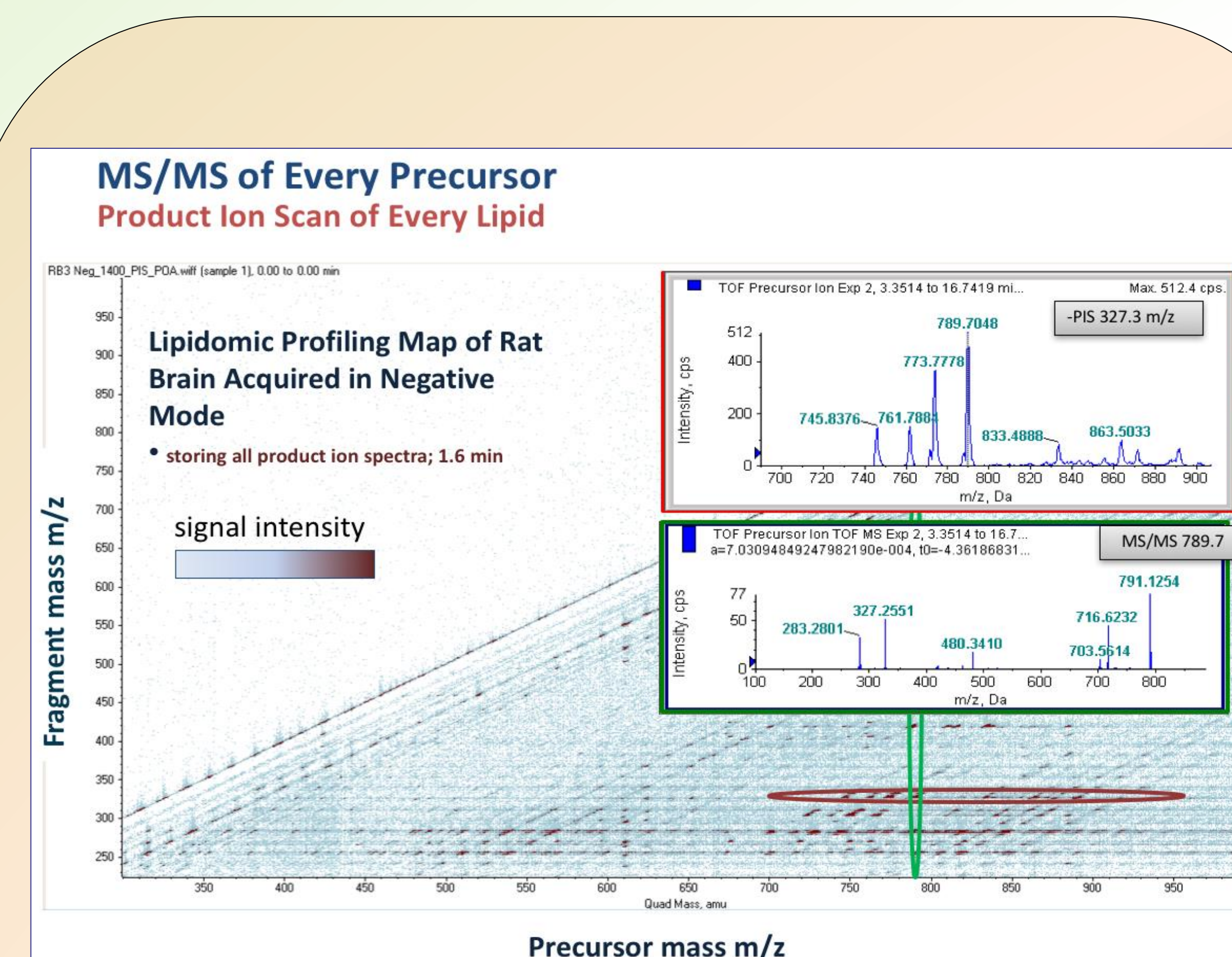


LC-MS of estrogens at the pg/ml level



Contacts: Taylor Berryhill

Untargeted Analyses



Comprehensive analysis of all sample lipids with MSM^{ALL}
Contacts: Jeevan Prasain and Landon Wilson

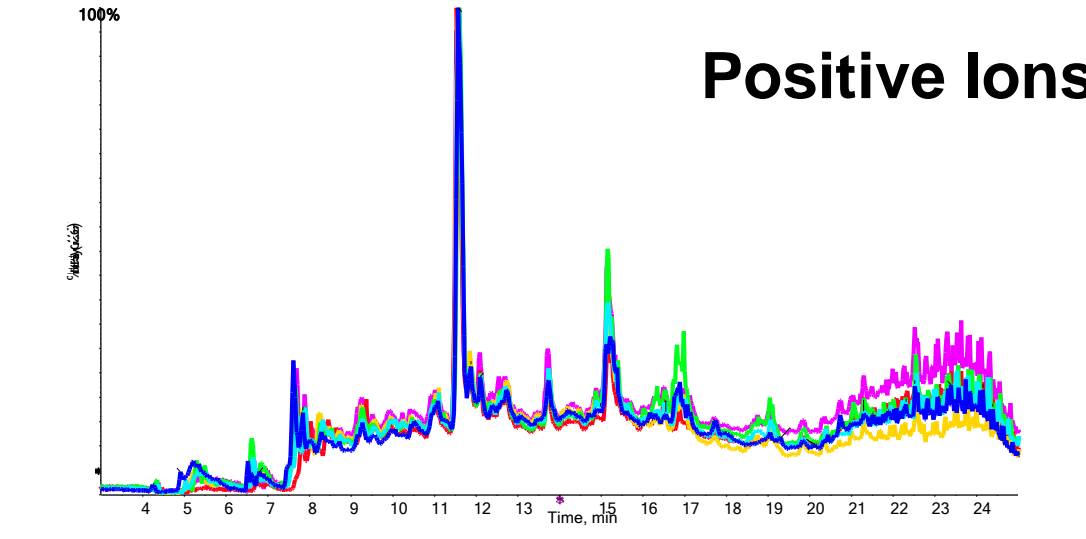
Metabolomics and data analysis

MZmine 2.40
Data inspection

XCMSonline
<https://xcmsonline.scripps.edu>
Peak alignment

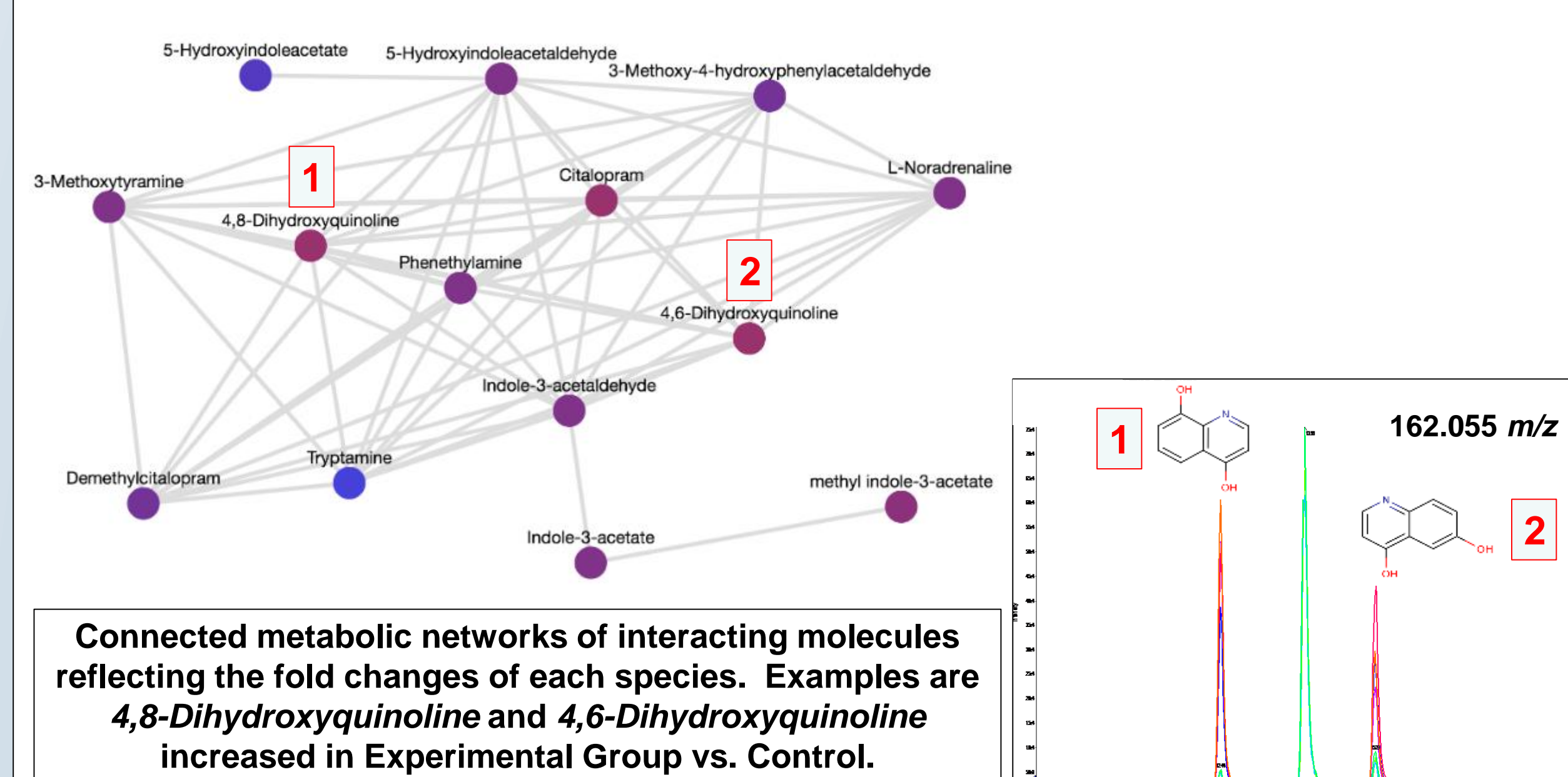
Metaboanalyst 4.0
<http://www.metaboanalyst.ca>
Statistical analysis

Mummichog 2.0.6
<http://mummichog.org/>

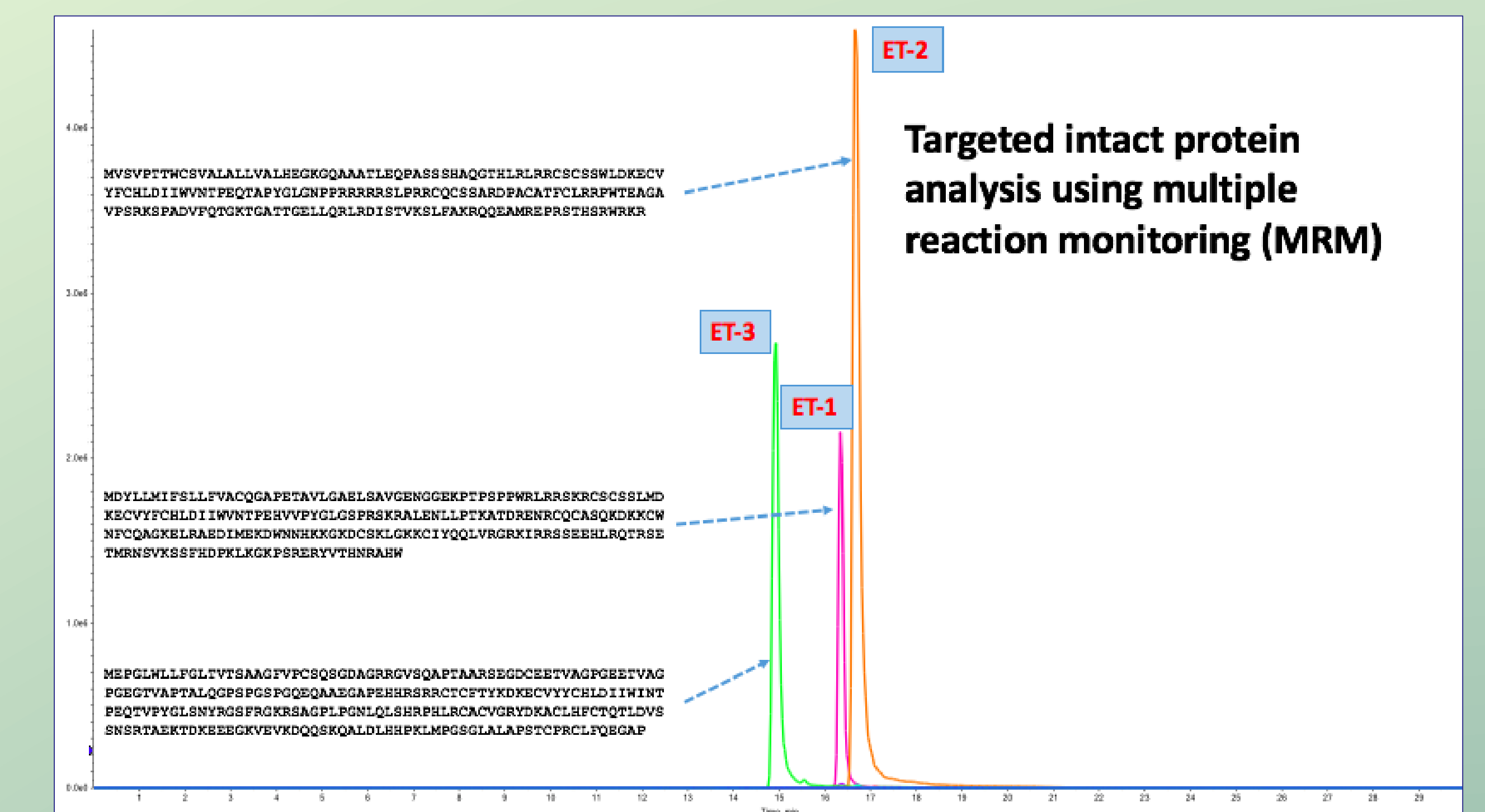


Global metabolome profiling with statistics and pathway analyses using High Resolution Mass Spectrometry.
Contacts: Stephen Barnes and Landon Wilson

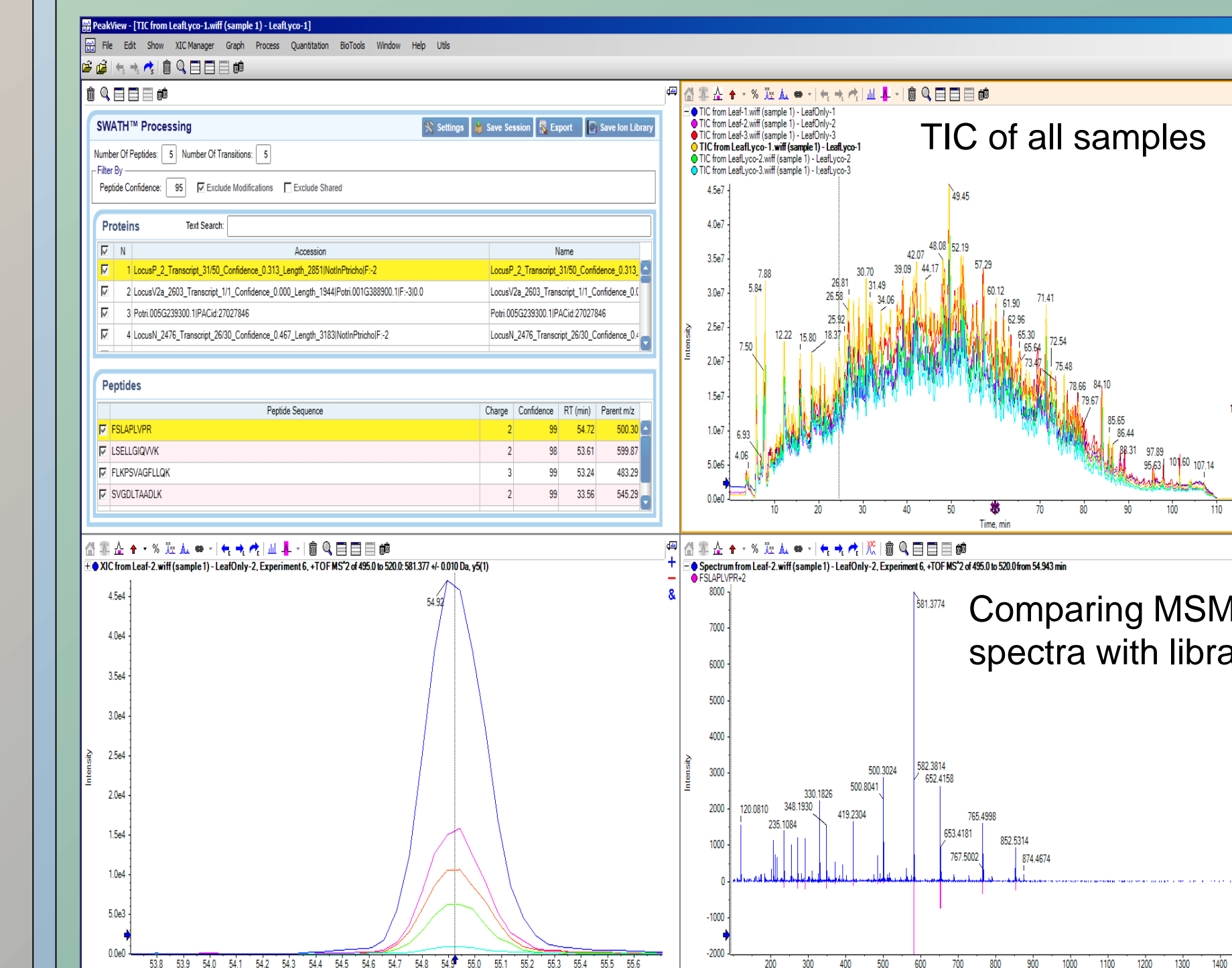
Metabolic Pathway and Molecular Networks



Proteomic Analyses



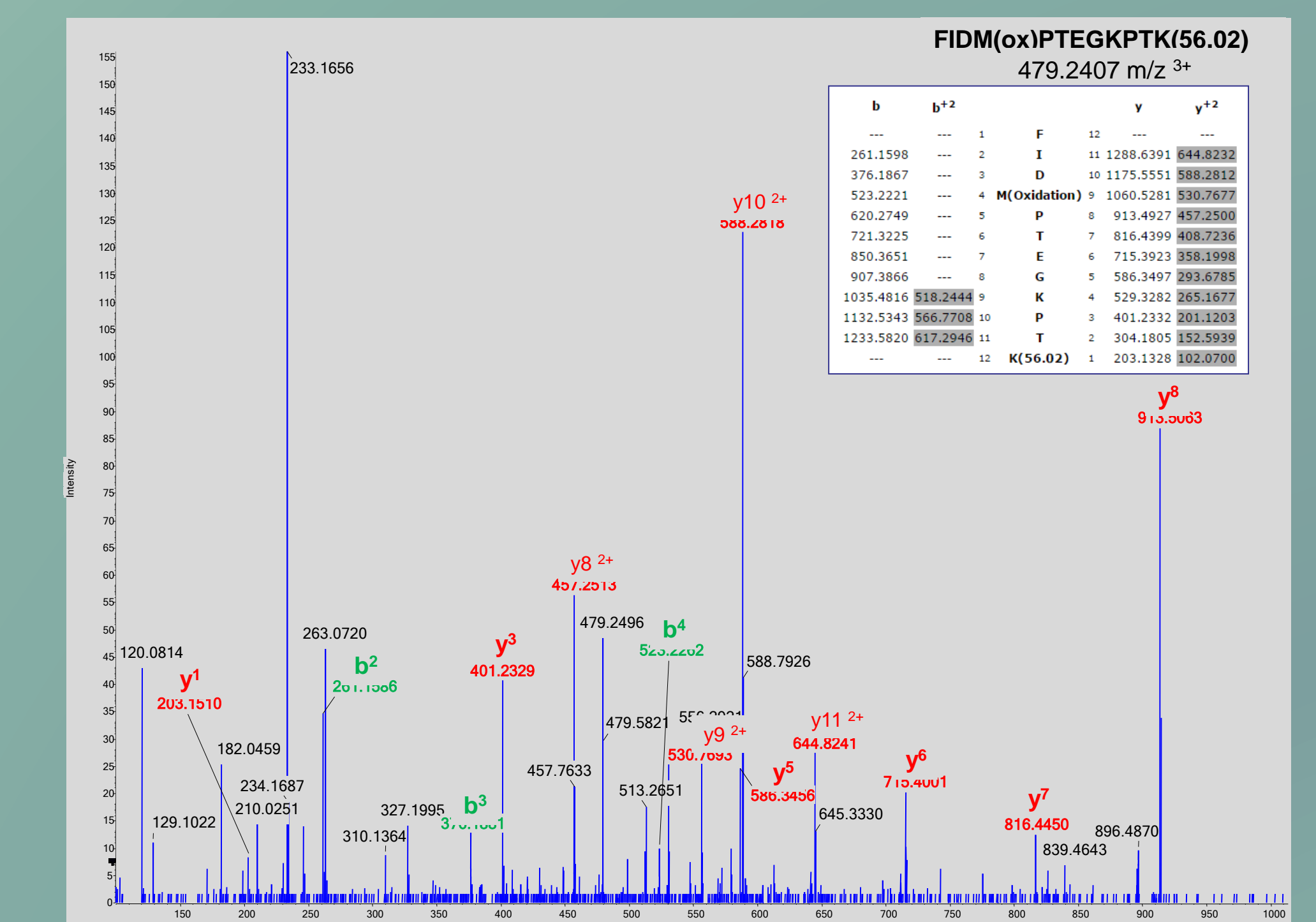
Quantitative analysis of protein-specific peptides
Contact: Landon Wilson



Protein analysis using SWATH-MS

SWATH-MS provides quantitative analysis across the entire proteome. It is preceded by discovery proteomics to build a sample-specific protein database.

Contact: Landon Wilson



Verifying expressed proteins and PTMs

Example: The CFTR Potentiator Ivacaftor Augment Mucociliary Clearance Abrogating CFTR Inhibition by Cigarette Smoke. Raju SV, Lin VY, Liu L, McNicholas CM, Karki S, Sloane PA, Tang L, Jackson PL, Wang W, Wilson L, Macon KJ, Mazur M, Kappes J, DeLucas LJ, Barnes S, Kirk K, Tearney GT, Rowe SM. *Am J Respir Cell Mol Biol*. 2016 Sep 1. [Epub ahead of print] PMID: 27565394

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