

Mouse Metabolic Phenotyping Center at Vanderbilt

*16th Annual Meeting of the Mouse Metabolic
Phenotyping Centers*



<https://labnodes.vanderbilt.edu/mmpc>

 [@mousecentral](#)

Publications

(2011 – Oct 2015)

Total citing DK059637 or Vanderbilt MMPC = 189

Technical publications or reviews = 6

Citations without MMPC personnel = 115 (60%)

Core Interaction Factor = 1.80



MMPC Executive Committee

Director: David H. Wasserman, PhD

Associate Director: Owen P. McGuinness, PhD

Program Manager: **Amanda Zetans**

Executive Committee: Harris, Harrison, Peek,
Powers



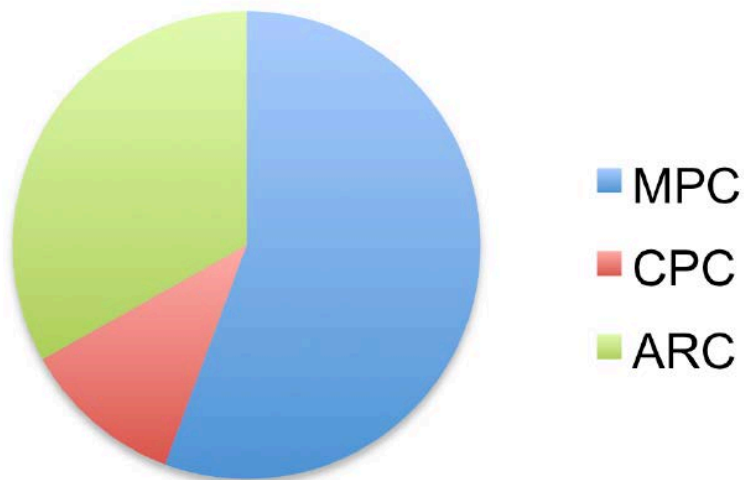
Institutional Buy-In to the MMPC Program

- No cost quarantine
- Administrative fee from 25 to 10%
- “MMPC Scholarship” to cover partial cost of services.

Charge Backs

Table B.5 VMMPC program income: annual, accumulative, and mean.

FY11	FY12	FY13	FY14	4 year total	mean per year
\$838,198	\$1,026,163	\$974,914	\$1,162,966	\$4,002,241	\$1,000,560



Four Goals:

- Standardization
- Implementation
- Development and Innovation
- Education and Outreach
- Contribute to Searchable Database

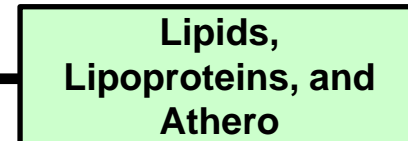
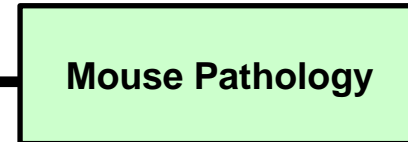
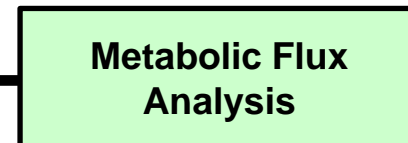
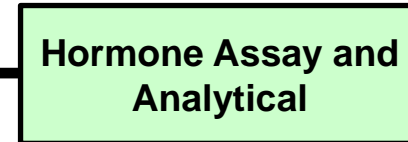
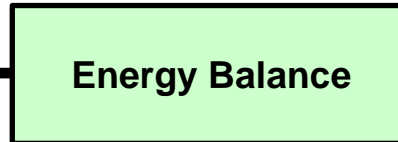
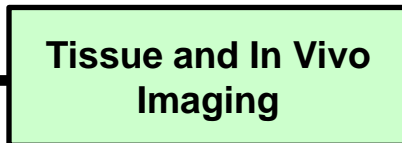
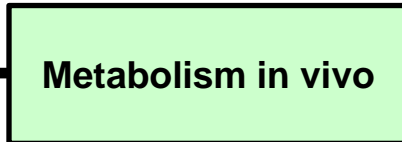


Cores and Primary Services

Mice

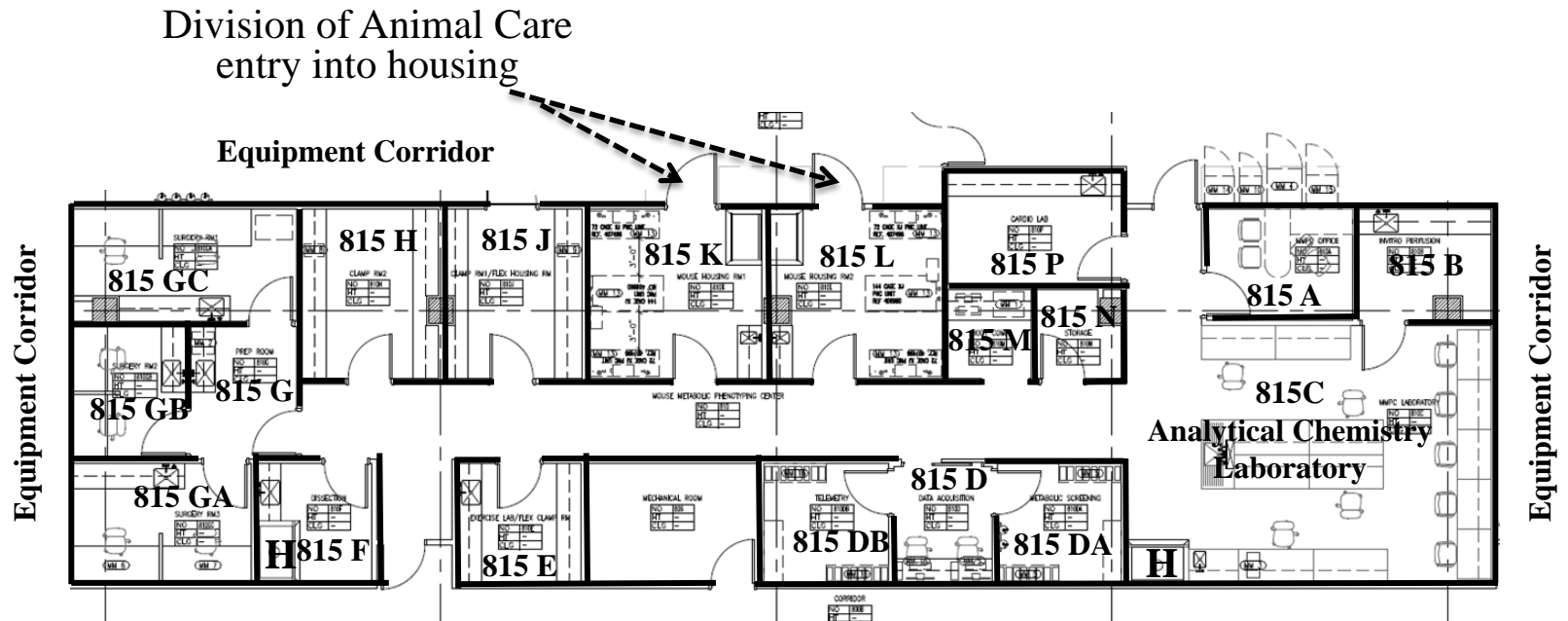


Tissue, Blood and Urine



AHWC = Animal Health and Welfare Core
MRC = Metabolic Pathophysiology Core
BWRC = Body Weight Regulation Core
ARC = Analytical Resources Core

Experimental Cores (Light Hall Rm 815)



>3000 sq ft

3 surgery suites (6 stations), 3 clamp/exercise rooms, 2 animal housing rooms, telemetry room, indirect calorimetry room, cardiovascular procedures room, perfusions/dissection room, general lab space

Metabolic Regulation Core (MRC)

Director: Owen P. McGuinness, PhD

Managing Scientific Director: Louise Lantier, PhD



MPC Subcores

Imaging (**vascular nutrient and hormone efflux, blood flow and blood flow heterogeneity**)

- Director: Sam Wells, PhD

Islet Isolation (DRTC)

- Director: Marcella Brissova, PhD



Procedures

- Glucose tolerance test (including FSIVGTT)
- Clamps (a variety)
- Exercise
- Circadian rhythm cycles
- Urine and blood analysis



Body Weight Regulation Core (BWRC)

Director: Kevin Niswender, MD, PhD

Managing Scientific Director: Louise Lantier, PhD



Procedures/services

- Telemetry (e.g. Temp, CV function, Glucose?)
- Energy balance (activity, food intake, EE)
- **Mitochondrial function**
- Bariatric surgery



Mouse Bariatric Surgery (up and running)

Yin DP, Gao, Q, Ma L, Yan W, Williams PE, McGuinness OP, Wasserman DH, Abumrad, NN. **Assessment of different bariatric surgeries in the treatment of obesity and insulin resistance in mice.** *Annals of Surgery* 254(1): 73-82, 2011. PMC3115424

Hatoum IJ, Stylopoulos N, Vanhoose AM, Boyd KL, Yin DP, Ellacott KLJ, Ma LL, Blaszczyk K, Keogh K, Cone RD, Farooqi IS, Kaplan LM. **Melanocortin-4 receptor signaling Is required for weight loss after gastric bypass surgery.** *J Clin Endocrinol Metab* 97: E1023-E1031, 2012. PMC3387412

Zaika E, Wei J, Yin DP, Andl C, Moll U, El-Rifai W, Zaika AI. **p73 protein regulates DNA damage repair.** *FASEB J.* Dec; 25(12): 4406–441, 2011 PMC3236618

Reddy IA, Wasserman DH, Ayala JE, Hasty AH, Abumrad NN, Galli A. **Striatal dopamine homeostasis is altered in mice following roux-en-Y gastric bypass surgery.** *ACS Chem Neurosci.* 5(10):943-51, 2014 PMC4324416

Flynn CR, Albaugh VL, Cai S, Cheung-Flynn J, Williams PE, Brucker RM, Bordenstein SR, Guo Y, Wasserman DH, Abumrad NN. **Bile diversion to the distal small intestine has comparable metabolic benefits to bariatric surgery.** *Nat Commun.* 2015 Jul 21;6:7715. doi: 10.1038/ncomms8715. PMID: 26197299 PMC4518285

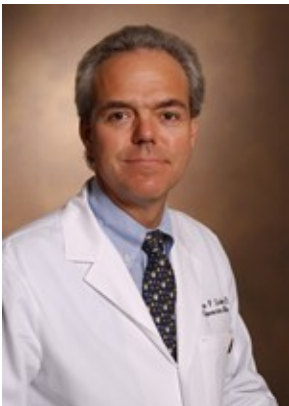
Albaugh VL, Poland JC, Xiong Y, McLean JA, Abumrad NN, Flynn CR
Less distal bile diversion to the small intestine partitions fat malabsorption from the metabolic effects of bile acids (2016) *Gastroenterology* submitted.

Albaugh VL, Banan B, Alikhan M, Clements A, Xiong Y, Abumrad NN, Flynn CR
Bile diversion to the ileum in lean, chow-fed mice is associated with improved insulin sensitivity without changes in intestinal glucose uptake (in preparation).

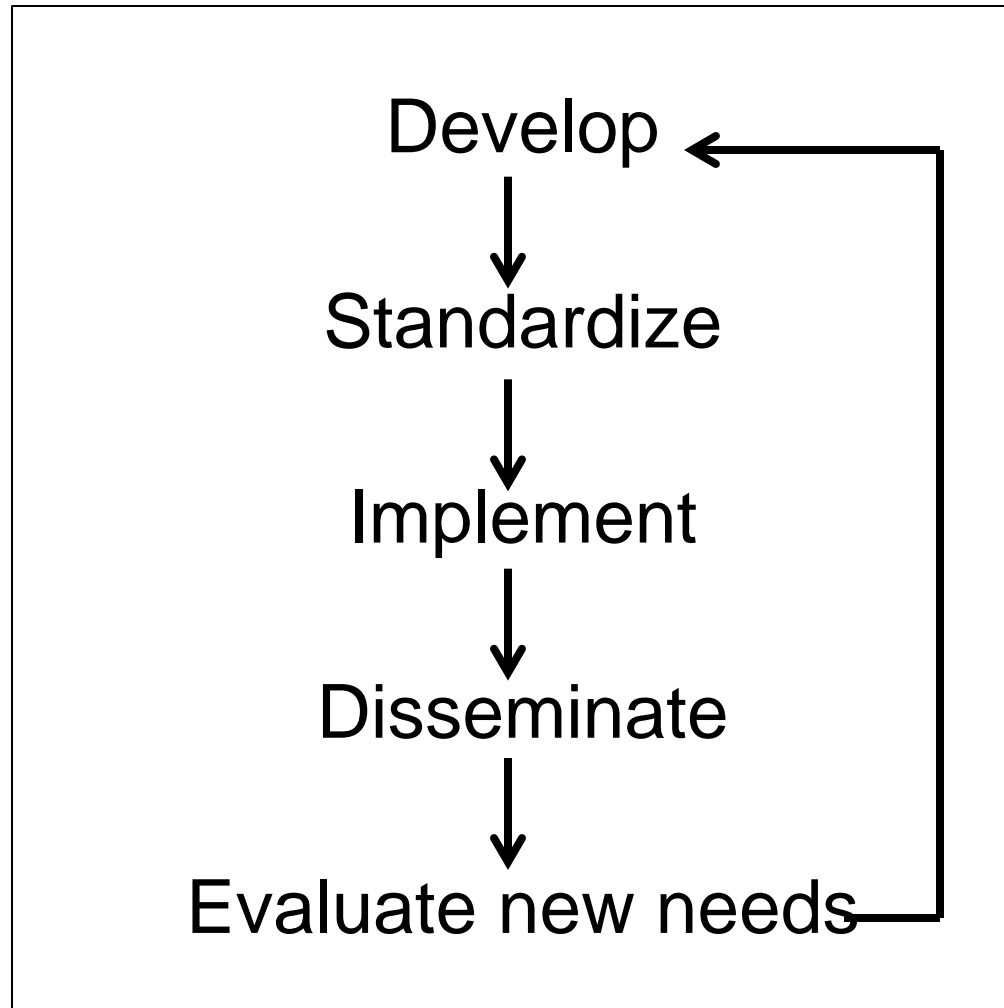
Analytical Core

Director: MacRae Linton, MD

- Hormone Assay and Analytical Services (Edgerton)
- **Metabolic Flux Analysis (Young)**
- Lipids, Lipoproteins, and Atherosclerosis (Swift)
- Mouse Pathology (Boyd)



Long Term Strategy



Vanderbilt Courses

- *Glucose Clamping the Conscious Mouse*
- *Experimental Techniques in Mouse Kidney Injury Workshop (with Vanderbilt Kidney Center)*
- ***9th Annual Course Isotope Tracers in Metabolic Research (McGuinness, Brunengraber, Wolfe)*



Vanderbilt MMPC
Glucose Clamping the Conscious Mouse
September 2016



Major Designated Initiatives

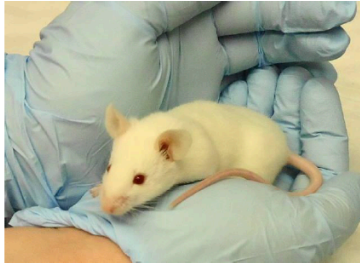
- Work with CBU on consolidating ARC request for services and on database.
- Train staff for new tests mitochondrial function, metabolic flux analysis, and imaging.



Lab Manual

downloadable from our website

GLUCOSE CLAMPING THE CONSCIOUS MOUSE: A LABORATORY COURSE



11th Edition

Vanderbilt-NIDDK
Mouse Metabolic Phenotyping Center
Nashville, Tennessee

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Hyperinsulinemic-euglycemic Clamps in Conscious, Unrestrained Mice

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¹Diabetes and Obesity Research Center, Sanford-Burnham Medical Research Institute at Lake Nona, ²Department of Molecular Physiology and Biophysics, Vanderbilt University School of Medicine, ³Vanderbilt Mouse Metabolic Phenotyping Center, Vanderbilt University School of Medicine, ⁴Department of Pediatrics and Cellular and Integrative Physiology, Indiana University School of Medicine

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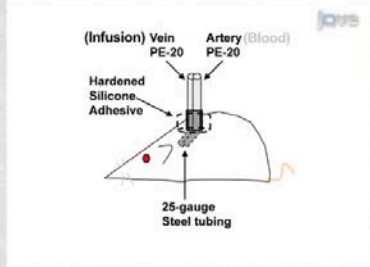
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