

STANDARD OPERATING PROCEDURES
FOR
Biomedical and Obesity Research Core (BORC)

**Nebraska Center for the Prevention of
Obesity Diseases (NPOD)**

College Of Education and Human Sciences

University of Nebraska-Lincoln

**Leverton Hall, Room 14, 23
Life Science Annex, Room 22A, 22C**

SOP#: 001	Date Issued: 8/03/2021	Date Revised: 9/06/2024
TITLE:	BORC Management	
SCOPE:	Research Personnel	
RESPONSIBILITY:	BORC staff	
PURPOSE:	To outline the general procedures to use services and facility at BORC	

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1 Introduction and goals

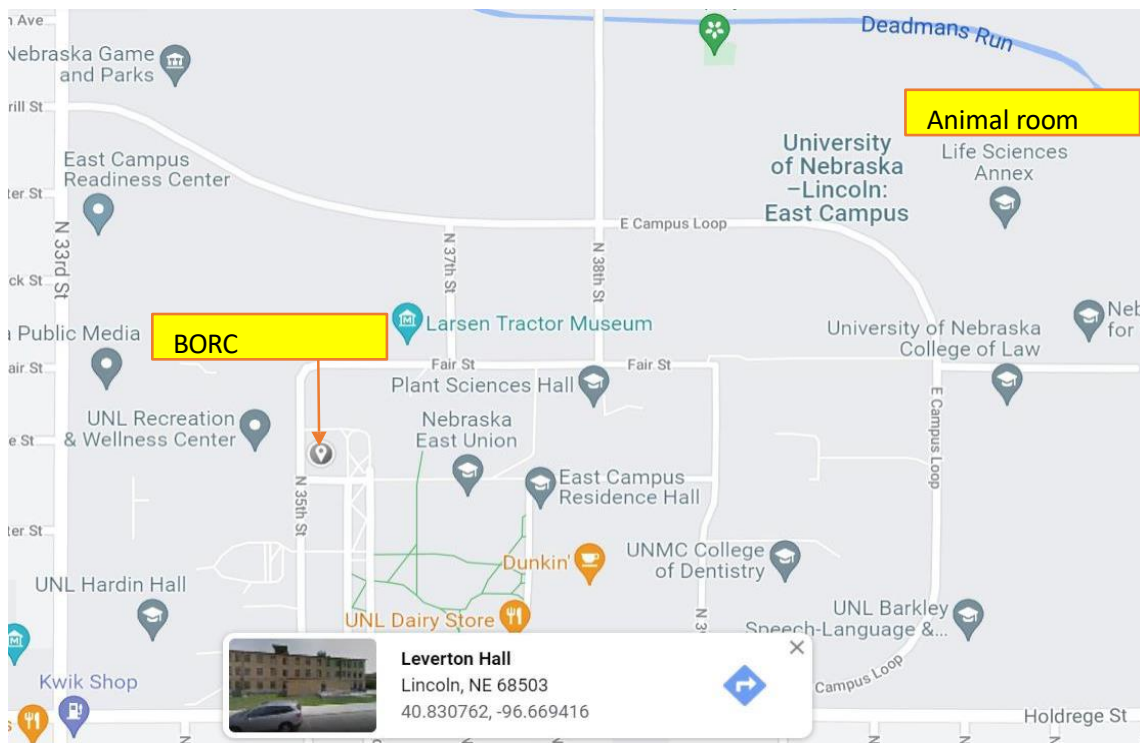
The Biomedical and Obesity Research Core (BORC) is a one-stop shop core facility in the Nebraska Center for the Prevention of Obesity Diseases (NPOD). The BORC provides cutting-edge biomedical research services for investigators in the University of Nebraska system and external users.

BORC's Goal

- 1) To provide facilities, equipment, and resources that enable researchers to discover new mechanisms and explore new approaches for prevention of obesity diseases.
- 2) To provide training for researchers on services available in the BORC.
- 3) To develop unique and innovative research tools in BORC that will benefit research community at large and contribute to their research and grant applications.
- 4) To expand research tools, standardize key methodologies, and introduce newest techniques available to investigators.

2 Facility location and layout

The BORC's facility includes two offices and a 2,000 square feet laboratory in the lower level of Leverton Hall and two animal rooms for in vivo study in the Life Science Annex on the East Campus of University of Nebraska-Lincoln. In addition, to meet our users' need for large capacity, high-speed computational solutions, the BORC is networking with the Holland Computing Center.



Leverton Hall

The BORC occupies a total of 1976 sq. ft. of laboratory and office space in the basement of Leverton Hall on UNL's East Campus, where most cell biology, biochemistry, and molecular biology studies are performed. The laboratory includes a separate biosafety level 2 cell culture room (176 sq. ft.), equipped with a ZEISS Primo Vert microscope, a NuAire In-VitroCell ES NU-5710 Incubator for cell culture, and a LabGuard® ES NU-430 Class II, Type B2 Biosafety Cabinet. A fume hood was built at the end of the room to limit researchers' exposure to hazardous or toxic fumes and vapors when they perform experiments.



Life Science Annex

The BORC also occupies two animal rooms in Life Science Annex for researchers to perform in vivo study. Room A25A (360 sq. ft.) is equipped with seven behavioral study equipment including Grip Strength System, ROTOR-ROD™ System, SR-LABTM Startle Response System, Place Conditioning Preference, Barnes Maze, Morris Water Maze and Radial Arm System, as well as a live mouse imaging system, iBox® Scientia. Room A22A (255 sq. ft.)

houses the TSE Phenomaster/Labmaster caging system, a multi-modular platform that allows researchers to carry out metabolic, behavioral and physiological study of mice in an automated and synchronized manner.



3 Equipment and services

The major equipment at BORC is categorized into four groups:

Molecular and Cell Biology
Metabolic Study
Animal Behavior Research
Small Animal Imaging

3.1 Molecular and Cell Biology

BORC provides basic equipment for molecular biology and biochemistry in laboratory at Leverton Hall location, such as centrifuge, homogenizer, incubator, shaking incubator, apparatus for DNA/RNA and protein analysis.

The major equipment used for molecular and cell biology study in BORC may be booked and operated by the users' themselves after being trained by BORC staff.

- [Bio-Rad QX200 ddPCR system](#)
- [BioTek Synergy™ H1m Plate Reader](#)
- [CFX Connect™ Real-Time PCR Detection System](#)
- [Cytation C10 Confocal Imaging reader](#)
- [DIGITAL Sonifier® UNITS Models S-450D](#)
- [FreeZone® 4.5 Liter Freeze Dry Systems](#)
- [ImageStream®X MkII Image Flowcytometry](#)
- [Leica RM2125 RTS Microtome](#)
- [LICOR ODYSSEY® CLx](#)
- [MAGPIX-Multiplexed Genomic and Proteomic Biomarker Analysis](#)
- [Malvern NanoSight NS300](#)
- [Microlab Prep](#)
- [MinION MK1c Nanaopore Sequencer](#)
- [NanoString GeoMx® Digital Spatial Profiler](#)
- [nCS1 Nano Particle Analyzer](#)

3.2 Metabolic Study

Metabolic research unit is designed to provide an array of sophisticated research techniques from animal model to cell biology to the scientific community.

- [Agilent GC-MSD](#)
- [Anaerobic Chamber](#)
- [Metabolic cages \(TSE Systems\)](#)
- [UltraFocus DXA](#)
- [Vitros 250 Chemistry Analyzer](#)
- [XFe-24 Extracellular Flux Analyzer \(Seahorse Bioscience\)](#)

3.3 Animal Behavior Research

The Animal Behavioral Research Unit can help researchers with phenotype screening of mice and rats in a variety of paradigms, including motor function, rewarding, startle response, spatial learning and memory. These types of screens may be used to phenotype mutant animals, test diet or drug effects on animal muscle and neurological function.

- [Barnes Maze](#)
- [Grip Strength System](#)
- [Morris Water Maze](#)
- [ROTOR-ROD™ System](#)
- [Place Conditioning Preference](#)
- [SR-LABTM Startle Response System](#)
- [The Radial Arm Maze](#)
- [Treadmill](#)

3.4 Imaging facilities

BORC provides imaging systems to its investigators. iBox® Scientia is an in vivo fluorescence protein imaging tool for small animals (mice). It is designed to automate capturing accurate and repeatable images of small animals with one-touch, pre-set or user-defined PC controls. The Pearl® Impulse Animal Imaging System is a small animal in vivo imaging system that offers dual-channel near-infrared fluorescent detection. The design simplicity minimizes user effort through one-button image acquisition. LI-COR ODYSSEY® CLx also provide a module for infrared imaging of small animals, whole organ and tissue section. Its pseudo-color display style can help researchers to quickly isolate regions of interest.

- [ImageStream®X MkII Image Flowcytometer](#)
- [GeoMx® Digital Spatial Profiler](#)
- [Cytation C10 Confocal Imaging reader](#)
- [iBox® Scientia™ Small Animal Imaging System](#)
- [LI-COR Odyssey® CLx](#)
- [UltraFocus DXA](#)

3.5 Experimental services

BORC users must have an approved IBC protocol for the work they request BORC to do. Please contact a staff member prior to submit any samples to verify sample preparation. To submit a service request, please provide all information in this form as accurately as possible and email the filled form to BORC staff. The experimental services provided at BORC include:

- [Cell Based Assays and Biochemical Assays](#)
- [Chemistry Panel Analysis DNA & RNA extraction](#)
- [Gene Cloning and Subcloning Genotyping](#)
- [Real Time PCR and Digital Droplet PCR](#)

3.6 Biostatistics and Computational Services

4 Mandatory prerequisite training

All users are required to finish relevant EHS training before working at BORC lab. The training information can be found at <https://ehs.unl.edu/web-based-training#BioRC>

5 Management

The BORC uses iLab Organizer, an online managing system to manage equipment scheduling, tracking service requests, billing, and analyzing data. The director oversees the day-to-day operation of the BORC and manage the facility staff. The director interacts with users to discuss experimental needs, technical issues, provide support for users' grant application, and fulfill the mission of the BORC. The director also evaluates the needs for purchasing and updating new equipment, attending scientific meeting, expanding user base and optimize the BORC operation. The technologists manage the request schedule, equipment training, perform assay, and maintain the equipment to make sure services are available. If necessary, the technologists may participate in users' projects and carry out experiments that require specific expertise. Both director and the technologists provide pre and post-experiment consultation whenever needed.

5.1 Service prioritization

The major role of BORC is to serve NPOD. Members of NPOD always have higher priority to request BORC service than other investigators. Service requests from project leaders will have top priority, followed by requests from pilot and seed grant recipients. Next in line will be the requests from center members who contribute to NPOD by mentoring project leaders or through providing leadership. Next will be the requests from regular center members, followed by UNL and UNMC faculty who are not NPOD members. Faculty from other institutions and for-profit entities will be last in line for services when requests exceed capacity. Emergencies such as the generation of preliminary data for an upcoming grant application are decided case-by-case. The same prioritization scheme will apply when signing up for BORC workshops. A decision-making tree has been developed that allows the BORC technologists to accept and prioritize service request in cases when the BORC director is not available.

5.2 Research compliance

The BORC will not apply for any research compliance approvals other than its own IBC approval to maintain a BSL-2 biosafety level laboratory for research with recombinant DNA and human biological fluids. It will be each user's responsibility to provide the BORC with

protocols approved by IACUC, IBC and IRB whenever required, before service requests will be accepted.

5.3 User fee and pricing

User fee will be charged for instrument usage and experimental services. NPOD will provide subsidies for NPOD members and investigators in UNL at different levels (Table 1). The BORC has established the fee structure by taking into account costs of materials and supplies, personnel, equipment maintenance and depreciation. These fees may be adjusted based on an annual review of the research core's budget by the CEHS Business Center, NPOD director and BORC director. BORC usually bills users monthly but may prepare bills any time after services provided as requested for customer's' convenience.

BORC Users	Project Leader	Pilot & Seed Grant Investigator	Other related Members	Other UNL Members	Outside Customers	Industry Customers
Charge Rate	10%	20%	50%	80%	100%	140%

6. How to use BORC facility

The Biomedical and Obesity Research Core (BORC) is a service center providing equipment and services on a fee-for-service basis. BORC also provide trainings to new users to operate the instruments and consultations for available services at BORC. New users need to register an account on iLAB and finish instrument/service-related training before using BORC instruments and services. You may find online training program here <https://borc.unl.edu/training/>.

1. All new users are required to finish the first two training. BORC services can leverage your research and How to Sign Up iLAB and Reserve Instruments.
2. For service request, the users need to fill the Service Request Intake Form before submitting any samples (<https://cehs.unl.edu/borc/services/>).
3. New users need to finish the related online training before using any instruments.
4. Users may contact staff for personal training whenever needed.
5. The accesses to BORC laboratory at Leverton Hall and animal room at Life Science Annex are controlled by ID card reader. Regular users may request NUID card activation to access BORC facility.
6. Users are required to reserve instruments online through iLab system with their credentials before starting their experiments.
7. If you have any questions or any problems while using instruments, please contact staff immediately.
8. Please acknowledge BORC/NPOD in any grant application or publication in which equipment and/or staff expertise was provided. Also, please send the director a copy of accepted publications containing data generated in the facility.

7. General Practice

All general laboratory safety practices will apply to this laboratory including the following.

1. No eating, drinking, smoking, handling contact lenses, or applying cosmetics is permitted.
2. Gloves and closed toe shoes are required to be worn at all times
3. All procedures should be performed in a manner to minimize the likelihood of spills and aerosols.
4. Any work surface used should be decontaminated using 70% isopropyl alcohol after.
5. Any waste materials containing will be discarded into orange biowaste plastic bags
6. Razor blades, scalpels, hypodermic needles or any other sharp objects should be discarded in a provided approved “sharps” disposal container.

8. Exposure and Emergency Responses

All research personnel that work in the BORC Lab must comply through University Environment, Health and Safety (EHS) with the requirements listed on Safe Operating Procedures.

General guidance on response actions for tornados, floods, power outages, and other emergencies is available on the UNL Emergency Preparedness web site (emergency.unl.edu).

General response procedures for certain emergencies that may also result in injury/illness are also addressed in the following EHS SOPs (available on the EHS web page):

- Spill and Exposure Response – Biohazardous Materials (including Recombinant and Synthetic Nucleic Acids)
- Radioactive Material Spills
- Pre-planning for and Responding to Chemical Spills.

9. Contact information

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