

CHHE Facilities and Other Resources (chhe.research.ncsu.edu)

NC State's NIEHS-funded P30 Center for Human Health and the Environment (CHHE) provides the following facilities/resources to its members:

Systems Technologies Core

The Systems Technologies Core (STC) is a three-compartment facility core consisting of Proteomics, Metabolomics, and Genomic Sections. The STC provides guidance in study design for proteomic, metabolomics, and genomic experiments and in the implementation of these analytical technologies. Additionally, CHHE employs a dedicated bioinformatician for consultation at the design stage of research studies to ensure that the experimental design of the studies are valid, efficient, and correctly powered and to provide analyses of high-throughput proteomic, metabolomic, and genomic data sets as well as large epidemiology data sets.

- **Proteomic Section**

The Proteomics Section uses state-of-the-art LC MS/MS techniques to conduct discovery proteomic experiments, analyses of targeted proteins and their posttranslational modifications. The Proteomics Section is equipped with both a Quadrupole Orbitrap (QE-Plus, ThermoFisher, Bremen, Germany) and triple quadrupole mass spectrometers (Quantiva, ThermoFisher, San Jose, CA). Both instruments are equipped with ultra-high pressure liquid chromatography systems (Easy NanoLC 1000, ThermoFisher) and custom built nanoLC sources.

- **Metabolomics Section**

CHHE has a partnership with the NIH Eastern Regional Comprehensive Metabolomics Resource Core (RCMRC) at RTI, which is a 30-minute drive from the NC State Campus. RCMRC conducts broad spectrum metabolomics and metallomics, and uses targeted methods for analysis of specific endogenous or exogenous compounds. RCMRC is equipped with 950 MHz Bruker Avance NMR spectrometer (three other lower-field NMRs), Thermo LTQ Velos Orbitrap with ETD, 2 LTQ XL (ThermoFisher), Quattro Premier MS (Waters, Corp), API 5000 and 2 API 4000 Qtrap (AB Sciex). Agilent 6890 GC with Agilent 5973 Mass Spectrometer. Other capabilities include 2D-GC-TOF-MS, inductively coupled plasma, and MALDI imaging.

- **Genomics Section**

Powerful high-throughput sequencing technology available in the Genome Science Laboratory (GSL) at NC State allows CHHE researchers to conduct genome wide studies of DNA protein interactions (ChIPseq), gene mutation analysis, SNP analysis, DNA methylation changes, RNAseq and micro RNA analysis, eQTL analysis, genotyping by sequencing (GBS) and genome wide association studies (GWAS). GSL is equipped with the following NGS platforms; Illumina MiSeq, NextSeq 500, HiSeq 2500 and Life Technologies Ion Proton. Other instrumentation at the facility include the BioRad's QX200 digital PCR platform for rare variant detection, Applied Biosystems 3730xl sequencers (Sanger Sequencing), a Biomek FX robot, and a fluorescent plate reader.

Comparative Pathology Core

The Comparative Pathology Core (CPC) provides pathology expertise and pathologic phenotypic assessment of diverse animal models. CPC pathologists and a network of pathologists with specialized organ system expertise will provide advanced pathology evaluation for CHHE member projects. CPC is located in NC State's highly ranked College of Veterinary Medicine. CPC also provides training to CHHE members in pathology techniques and tissue assessment methods. Together, the CPC and the Histology Laboratory allow for complete tissue handling, processing, and pathology assessment for CHHE researchers.

Integrative Health Sciences Facility Core

The Integrative Health Sciences Facility Core provide services and resources to facilitate and foster the translational and reverse-translational capabilities of basic researchers, epidemiologists, public health workers, and clinicians at East Carolina University (ECU) Brody School of Medicine. Specifically, it provides: a) access to the vast data resources at the NC Department of Health and Human Services, b) expertise in the design and implementation of human population-based studies, c) training and customized data curation in the Comparative Toxicogenomics Database, and d) access to human samples associated with the Newborn Epigenetics Study (NEST) and ECU's NC Tissue Consortium.