# Barocycler® 2320EXT

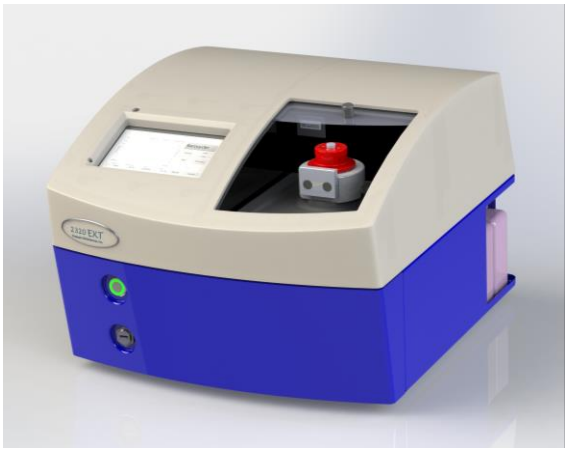
## For the PCT-HD Sample Preparation System

Pressure Cycling Technology (PCT) is a unique, patented technology platform based on repeated cycles of hydrostatic pressure between ambient (14.7 psi) and ultra-high levels. These rapid changes in pressure are used to control biomolecular interactions for applications such as accelerated proteolytic digestion, and improved extraction of cellular components, including proteins and lipids. The PCT platform allows for a high degree of safety, speed, reproducibility, and convenience in modern sample preparation protocols.

The PCT-HD Sample Preparation System is a proven PCT-based workflow for processing small tissue samples for proteomic and other applications. PCT-HD combines efficient, hands-off tissue homogenization and protein extraction with pressure-enhanced digestion, for rapid, efficient and reproducible generation of peptides for MS analysis. This unique workflow combines two of PBI's innovative sample preparation tools: the Barocycler 2320EXT and our patent-pending PCT MicroPestles. PCT-HD and the Barocycler 2320EXT can provide unprecedented speed and reproducibility for biomarker discovery, yielding peptides ready for clean-up and MS within 2-4 hours from the start of tissue processing.

The Barocycler 2320EXT is a compact, bench top instrument that can process up to 16 samples simultaneously using PCT MicroTubes. Features that come standard with the 2320EXT include: data input and output options to accommodate validation and quality control; computer-operated control with touch screen programming and automatic data logging; and the ability to control multiple pressure cycling parameters, such as the rate of pressure increase/decrease, both the high and low pressure levels, and the shape of the pressure profile (e.g., sine wave, square wave, and others). In addition, the 2320EXT is available with a choice of two different methods for temperature control (an external circulating waterbath for heating and cooling, or a built-in electric heater).
*Patent Pending*

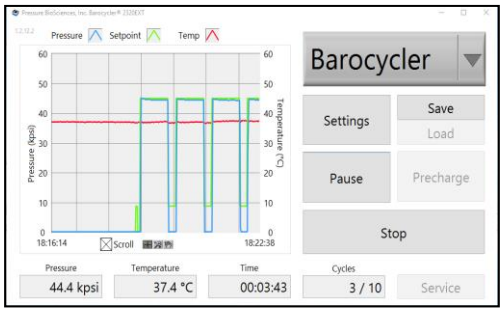
**The Barocycler 2320EXT**



- Computer-operated control with Touch Screen Interface
- Pressure Range: ambient - 45,000psi (310 MPa)
- Choice of temperature control - heating/cooling or heating only
- Max Temperature: 95˚C
- Min Temperature: 4˚C with circulating waterbath, ambient with electric heating
- Insulated closure for easier use at high temperatures
- Chamber capacity: up to 16 samples in MicroTubes
- Easily accessible USB port on front panel
- Requires 110psi input air pressure
- Input air pressure can be provided by an air compressor, house air or nitrogen lines, air or nitrogen tanks.
- Pressure medium: Distilled Water

**Touch Screen Interface**

Pressure Profiles are programmed via an onboard touch screen, which can be connected to a network. The instrument is also equipped with a USB port that can be used to connect a mouse or keyboard to the 2320EXT.



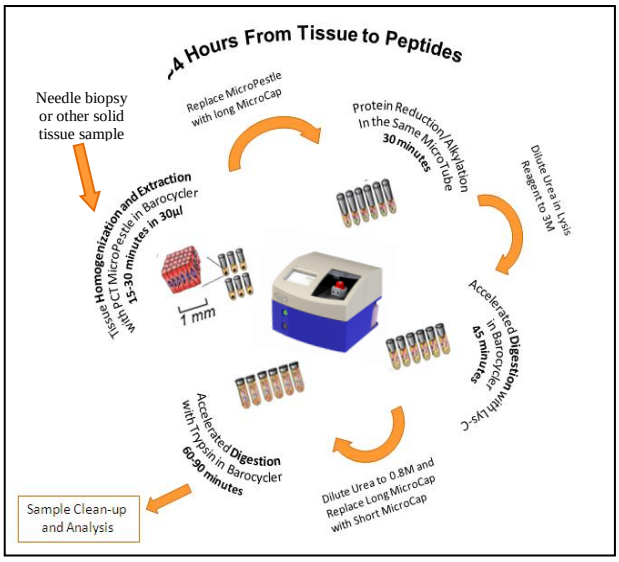

- Pressure Mode Settings: Barocycler, Ramp, Waveform
- Cycled or Static Pressure
- Network Enabled
- Automatic Logging of All Run Parameters
- Data Output
- Save and Record Programs
- Real-time pressure display graph shows pressure and temperature throughout the run
- Touch Screen Temperature Control (with electric heating option only).

## MicroTubes and MicroPestles


The 2320EXT comes with a full MicroTube Adapter Kit, that includes the MicroTube Cartridges, Capper Tool, and other accessories that are required when using PCT MicroTubes in the 2320EXT. PCT µPestles[9], used in conjunction with PCT MicroTubes in the Barocycler, are designed for rapid, hands-off homogenization and extraction when working with minute amounts of solid tissue. PCT MicroTubes and MicroPestles are an integral part of the PCT-HD workflow.

- Process up to 3mg of solid tissue in 30uL of extraction reagent
- Process as few as 5 x $10^4$ cells
- MicroTubes are constructed of non-wetting, low binding FEP plastic
- MicroPestles are made from inert PTFE (Teflon)

### Example of a PCT-HD Workflow with the Barocycler 2320EXT




PCT-HD was developed by PBI scientists and engineers in collaboration with Professor Ruedi Aebersold and Dr. Tiannan Guo of the Institute of Molecular Systems Biology, ETH Zurich, and the University of Zurich, Zurich, Switzerland [1, 2, 3, 4, 5, 6, 7, and 8].

### References (Hyperlinked)


1. Reproducible Tissue Homogenization and Protein Extraction for Quantitative Proteomics using MicroPestle-assisted Pressure Cycling Technology. *Shiying Shao, et al.*
2. Rapid mass spectrometric conversion of tissue biopsy samples into permanent quantitative digital proteome maps *Tiannan Guo, et al.*
3. Quantifying cancer related proteins via targeting MS assay resources *Ruedi Aebersold, Ph.D.*
4. Proteomic investigation of intra-tumor heterogeneity *Tiannan Guo, MD, Ph.D.*
5. Proteotypic features of NCI-60 cancer cells obtained by SWATH-MS predicts phenotypes *Tiannan Guo, et al.*
6. Analysis of Tissue Biopsies by PCT-SWATH *Tiannan Guo, MD, Ph.D.*
7. *Hands Free Sample Homogenization and Protein Extraction from Small Tissue Biopsy Using Pressure Cycling Technology and MicroPestle Shiying Shao et al.*
8. *More Efficient Tissue Lysis and Protein Digestion with Lower Concentration of Denaturant Using Pressure Cycling Technology Wen Yan et al.*
9. PCT µPestle System Specification Sheet



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