

# Flow Cytometry and Cell Sorting (FCCS)

A University of Tennessee Health Science Center Institutional Core



## MISSION

The FCCS Core's mission is to provide investigators at all UTHSC campuses and in the Memphis area with training in flow cytometry principles and access to state-of-the-art flow cytometry and cell sorting technology.

## INTRODUCTION AND SERVICES

The Flow Cytometry and Cell Sorting (FCCS) Core was created to provide all UTHSC campuses and the Memphis research community with access to state-of-the-art instruments, expertise, instruction, and assistance with experimental design and data analysis for multicolor flow cytometry and cell sorting, including indexed single-cell sorting. Services include one-on-one consultation with internal investigators at no charge for experimental design, training in the use of the instrumentation (hourly rate), and software resources. The Core Director, a highly experienced immunologist and flow cytometry and cell sorting expert, is also available to analyze investigators' data (hourly rate). Together, these activities are part of the service, educational, and academic missions of the FCCS core.

## EQUIPMENT AND SERVICES

The **BD Biosciences FACSAria II** cell sorter is equipped with four lasers and 12 fluorescence detectors, in addition to forward (FSC) and side (SSC) scatter detectors. The 100 mW, 488 nm blue diode laser has 5 fluorescence, SSC, and FSC detectors. The 30 mW, 638 nm red diode laser has three fluorescence detectors. The 50 mW, 405 nm violet diode laser has two fluorescence detectors, and the 20 mW, 355 nm solid-state UV laser has two fluorescence detectors. The sorter has two- and four-way

sort capability into tubes or microtubes. The sorter is also equipped for indexed, single-cell sorting or multiple cell sorting into microwell plates or onto microscope slides. The sorter has temperature-controlled sample injection and collection chambers within a biosafety level-2 (BSL2) laboratory and includes an Aerosol Maintenance System (AMS) to prevent exposure to potentially infective agents during cell sorting.

The **Bio-Rad ZE5** cell analyzer is a four laser, 21-fluorescence parameter, highly automated cytometer, with a 4-7-7-3 configuration for blue, green, violet, and red lasers, respectively, to include detection of popular "fruit" dyes and standard FSC and SSC light detection. The instrument also has the capability for small particle detection (exosomes, subcellular particles, and bacteria). The Everest software is user friendly, offering operator-independent programmable sample loading and data collection for up to 48 tubes, as well as from 96-well plates. Also available for use at no additional charge to our clients are FlowJo® and ModFit® software on workstations with either PC Windows or Apple OSX operating systems for advanced data analysis and cell cycle modeling, respectively.

The Regional Biocontainment Laboratory (RBL) **BD Biosciences FACSAria II** cell sorter is equipped with 3 lasers and 8 fluorescence detectors operating within a Class II, Type A2 biosafety cabinet in BSL-3 containment.

## CORE CAPABILITIES

The FCCS core supports:

- Detection and quantification of up to 21 cell surface and/or intracellular molecules
- Detection and quantification of GFP, mCherry, or other fluorescent protein expression including “fruit” dyes
- Measurement of Ca<sup>2+</sup> flux during cell signaling among different cell subpopulations
- DNA quantification, cell cycle analysis, and apoptosis detection and quantification
- Detection and quantification of exosomes
- High-speed sorting of viable or fixed eukaryotic or prokaryotic cells into four or fewer defined subpopulations (BSL-2 or BSL-3)
- Single or multi-cell sorting into microwell plates or onto microscope slides (BSL-2 only)
- Indexed single cell sorting into microwell plates or onto microscope slides (BSL-2 only)
- Flow cytometry and cell sorting within the Regional Biocontainment Laboratory (RBL) (BSL-2 or BSL-3)
- Immunology and flow cytometry expertise for fluorochrome panel design, immunophenotyping, and data analysis

## STAFF

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#### For more information:

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