Vol .05 - June 2023

Research Core Facilities

Newsletter

Cell Culture

Compromised airflow in BSC results in contamination

- The in-flow and down-flow of air into a BSC creates an air barrier
- The air barrier separates the samples from the surrounding environment
- To maintain it, hands inside the BSC should move deliberately, gently, and perpendicular to the airflow
- Turbulent movements can compromise the air barrier and cause contamination

Jumping into a pool with a big splash creates lots of turbulence, ripples, and air bubbles beneath the surface

Gently walking into a pool does not create a splash, air bubbles, and turbulence beneath the surface

Even though we cannot see it, this is what happens as we reach into and out of the front opening of the BSC.

Minimize the transfer of airborne contaminants from inside out or outside in by trying to work with that air barrier at the front opening.

Flow Cytometry

Database Clean Up - BD Fortessa, Sony SP6800, Beckman CytoFlex LX

- Please back-up all your experiments by exporting files to an external hard drive by **Friday, June 16th**
- Detailed instructions will be posted by the instruments
- On **Monday, June 19th** all data acquired prior to **February 1, 2023** will be purged from the database
  - Exception: templates, experiments with single stain files (Sony), compensation acquisition files/matrix (CytoFlex LX)
- **For routine experiments:**
  - Please create and save your templates (the word template must be included in the file name)
  - Save a copy of your templates, single stain files, compensation matrix (where applicable) on an external hard-drive, as a back-up

New BD Aria III sorter Yellow-Green Laser (561nm- 50mW)

Procured through Dr. Haibo Zhang's CFI

- Permits identification/sorting of: RFP, mCherry, dsRed transduced cells
- Eliminates PE-FITC spillover (compared to the 488nm laser)
- Improves PE and PE conjugate signal
- New detector configuration can be found on the website

Contact your flow cytometry specialist for more information or for sorting appointment consultations.

What's New

Replacing Incubators

Two aged incubators in the Bacteria lab, room 644 will be replaced soon. This will provide users with more reliable service.

Corning Cell Counters

Our new Corning Cell Counters are now available for use in the Analytical Rooms:

- 4th floor - Rm 458
- 6th Floor - Rm 654

These cell counters are user-friendly and easy to operate. Simply log into the cloud based app, load the disposable counting chamber with 10 µl sample premixed with Trypan Blue (1:1), place it on the stage, focus on your cells, and press the 'Count'. This SOP provides detailed instructions and serves as a quick reference guide.

Microfabrication

Upcoming Event

There's an exciting upcoming event called "Chip Chat" for those interested in microfluidics and microfabrication technologies. This bi-weekly gathering encourages networking and collaboration among researchers. You can keep up with cutting-edge equipment and share tips and tricks. Dr. Darius Rackus and Dr. Scott Tsai are supporting this event, and anyone interested in learning more about microfabrication capabilities and microfluidics research in the institute is welcome.

Date: Thursday, June 15th
Time: 10:00 am
Location: 573 Conference Room

Cleanroom

The 7th-floor cleanroom has some issues with the Mask aligner, which can't be used for alignment anymore. However, the instrument is still suitable for first mask exposure. The MicroWriter can be utilized instead of the Mask Aligner. The service is scheduled for June 6th and 7th, and we're hoping to get the Mask Alinger fully functioning after that.

Histology

Training Videos

The training videos for the Epredia™ PrintMate™ AS 450 Cassette Printer and the SlideMate™ AS Slide Printer are now available on the Research Facilities YouTube channel. Please view these videos before using the printers. Both printers are located in the Histology lab, room 666. If you have any questions, you can contact Xiaofeng Lu (xiaofeng.lu@unityhealth.to) for in-person training.

The training video for the Leica HistoCore Arcadia Embedding Center is also available. An announcement will be made once the new embedding center is installed in Room 666 and ready to use. Please keep an eye on turning.

SUBSCRIBE

Validation Testing

We are currently doing validation testing with several protocols on the Leica tissue processor, PEGASUS. A training video will be available to view once the equipment is ready for use.

Pre Clinical Imaging

Why Choose Pre Clinical Imaging?

- Non-invasive imaging modality
- High sensitivity, high-throughput screening
- Monitoring disease progress and therapeutic treatment
- Quantitative analysis
- Reduction in animal usage and avoiding the inter-animal variability

Study Example

3 study groups 6 animals per group 5 time points

Biodistribution study

- 90 animals
- N = 3 x 6 x 5 ; one animal per time point

In vivo imaging

- 18 animals
- N = 3 x 6 x ; same animal for 5 time points

Equipment Available Now

Newton 7.0

U-CT

Light Microscopy

Data Acquisition Checklist

Microscopy can be highly quantitative if performed correctly, but is your data good enough for quantitation? Use the checklist below to ensure you have set up your acquisition parameters correctly.

Resolution and Nyquist Sampling

- Are you using the correct NA lens to detect objects of interest?
- For 2D - are your objects of interest at least 3 x 3 = 9 pixels (area)?
- For 3D - are your objects of interest at least 3 x 3 x 3 = 27 voxels (volume)?

Detector

- Are your images within detector limits?
- There should **NOT** be detector saturation
- Data should be within the linear range of detector

Signal

- Is your signal to background ratio 3:1 or better?
- If your signal is noisy (shot noise) consider longer exposure times, averaging, etc.

Samples

- Have **all parameters** been kept constant between image data sets that are to be compared?
- Have you checked for the photostability of your probe?

Controls: Have you prepared and imaged your technical controls with the exact same parameters? This will tell you the following:

- Is your probe/signal specific?
- What is autofluorescence of your sample?
- Do you have signal cross-talk/bleed through?

Genomics

Upcoming Event

10x GENOMICS

Experience the power of Xenium In Situ: From simple workflow to powerful visualization

This seminar will Introduce high-performance subcellular spatial profiling with Xenium In Situ. The Xenium platform reveals new insights into cellular structure and function by performing high-throughput mapping of 100s of RNA targets in their true tissue context. The platform includes a versatile and easy-to-use instrument, sensitive and specific chemistry, a diverse menu of customizable panels, and powerful visualization software.

Date: Tuesday, June 27
Time: 11:00 am - 12:00 pm
Location: Allan Waters Auditorium

Register here!