Overview of Instruments/Services
at the Analytical Instrumentation Core

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Array Service Manager
December 1st, 2015
Overview of AIC Instruments

**INSTRUMENTS:**

### Biochemical Analyzers:
- **Agilent 1100 HPLC**
  - Location: X-Lab 232, 670 Albany Street
  - Manager: Lynn Deng, Ph.D.
  - Charge Rate for HPLC: $10 per 2 hours

- **Ion Trap Mass Spectrometer**
  - Bruker Esquire 3000

### Real Time PCR Cyclers (3 Sets)
- The 7900HT (96 or 384 well plate) and the StepOne Plus (384 well plate only) are real-time PCR systems made by Applied Biosystems. They are real-time PCR instruments used to amplify and quantify a targeted DNA or cDNA molecule in a sample.
  - Charge Rate: $11 per hour; minimum use is 2 hours

### Spectrophotometers:
- **Tecan M1000 Microplate Reader**
  - For binding, absorbance, and ALP assays.

- **GloMax Luminometer**
  - Charge Rate: $5.5 per 10 min

### Blood/Cell Analyzers:
- **Auto-Cell Counter**
- **IDEXX Chemistry Analyzer**
- **Seahorse Extracellular Oxygen Analyzer**
  - For multiple species: rat, mouse, cat, NMRI, male, female, genders, age, diet.
  - Charge Rate: $22 per hour; minimum use is 3 hours

### Liquid Scintillation Counter (LSC)
- **Tecan Nanolight M200 Pro Microplate Reader**
  - The Nanolight is similar to the M2000 and can check UV/Vis 230-1000 nm. It can also measure fluorescence in microwells with 24, 96, and 384 wells. The special Nanolight plate allows for the quantification of labeled DNA/RNA samples at a time using as little as 500 pL per sample.

**Summary of the Core**

The Analytical Instrumentation Core was developed in the 1980s at the SUHSC. The objective of the Core is to support the investigators through cutting-edge analytical instruments and services to facilitate research and education. The Core supports approximately 30 new and old instruments which are accessed through a competitive request for proposal (RFP) process, evaluation, and review. There are three sections in the AIC: IMS, Plate Reader, and DNA/RNA analysis (RNA and DNA). There is an advisory committee to oversee core activity and to advise on technical issues. There are two core and 7 satellite core locations in the Biomedical Campus. Each of these instruments is sponsored by a core scientist or facility manager. The Core also holds regular instrumentation seminars to introduce cutting-edge analytical instruments. The Core Director is responsible for consulting with the BI managers, collaborating with the core scientists, and writing supporting letters and other materials in order to support the investigators in their efforts to win extramural research funding.
Services Offered

1. Bio-Rad Supply Center

2. qRT-PCR Array Service

3. Lipid Analysis Service
   - Fatty Acids/Monosaccharides

4. Protein/Cytokine Array Service
   - Luminex Platform
   - Multiplexing
Protein/Cytokine Arrays as an Extension of qRT-PCR

- Logical extension of PCR Arrays that can verify that changes at the mRNA level (gene expression) correspond to changes at the protein level
- Can also be used to identify the presence and amount of various proteins/cytokines in a sample
- Viewed as an alternative to running ELISAs
Brief Overview of the Workflow

1. Researchers will submit their samples
   - Plasma, serum, cell supernatants, etc.

2. Purchase kits from various vendors
   - EMD Millipore, R&D Systems, Bio-Rad, etc.

3. Kits contain magnetic beads that already have capture antibodies and are fluorescently coated
Miniaturization of Protein Arrays

- Incorporated Curiox Biosystems’ DropArray Technology

- Typically run the assays on a regular 96-well microtiter plate using handheld magnet (bottom left)

- Conversion has allowed a 5-fold reduction in the amount sample volume and reagents required
Advantages of Miniaturization

<table>
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<tr>
<th></th>
<th>DA-Bead Plate (96-well plate)</th>
<th>MTP (96-well plate)</th>
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<tbody>
<tr>
<td>Sample volume</td>
<td>10 µl*</td>
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<td>Bead volume</td>
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<tr>
<td>Sensitivity</td>
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<tr>
<td>Cross-reactivity</td>
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<tr>
<td>Ease of washing</td>
<td>More convenient, faster</td>
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<tr>
<td>No. of wells per kit</td>
<td>480</td>
<td>96</td>
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<td>Total reagent cost of one 96-well assay</td>
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<td>$1500</td>
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<td>Wash of non-magnetic beads</td>
<td>Easy</td>
<td>Difficult</td>
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- Reduces total assay costs 60-80%
### MILLIPLEX Analyst Detail Report

#### Summary

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<tr>
<th>Analyte Sample</th>
<th>IFN-Gamma</th>
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**Mouse 5-Plex Kit from EMD Millipore**
Different Kits Available

- Cancer
- Cardiovascular
- Cell Signaling
- Cellular Metabolism
- Immunology
- Metabolism & Endocrinology
- Neuroscience
- Stem Cells
- Toxicity
- Custom
Contact Us!

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