About CDDI...

The Center for Drug Discovery and Innovation (CDDI) is a Florida Center of Excellence serving the research community at USF and beyond. From concept to clinical trials, there are significant challenges in the successful development of new pharmaceuticals. It is the mission of CDDI to assist research groups in overcoming some of the critical bottlenecks in early phase drug discovery. CDDI will provide researchers access to specialized equipment, not available in most research laboratories, that is important for validating protein drug targets and the development of small molecule inhibitors. The CDDI instrumentation cores offer a wide choice of analytical methods with application to the general analysis of proteins and cells. CDDI operates on the principle that success is best achieved through active partnership in a setting that trains the individual researcher to work independently and return to their home laboratory with new skills and knowledge gained in their CDDI experience. CDDI aims to recruit and retain leading researchers in early phase drug discovery and to support a culture of discovery that will lead to ‘home grown’ USF-discovered drugs advancing to clinical use.

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Visit our website to learn more about the Drug Discovery Infectious Disease Training Program.
Creating a successful drug discovery pipeline requires core competencies in several critical areas. At CDDI, we have assembled the requisite capabilities as well as a team of experienced personnel to discover new clinical candidates.

**CHEMODIVERSITY**
The facility offers a library of natural product-derived crude extracts, fractions and pure compounds for screening. Small molecules high resolution mass analysis (Agilent GC/MS- 7200 Qtof), mass targeted chromatographic separation (LC/MS 6120B SQ) and high throughput screening (targeting solid tumor cell lines, anti-microbial activity, permeability and drug solubility determination) are provided. The services also include general chromatography (MPLC, HPLC) and spectrometric characterization (UV, IR) as well as microbiology workspace (biosafety cabinets), training and synthesis activities.

**NMR**
The NMR core laboratory enables researchers to characterize protein structure at atomic resolution. The facility includes NMR spectrometers operating at 600 and 800 MHz with associated HCN triple resonance cold probes that have carbon-enhanced and salt tolerant capabilities, which supply the highest possible 1H and 13C sensitivity for all applications. Technical support and training are available for all aspects of project development, including feasibility studies as well as advanced protein-ligand interaction studies.

**BIOLOGICAL MASS SPECTROMETRY**
Five mass spectrometers (ThermoScientific LTQ XL, LTQ-OrbiTrap XL, TSQ Quantum QqQ, Agilent 6460 QqQ, and 6540 Q-ToF) are equipped with nano and standard flow liquid chromatography devices to support analysis of many different types of molecules. Experiments that can be performed include - but are not limited to - single protein identification, large-scale proteomics (with relative quantification), fractionation of complex samples, post-translational modification characterization.

**PROTEIN PRODUCTION**
Protein production is a significant bottleneck in early phase drug discovery. Whether a protein is hopelessly insoluble or difficult to produce in quantity, the Protein Production facility is prepared to work with researchers to help turn failure into success. The facility is fully equipped to produce proteins in bacteria, yeast or insect cells and provides support in protein crystallization, remote synchrotron X-ray data collection and structure determination.

**CELL ISOLATION AND ANALYSIS**
The cell biology core provides access to cell sorting and analysis for target characterization and validation. The BD FACSAria II sorter is BSL2 capable, permitting levels of safety in cell sorting not available in most flow cores. A second BD Canto II flow cytometer provides automated sampling for analytical flow cytometry. Fully automated Zeiss Axiowert 100 deconvolution and Leica LMD6000 (laser microcapture) microscopes provide tools for protein analysis with particle resolution >0.5μm.

**CHEMODIVERSITY LABORATORY**
- HPLC and MPLC fractionation/purification systems
- Tecan EVO 150 HTP workstation
- High capacity freeze drying and solvent removal systems
- Agilent 7200 GC/MS QTOF
- Agilent 6120B LC/MS SQ
- Chemical synthesis and microbiological services
- Innovative Technologies solvent purification system

**PROTEIN PRODUCTION**
- BioRad and GE AKTA FPLCs
- NBS BioFlo 310 Fermentor (to 14 liters)
- Bacteria, yeast and insect cell protein expression systems
- ARI Crystal Phoenix for HTP crystal production

**PROTEIN AND SMALL MOLECULE ANALYSIS**
- Agilent VNMRS 600 MHz NMR
- Agilent 800 MHz NMR
- Synchrotron X-ray analysis (via remote access)
- Thermo Hybrid Linear Ion Trap-OrbiTrap, Linear Ion Trap and Triple Quadrupole mass spectrometers
- QSense E4 QCM-D
- BioRad Plex 200 (Luminex) HTP system

**CELL ISOLATION AND ANALYSIS**
- BD FACSAria II cell sorter/flow cytometer (BSL2 capable)
- BD FACSCanto II analytical flow cytometer
- Zeiss Axiowert 100 deconvolution microscope
- Leica LMD6000 laser microdissection microscope
- ABI 7900 real time PCR
- Agilent 2100 bioanalyzer