For more information about services available at the COBRE-PSF Core Laboratories contact:

**Protein Production Group**
Director: Fei Philip Gao, Ph.D.
Tel: (785) 864-1825
gao@ku.edu

**Protein Structure Laboratory**
Director: Scott Lovell, Ph.D.
Tel: (785) 864-3772
swlovell@ku.edu

**Biomolecular NMR Laboratory**
Director: Asokan Anbanandam, Ph.D.
Tel: (785) 864-3746
asokan@ku.edu

For work request forms and fee schedules visit:
http://psf.cobre.ku.edu

For more information about the COBRE-PSF contact:
Program Director: Robert P. Hanzlik
The University of Kansas
Department of Medicinal Chemistry
1251 Wescoe Hall Drive, Rm 4070, Malott Hall
Lawrence, KS 66045
Tel: (785) 864-3750; rhanzlik@ku.edu
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For information about other core laboratory services available at the University of Kansas please visit:
http://corelabs.ku.edu/

The University of Kansas, Lawrence, KS
NIH Center of Biomedical Research Excellence (COBRE) in Protein Structure and Function

Supported by a grant from
the National Institute of General Medical Sciences
(1 P30 GM 110761) at the National Institutes of Health
The KU NIH Center of Biomedical Research Excellence in Protein Structure and Function (COBRE-PSF) supports three Core Laboratories, each directed by an experienced Ph.D. scientist. The fee-for-service facilities are available to serve qualified researchers in academia and industry. Each director provides consultation in experimental design, assistance preparing grant applications and manuscripts, training in specialized research techniques, access to state-of-the-art research equipment (for experienced users), and a menu of research services. The laboratories are housed within the 44,000 sq. ft. Del Shankel Structural Biology Center (SBC) on the KU Lawrence campus.

**PROTEIN PRODUCTION GROUP**

The laboratory offers the following services:

- Construct design, cloning, expression & solubility testing
- Protein characterization and analysis
- Large scale expression and purification
- Protein expression in *E. coli* and insect cells
- Protein refolding and reconstitution
- Isotope-labeled proteins ($^{15}\text{N}$, $^{13}\text{C}$, $^2\text{H}$)

**High Throughput Cloning**

Ligation Independent Cloning is used to clone genes into a pET Vector without restriction enzyme digestion and ligation. Targeted genes can be cloned in ~one day with low background. Expressed proteins are purified using one-step affinity chromatography.

**Expression of Challenging Proteins**

Various fusions are used to increase the expression level, solubility and/or stability of the protein, or to drive the protein into inclusion bodies. The same PCR product can be inserted into multiple expression vectors. All tags and fusion proteins are cleavable.

**Major Equipment**

AKTAxpress, AKTA purifier and FPLC systems; Biacore 3000; shaker incubators & fermenters; high capacity centrifuges; cell disruptors, and thermocyclers.

**PROTEIN STRUCTURE LABORATORY**

The laboratory provides services in:

**High Throughput Crystallization Screening**

- High throughput crystallography with protein-ligand complexes
- 96-well screen setup in five to 10 minutes, using 50 μL of concentrated protein per 96-well screen
- Greater number of screens setup with less sample

**In-house and Synchrotron X-ray Data Collection**

- Screen crystals for diffraction and collect data for structure solution
- Rigaku rotating anode generator, R-axis IV++ imageplate detector and X-stream 2000 cryostream

- Collaboration with Advanced Photon Source (APS) IMCA-CAT, Sector 17 for synchrotron data collection
- Ship samples, data collected and returned; processed data obtained via ftp site
- Model building, refinement of structures deduced from diffraction data
- Phase determination (experimentally or through molecular replacement)

**Structure Solution and Refinement**

- Molecular replacement, MIR and SAD/MAD phasing methods
- Structure refinement and model building

**BIOMOLECULAR NMR LABORATORY**

The facility provides state-of-the-art, user-friendly, cost-effective high resolution NMR resources and technical expertise for study of macromolecular structure, function and dynamics in solution.

**Laboratory Capabilities and Services**

- From 1D to 4D—NMR data acquisition
- nD-NMR data processing, analysis, and interpretation
- High resolution structure determination in solution
- $^{15}\text{N-}'\text{T}_1$, $^{15}\text{N-}'\text{T}_2$, $^{15}\text{N-}'\{1\text{H}\}$-NOE-NMR experiments (pico to nano second motions)
- Micro to millisecond motion dynamics studies by relaxation dispersion NMR
- NMR titration measurements
- Protein-protein, protein-DNA, protein-ligand interaction studies

**The laboratory has two NMR spectrometers** capable of performing any advanced bio-NMR experiment:

- Bruker Avance 800 MHz with TCI cryoprobe
- Bruker Avance III 600 MHz with two probes; TXI-RT probe and $^{13}\text{C}$,$^{15}\text{N}$, $^{31}\text{P}$–$^{19}\text{F}$ and all the way to silicon NMR Broad Band probe

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**Fragment-Based Drug Discovery**

Our fragment screening program transcends all three of our core labs. We have prepared a starter set of 288 carefully selected low-MW compounds that represent “fragments” of numerous drugs and other bio-active compounds. We are ready to screen the collection against any protein of interest using STD-NMR, SPR (surface plasmon resonance) and even X-ray crystallography. Our cores also interface effectively with both computational and synthetic chemistry service labs to carry a project seamlessly from screening for hits to lead development and improvement.
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