

BIOGRAPHICAL SKETCH

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NAME Fei Philip Gao	POSITION TITLE		
COMMONS USER NAME PHILIPGAO	Director, Protein Production Core Laboratory		
EDUCATION/TRAINING (<i>Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.</i>)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
Peking University Medical Center	B.S.	1988	Medical Chemistry
University of Kansas	Ph.D.	1996	Biochemistry
University of California in Los Angeles	Postdoc	1996-2000	Physiology, Immunology and Microbiology

A. Personal Statement.

Being involved in research areas of molecular biology, production and biophysical characterization of protein in the last 25 years, I have extensive experience of preparing samples of challenging proteins for NMR, X-ray crystallography, and Mass spectrometry. I equipped and managed a new membrane protein production facility from 2001-2007 in the National High Magnetic Field Laboratory at Florida State University and the COBRE protein production Core lab at University of Kansas from July 2008 to present. Both core facilities provide proteins to be used for team-based NIH projects to study structure and function of proteins. I have always been interested in collaborative research and enjoy working with people from different disciplines and backgrounds. I have a demonstrated record of successful and productive collaborative research projects in protein production. I will be able to make substantial contributions to the project.

B. Positions and Honors.Positions and Employment

08/89–08/96 Graduate Research Assistant, laboratory of Dr. Mark Richter, Department of Biochemistry, University of Kansas
 08/96–08/00 Postdoctoral Fellow, laboratory of Dr. H. Ronald Kaback, University of California in Los Angeles
 06/99–06/00 Visitor, National High Magnetic Field, Florida State University
 09/00–12/01 Visiting Scientist, National High Magnetic Field Laboratory, Florida State University
 01/02–04/07 Assistant Scholar Scientist, Membrane Protein Production Facility, High Magnetic Field Laboratory, Florida State University
 05/07–06/08 Research Associate, Department of Molecular Biosciences, University of Kansas.
 07/08–present Director, Protein Production Core Laboratory, University of Kansas

Membership in Professional Organizations:

Biophysical Society (from 1995);
 Association of Biomolecular Resource Facilities (from 2010)

Honors and Awards

1991 The Borgendale Best Graduate Seminar Award in Biochemistry, University of Kansas
 1993 Graduate School Summer Fellowship, 1993, Univ. of Kansas
 1996-1997 Howard Hughes Medical Institute postdoctoral fellowship
 1997-2000 NIH Research Service Award

C. Selected peer-reviewed publications (in chronological order).

- Gao F, Lipscomb B, Wu I, Richter ML. In vitro assembly of the core catalytic complex of the chloroplast ATP synthase. *J Biol Chem.* 1995 Apr 28; 270(17):9763-9
- Sokolov M, Lu L, Tucker W, Gao F, Gegenheimer PA, Richter ML. The 20 C-terminal amino acid

- residues of the chloroplast ATP synthase gamma subunit are not essential for activity. *J Biol Chem.* 1999 May 14; 274(20):13824-9.
3. Hughes T, Strongin B, Gao FP, Vijayvergiya V, Busath DD, Davis RC. AFM visualization of mobile influenza A M2 molecules in planar bilayers. *Biophys J.* 2004 Jul; 87(1):311-22. PMC1304352
 4. Korepanova A, Gao FP, Hua Y, Qin H, Nakamoto RK, Cross TA. Cloning and expression of multiple integral membrane proteins from *Mycobacterium tuberculosis* in *Escherichia coli*. *Protein Sci.* 2005 Jan; 14(1):148-58. PMC2253320
 5. Xiong Y, Chalmers MJ, Gao FP, Cross TA, Marshall AG. Identification of *Mycobacterium tuberculosis* H37Rv integral membrane proteins by one-dimensional gel electrophoresis and liquid chromatography electrospray ionization tandem mass spectrometry. *J Proteome Res.* 2005 June 4(3):855-61.
 6. Wu YY, Chin KH, Chou CC, Lee CC, Shr HL, Gao FP, Lyu PC, Wang AH, Chou SH. Cloning, purification, crystallization and preliminary X-ray crystallographic analysis of XC847, a 3'-5' oligoribonuclease from *Xanthomonas campestris*. *Acta Crystallograph Sect F Struct Biol Cryst Commun.* 2005 Oct 1; 61(Pt 10):902-5. PMC1991326
 7. Li C, Mo Y, Hu J, Chekmenev E, Tian C, Gao FP, Fu R, Gor'kov P, Brey W, Cross TA., Analysis of RF heating and sample stability in aligned static solid-state NMR spectroscopy. *J Magn Reson.* 2006 May; 180(1):51-7.
 8. Page RC, Moore JD, Nguyen HB, Sharma M, Chase R, Gao FP, Mobley CK, Sanders CR, Ma L, Sonnichsen FD, Lee S, Howell SC, Opella SJ, Cross TA. Comprehensive evaluation of solution nuclear magnetic resonance spectroscopy sample preparation for helical integral membrane proteins. *J Struct Funct Genomics.* 2006; 7(1):51-64.
 9. Hu J, Qin H, Li C, Sharma M, Cross TA, Gao FP. Structural biology of transmembrane domains: efficient production and characterization of transmembrane peptides by NMR. *Protein Sci.* 2007 Oct; 16(10):2153-65. PMC2204124
 10. Li C, Qin H, Gao FP, Cross TA. Solid-state NMR characterization of conformational plasticity within the transmembrane domain of the influenza A M2 proton channel. *Biochim Biophys Acta.* 2007 Dec;1768(12):3162-70. Epub 2007 Sep 8. PubMed PMID: 17936720; PubMed Central PMCID: PMC2258276.
 11. Page RC, Li C, Hu J, Gao FP, Cross TA. Lipid bilayers: an essential environment for the understanding of membrane proteins. *Magn Reson Chem.* 2007 Dec 19;45(S1):S2-S11.
 12. Moffat JC, Vijayvergiya V, Gao PF, Cross TA, Woodbury DJ, Busath DD. Proton transport through influenza A virus M2 protein reconstituted in vesicles. *Biophys J.* 2008 Jan 15;94(2):434-45. Epub 2007 Sep 7. PubMed PMID: 17827230; PubMed Central PMCID: PMC2157240.
 13. Hu J, Qin H, Sharma M, Cross TA, Gao FP. Chemical cleavage of fusion proteins for high-level production of transmembrane peptides and protein domains containing conserved methionines. *Biochim Biophys Acta.* 2008 Apr;1778(4):1060-6. Epub 2008 Jan 11.
 14. Qin H, Hu J, Hua Y, Challa SV, A Cross TA and Gao FP. Construction of a Series of Vectors for High Throughput Cloning and Expression Screening of Membrane Proteins from *Mycobacterium tuberculosis*. *BMC Biotechnology,* 2008; 8:51. PMC2396618
 15. Hu J, Sharma M, Qin H, Gao FP, Cross TA. Ligand binding in the conserved interhelical loop of CorA, a magnesium transporter from *Mycobacterium tuberculosis*. *J Biol Chem.* 2009 Jun 5;284(23):15619-28. Epub 2009 Apr 3. PMCID: PMC2708858.

D. Research Support.

Ongoing

■2P20RR017708-06 (PI: R.P. Hanzlik)

09/30/02 – 03/31/13

National Institutes of Health COBRE

Protein Structure and Function

Core B: Protein Production Core Laboratory

Core B goal is to provide large quantities of specified proteins that may prove to be excellent new drug targets for a variety of disease states. NIH COBRE program objectives are (1) to strengthen an institution's biomedical research infrastructure through the establishment of a thematic multi-disciplinary center, and (2) to enhance

the ability of investigators to compete independently for complementary NIH individual research grants or other external peer-reviewed support.

Role: Core Leader

■HHSN272200900033C (PI: S.A. David)

09/30/09 – 03/31/14

National Institutes of Health/NIAIH

Innate Immune Receptors and Adjuvant Discovery

One of the specific goals of the contract is to examine the tryptic peptides of TLR5-agonistic flagellin, and characterization of potential post-translational modifications in such peptides. Large amount of flagellin from E. coli, Semanella and Shigella will be produced at the Protein Production Core Lab in the first two years.

■ NFP0065652 (PI: J. Karanicolas)

10/01/09 - 09/30/10

Institute for Advancing Medical Innovation (IAMI)

Design of a Stabilized Ricin Vaccine

The goal of the proposal is to engineer variants of the ricin toxin A-chain through rational mutations to the protein core and develop a stable antigen. The Protein Production Core Lab will mutate, express, and purify the proteins designed by computational techniques.

Completed (during the last three years)

■W911NF-05-1-0054 (PI: M.L. Richter)

02/15/05 – 02/14/08

DOD, Army Research Office

Patterning complex motor proteins on solid surfaces

The goal of the proposed research is to produce a prototype hybrid F₁-based nanodevice that is firmly attached to a solid surface in a defined density and orientation with an extended, smoothly rotating armature that rotates in response to binding of a target ligand.

Role: Research Associate

■5R01AI023007-21 (PI: T.A. Cross)

03/01/05 – 04/30/07

National Institutes of Health

Correlation: Structure-Dynamics-Function in Channels

Project goals are to clone and express integral membrane proteins from prokaryotes and to obtain high resolution structures of these proteins.

Role: Co-Investigator