GRANT SUPPORT

a) Qu as the PI or subcontract to UB PI (Total all years ~$3.3M in DC allocated to Qu lab only, ~$1.9 M since tenure/promotion)

Active:

29. Center for Protein Therapeutics (Qu) Role: PI 9/1/2017-8/31/2018 0 calendar
Peer-reviewed Industry Consortium Funds DC to Qu Lab: $78,000

Spatially Resolved Determination of Mab and Receptors in Tissues.
The goal of these studies is to develop novel sample treatment methods and cutting-edge LC/MS techniques to enable ultra-sensitive analysis of bi-specific antibodies and receptors in a spatial manner, to create the density map of drug and targets.

28. Amgen Research grant (Qu) Role: PI 4/6/2017 - 4/5/2018 0.5 calendar
DC to Qu Lab: $54,044

Membrane Receptors as Potential Therapeutic Target
This project proposes to push the analytical sciences for the general analysis of membrane receptors. We will develop and optimize novel LC/MS-based technologies to quantitatively investigate specific cell surface receptors that may serve as potential drug targets. These molecules are of low abundance and hydrophobic, representing a daunting challenge for current analytical techniques.

27. AI129518 (Zand) Role: Subcontract PI 2/1/2017 - 1/31/2022 0.5 calendar
NIH DC to Qu Lab: $302,935

Modeling Mechanisms of Adjuvanted Influenza Vaccine Induced IgG Repertoire Diversity and Heterosubtypic Immunity
This project proposes to investigate how a new vaccine, which contains the adjuvant (immune system booster) MF59, increases the range of influenza antibodies binding to molecularly different influenza strains. My lab will use a combination of data from mice and human subjects, combined with mathematical modeling, to test hypotheses about how antibodies that bind different influenza strains arise.

26. U24DK11234 (Adkins) Role: Subcontract PI 1/1/2017 - 2/31/2021 0.5 calendar
NIH DC to Qu Lab: $120,000

Promotr: A Proteomics Center for Motpac
The proposed research aims to provide a comprehensive map of the protein “molecular transducers” that transmit the health benefits of physical activity by applying high throughput proteomics technologies. This project will be accomplished by a team and facility with an excellent record of accomplishment applying and developing advanced mass spectrometry-based workflows and pipelines for proteomics research for human health applications. My lab will be responsible for the development of high-throughput LC-MS strategy for method validation.

25. UCB scientific research grant (Qu) Role: PI 12/1/2016 - 6/30/2018 0 calendar
UCB of UK DC to Qu Lab: $100,000

Urine Metabolite Biomarkers for Renal Fibrosis
The goal of this scientific research grant is to establish a series of di-peptide metabolites for staging renal fibrosis caused by kidney diseases and for evaluating of therapeutic efforts. Novel preparation, treatment and analytical methods will be developed advance this important field.

24. R41 GM121174 (Qu, Aletta)  
Role: co-PI  
9/1/2016-8/31/2018  
0.5 calendar  
STTR  
DC to Qu Lab: $56,000 (phase-I)  
**Drug Discovery Platform for Protein Arginine Methyltransferase Inhibitors**  
The long-term objective of this project is the generation of a universal drug discovery platform based on protein arginine methylation mechanisms involved in human disease.

23. BX002659 VA (multiple)  
Role: co-PI  
10/1/15-9/30/19  
0.6 calendar  
Department of Veterans Affairs  
DC to Qu Lab: $94,600  
**Dynamic Remodeling from Reversible Ischemia and Sudden Cardiac Arrest**  
The central hypothesis of this proposal is that ischemia-induced adaptations resulting from the progression of a coronary stenosis leads to dynamic molecular remodeling that transiently increases the vulnerability to VT/VF during sympathetic activation. My lab employs proteomics technique to characterize the dysregulations during brief ischemia and arrhythmia in swine models.

22. La-Roche scientific research grant (Qu)  
Role: PI  
12/1/2015 - 11/30/2018  
0 calendar  
Roche-Pharmaceuticals EPBA1902731A17  
DC to Qu Lab: $300,000  
**A High-Throughput LC/MS Method for Quantification of Biotherapeutics**  
The goal of this scientific research grant is to push the limit of bioanalytical sciences and develop novel high-throughput, ultra-sensitive and robust methods for targeted protein quantification and address the challenges in biotherapeutics investigation.

**Completed**

21. Center for Protein Therapeutics (Qu)  
Role: PI  
9/1/2016-8/31/2017  
0 calendar  
Peer-reviewed Industry Consortium Funds  
DC to Qu Lab: $158,000  
**Characterization of Plasma PK and Tumor Penetration of Bi-Specific Antibodies Using LC/MS.**  
The goal of these studies is to develop novel sample treatment methods and cutting-edge LC/MS techniques to enable ultra-sensitive analysis of bi-specific antibodies, and to investigate the tumor penetration, B-cell and T-cell recruitment, activation and depletion.

20. CTSA (Qu)  
Role: PI  
7/1/2016-6/30/2017  
0 calendar  
UB-CTSA Award  
DC to Qu Lab: $50,000  
**Novel Circulating Biomarkers for Sudden Cardiac Death**  
The goal of this grant is to develop targeted LC/MS methods to validate highly promising candidates predictive of the risk of sudden Cardiac arrest.

19. MCR grant (Qu)  
Role: PI  
6/1/2014 - 5/30/2017  
0 calendar  
Murdoch Children’s Research Institute  
DC to Qu Lab: $60,000
**Vitamin D and Children's Diabetes**

The goal is to provide a seed grant to explore the relationship of Vitamin D level and children diabetes.

18. 12SDG9450036 (Qu)  
Role: PI  
1/1/2012 - 12/31/2016  
2.4 calendar  
AHA  
DC to Qu Lab: $278,766

**Biomarker Release after Reversible Ischemia**

The goal is to characterize the cTnI release and modification after reversible myocardial injury in large animal models.

17. U54HD071594 (Qu)  
Role: Core PI  
0.6 calendar  
NIH  
DC to Qu Lab: $202,937

**Proteomics, Bioanalysis and Bioinformatics Core-E. New York Pediatric Developmental Pharmacology Research Consortium.**

The goal is to perform proteomics biomarker discovery of ROP in clinical investigations.

16. Athenex contract (Qu)  
Role: PI  
1/7/2010-12/31/2016  
0 calendar  
Athenex Inc. #641624  
DC to Qu Lab: $393,882

**Corporal Research Program with Athenex**

The goals of this collaborative research grant are i) support the proteomics efforts to elucidate the action mechanisms of new anti-cancer drug candidates and ii) development of a novel Optimized Photo Affinity cleavable linker (OPAL)-LC/MS/ETD technique to find the smoking-gun evidence of drug-protein binding in vivo.

15. Center for Protein Therapeutics (Qu)  
Role: PI  
9/1/2015-8/31/2016  
0 calendar  
Peer-reviewed Industry Consortium Funds  
DC to Qu Lab: $158,000

**Characterization of ADC in Tissues and Study of MAb Catabolism/Metabolism.**

The goal of these studies is to use cutting-edge LC/MS techniques to investigate the tissue distributions of ADC as well as elucidation of the catabolism mechanisms of SC injection.

14. UB CAT (Qu)  
Role: PI  
7/1/2013 - 6/30/2016  
0 calendar  
UB  
DC to Qu Lab: $6,358

**Enrichment Toolkit for Proteomic Biomarkers**

The goal is to develop a commercial kit for the analysis of arginine methylation in clinical samples.

13. Merrimack Research Contract (Qu)  
Role: PI  
12/1/2014 - 10/30/2015  
0 calendar  
Merrimack Pharma  
DC to Qu Lab: $22,540

**Extensive Investigation of Protein Binding in Liposome Preparations**

The goal is to use proteomics to find binding partners novel liposome dosage forms.

12. SUNY Cooperate Fund (Qu)  
Role: PI  
6/1/2014 - 5/30/2015  
0 calendar  
Center for Hearing and Deafness  
DC to Qu Lab: $12,500

**Brain Network: Membrane Permeable Transcriptional Regulators for Retinal Repair**

The goal is to use proteomics to find biomarkers for retinal cell differentiation.
Highly Accurate and Reliable Quantification of Mab Distribution in Various Tissues.
This project addresses some fundamental challenges for investigation of mAb tissue distribution by a LC/MS-based method.

Proteomics Investigation of Laser Micro-Dissected Autopsy Samples from Prostate Cancer Patients
The project aims to develop robust, quantitative, accurate, and sensitive proteomic strategies by which to analyze protein biomarker expression patterns in LMD samples obtained by biopsy of CaP patients.

Gene-Environmental Interactions in Progression of Multiple Sclerosis
The goal is to characterize the relationship between Vitamin D metabolites and progression of multiple sclerosis using a LC/MS-based strategy.

Accurate and Sensitive Quantification of Therapeutic MAbs by Trapping-Micro-LC/MS and Stable-Isotope-Labeled, Full-Length Proteins.
This project seeks to understand the prominent problem of poor absolute accuracy associated with LC/MS-based quantification of therapeutic proteins.

Investigation of Levels of FcRn in Various Tissues.
This project seeks to develop a method for accurate and sensitive quantification of FcRn, a molecule that is critical for the PK of mAb, by an efficient precipitation/on-pellet-digestion method, a Trapping-micro-LC/MS and stable-isotope dilution.

Sensitive and Robust MAb Quantification by Nano-LC/MS.
This project develops and evaluates a novel nano-LC/MS-based method for the investigation of mAb in various pharmaceutical matrices, which is highly sensitive and reasonably robust.

Investigation of Anti-CEA MAb in Various Matrices.
This project employs a LC/SRM-MS-based method for the investigation of target-mediated dispositions of an anti-CEA antibody in various pharmaceutical matrices.
**PSA-Proteomic Analysis of Rb-Associated Proteins**
The fund supports the research of a comprehensive and sensitive method to characterize the sub-proteome pulled by Rb protein in rat models.

**Quantification of MAb in Tissues.**
This project explores the feasibility of quantifying mAb in tissues using a strong-buffer extraction, a gel-free preparation method and a LC/SRM-MS based analytical strategy.

**Quantitative Characterization of in Vivo Immune Complexes of MAb.**
This project seeks to develop a novel method to quantitatively analyze immune complexes in circulation by a Blue Native electrophoresis, followed by in-gel-digestion and nano-LC/MS analysis.

**Ultra-Sensitive Quantification of Cytokines.**
This project seeks to develop a ultra-sensitive method for the quantification of cytokines in tissue matrices.

b) Qu as the Co-I *(Total of $1.4M in total direct cost allocated to Qu lab, $0.8M since tenure/promotion)*

**Active:**

32. EY028553 (Farkas)  
Role: Co-I  
12/01/2017 – 11/30/2021  
0.24 calendar  
NIH  
DC to Qu Lab: $76,245  

**Using Functional Homology of RP1 Isoforms to Guide Alternative Therapeutic Strategies.**
Qu’s role is to research on the quantitative interactome method to discovery novel interactor of different RP1 isoforms in various biological systems.

31. HL103411 (Neelamegham)  
Role: Co-I  
08/04/2017 – 05/31/2021  
0.24 calendar  
NIH  
DC to Qu Lab: $114,502  

**Systems Biology of Glycosylation**
Qu’s role is to develop a novel nano-LC/CID/HCD/ETD on a ultra-high-field Obitrap analyzer for more efficient fragmentation of glycosylated proteins in complex biological systems, and to participate in the bioinformatics efforts to elucidate the complex sugar structure.

30. CA204192 (Balthasar)  
Role: Co-I  
3/1/2017-02/28/2021  
0.5 calendar
**Catch and Release Immunotoxins: CAR-Bombs for Cancer**
My role is to develop a LC/MS method to characterize peptide toxin in biological systems.

29. AI125746(Read)  
Role: Co-I  
NIH  
DC to Qu Lab: $23,031

**Posttranslational Modification of the Regulatory RNA Binding Protein, ZFP3**
My role is to develop a de novo method to identify the PTM of ZFP3 in a complex biological system.

28. NS096104(Wrabetz)  
Role: Co-I  
NIH  
DC to Qu Lab: $26,541

**Pathogenesis of Myelin Protein Zero Neuropathies in Transgenic Mice.**
This study will identify some of the pathological mechanisms, and inform potential therapeutic strategies for hereditary neuropathies.

27. EY019949 (Zhang)  
Role: Co-I  
NIH  
DC to Qu Lab: $42,650

**ER Stress and Diabetic Retinopathy.**
The goal of our project is to identify and harness endogenous protective factors to enhance retinal cell survival and improve vascular function in diabetes mellitus.

26. NS094181 (Park)  
Role: Co-I  
NIH  
DC to Qu Lab: $93,500

**Transcription Mechanism of Myrf for Central Nervous System Myelination.**
This proposal aims to unravel the transcription mechanism of Myrf.

25. RSG-14-214-01-TEB (Zhang)  
Role: co-I  
American Cancer Society (ACS)  
DC to Qu Lab: $44,312

**PTPN14 and YAP Tyrosine Modification Regulate the YAP Oncogenic Function**
Study focuses on the investigation of mechanisms by which PTPN14 and tyrosine phosphorylation regulate the YAP oncogenic function and how these regulatory interactions further affect tumor formation and metastasis.

24. DE023105 (Yang)  
Role: co-I  
NIH  
DC to Qu Lab: $64,543

**Regulation of Skeletal Development and Homeostasis by Ift Protein**
The goal is to dissect the molecular mechanism of IFT80 interactions that confers cilia formation and OB differentiation and function by characterizing IFT80 structural domains, interacting proteins and their functions.

23. AG048388 (Yang)  
Role: co-I  
NIH  
DC to Qu Lab: $72,513

**Function of Regulator of G Protein Signaling in Aging Skeleton**
The goal of this project is to discover the role and mechanism of RGS12 in OC differentiation and activation in pathologic age condition, and provide new and more effective therapeutic targets to age-associated osteoporosis and other bone diseases.

**Role of Rgs12, A Regulator of G Protein Signaling, In Bone Remodeling**
Qu’s role is to develop proteomics strategies for characterization of RGS12-related pathways and sub-proteomes.

**Completed**

21. HD075363 (Felttri)  
Role: co-I  
9/28/2012- 9/1/2017  
0.5 calendar  
NIH  
DC to Qu Lab: $28,500  
Subcellular Domains of Myelinating-Glia: Capturing Axonal Contact  
The goal is to study the proteomes of subcellular domains of neuron development.

20. CHE-1412405 (Hevel)  
Role: Co-I  
8/1/14-7/31/17  
0.6 calendar  
NSF  
DC to Qu Lab : $41,521  
Collaborative Research: Protein Arginine Methylation  
The goal of this grant is to investigate the specific PRMT specificity and activity on methylating arginine residues in cells.

19. SUNY Cooperate fund (multiple)  
Role: Co-I  
6/1/2014 - 5/30/2015  
0 calendar  
Center for Hearing and Deafness  
DC to Qu Lab: $12,500  
Brain Network: Membrane Permeable Transcriptional Regulators for Retinal Repair  
The goal is to provide a seed grant to explore the relationship of Vitamin D level and children diabetes.

18. Roche Research Grant (Balthasar)  
Role: Co-I  
6/1/2014 - 5/30/2016  
0 calendar  
Hoffmann-La Roche Inc  
DC to Qu Lab: $73,500  
Investigation of the Utility of LC/MS for Characterization of the Plasma and Tissue PK of A Novel Series of Anti-CEA Monoclonal Antibodies.  
The goal is to provide a seed grant to explore the relationship of Vitamin D level and children diabetes.

17. EY025061(Zhang)  
Role: co-I  
12/2/2014- 12/1/2016  
0.5 calendar  
NIH  
DC to Qu Lab: $34,507  
Study of the ER-Mitochondria Interface as A New Target in Diabetic Retinopathy  
The overall goal of this pilot study is to establish a role of MAM in retinal cell metabolism in diabetes.

16. HL103411(Neelamegham)  
Role: Co-I  
7/1/2011-6/30/2016  
0.6 calendar
Systems Biology of Glycosylation
Qu's role is to develop on a dual-enzyme-digestion and nano-LC/CID/HCD/ETD method for more efficient fragmentation of glycosylated proteins in complex biological systems, and to participate in the bioinformatics efforts to elucidate the complex sugar structure.

Protein Arginine Methylation in Trypanosomes
Qu's role is to develop and employ a dual-enzyme/activation, high-resolution SCX fractionation and nano-LC/MS strategy for the global identification of methylation proteins in the proteomes of trypanosomes.

Gamma-hydroxybutyrate: Toxicokinetics, Toxicodynamics and Treatment Strategies
Qu's role is to develop an ultra-sensitive and accurate targeted nano-LC/MS strategy for the quantification of multiple drug transporters in animal models.

Pharmacogenetics of Human Carbonyl Reductases
Qu's role is to employ a nano-LC/MS method developed by Qu lab in 2008 to quantify CBR1 and CBR3 in human tissues.

Metabolic Adaptation and Functional Recovery of Hibernating Myocardium
Qu's role is to discover the tissue biomarkers for hibernating myocardium and remodeling.

Subcellular Domains of Myelinating-Glia: Capturing Axonal Contact
Qu's role is to discover the biomarkers that are responsible for the neuron cell differentiation and the development of pseudopods, by the development and optimization of an ion-current-based method.

The Role of Protein Arginine Methylation in the Co-transcriptional Recruitment of pre-mRNA Splicing Factors
Qu's role is the use of CID/ETD nano-LC/MS methods to determine the methylproteins and localize the exact methylation sites on key proteins pulled-down by TAP procedures.
Peripheral Biomarkers of Cocaine Dependence and Relapse
Qu’s role is to design and execute the proteomics studies for the discovery of brain biomarkers for cocaine addiction and withdrawal.

Identification of Colon Cancer Protein Biomarkers in the Blood
Qu’s role is to design and execute the proteomics studies for proteomics comparison of the normal and cancerous epithelial cells enriched from clinical samples.

Laminin Receptors and Signals in Schwann Cells
Qu’s role is to develop a method to discover the biomarkers for the neuron cell differentiation.

Integration of Clinical, Genomic And Proteomic Data Using A Bioinformatic Approach
Qu’s role is to develop a proteomics strategy to compare the PBMC proteomes from NP and LTNP HIV patients.

Isoprenoid Metabolism in the Retina.
Qu’s role is to develop a proteomics and bioinformatics method to elucidate the mechanisms of retina degeneration in a SLOS model.

High Performance Computational System to Support LCMS/Proteomics Analysis
Funds the purchase of a state-of-the-art computational cluster to accelerate proteomics analysis and provide mass storage for large datasets, for the proteomics facility Qu is currently running.

Pharmacogenetics of Human Carbonyl Reductases
Qu’s role was to develop a highly sensitive and reliable method for the quantification of CBR enzymes in livers.
LC/Quadrupole Ion Trap Mass Spectroscopy System
Funds a state-of-the-art ion-trap LC/Linear Trap Quadrupole instrument for peptide sequencing and drug metabolite characterization.

High Sensitivity Liquid Chromatography Tandem Mass Spectrometry System
Funds a state-of-the-art ultra-sensitive LC/MS instrument for drug and proteomic analysis.

C) Selected Pending proposals

1. R33 CA225366(Qu) Role: Contact 09/01/2017-08/31/2020 2.5 calendar
   NIH Total cost: $1,578,980
   Robust in-depth, high-accuracy proteome/phospho-proteome quantification in large sample cohorts to support cancer drug discovery, therapy development, and individualized medicine
   We propose to develop a novel workflow, IonStar.Mine, that provides analytical, technological and informatics advances that will enable robust simultaneous quantification of a majority of the expressed proteome of a cell or tissue, at high sensitivity, accuracy, and reproducibility, in large sample cohorts necessary to support numerous potential applications. IonStar.Mine builds upon a rigorously optimized and validated analytical platform developed in a preliminary phase of the project, and our objective is to produce a robust, well-validated workflow for quantification of ≥10,000 proteins (est. >60-70% of the expressed proteome) in >200 biological samples, in a single batch and <3 weeks, with >95% proteins free of missing data and high accuracy, reproducibility (<10% median CV for quantification), and <5% false-positive biomarker discovery rate, without prior sample fractionation. Objectives also include a high throughput, high sensitivity and robust targeted proteomic quantification workflow, which will be useful for validation of panels of candidate markers and phosphosites of interest. The goal is to achieve low-ng/mL sensitivity with <10 min/run and sufficient robustness to quantify >2000 samples with high accuracy and precision.

2. Industrial Research fund Role: PI 12/01/2017-02/28/2018 0 calendar
   AbbVie Inc. Total cost: $34,000.00
   Proteomics Analysis using IonStar
   This study will perform a comprehensive experimental comparison between SWATH and IonStar, in order to demonstrate IonStar is a promising alternative to SWATH.

3. NIH Subcontract to UB Role: subcontract PI 07/01/2018-06/30/2023 0.24 calendar
   Roswell Park Alliance Foundation Total cost: $239,250.00
   Immunotherapy against chemotherapy-induced products of aberrant splicing
   My role is to develop novel proteomics methods to comprehensively investigate drug effect and validate hypothesized splicing.
Collaborative Research: Target recognition and regulation of protein arginine methyltransferase 1 (PRMT1)
My role is to employ our unique ETD technique for methylation analysis of PRMT products.

Regulation of transcription-dependent chromatin dynamics in cancer
My role is to develop and optimize IonStar-based techniques for large-scale investigation of chromatin associated proteomes and phosphoproteomes.

Akt-2Smad4 axis in controlling prostate cancer metastatic progression
Using an IonStar-based, quantitative proteomics platform, our lab will seek novel biomarkers and kinase activities associated with prostate cancer metastasis.