BRIAN F. CLEM, Ph.D.
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A. Education

B.S.	Major: Biology, Minor: Chemistry, Centre College, Danville	06/2000
M.S.	Biochemistry and Molecular Biology, University of Louisville Graduate School, Louisville	05/2003
Ph.D.	Biochemistry and Molecular Biology, University of Louisville Graduate School, Louisville	05/2005

B. Academic Appointments:

Post-doctoral Scholar:	James Graham Brown Cancer Center Department of Medicine University of Louisville	2005-2009
Assistant Professor:	Department of Medicine (Term Track) James Graham Brown Cancer Center University of Louisville	2009-2012
	Joint Appointment (Term Track), Department of Biochemistry and Molecular Biology	2010-2012
	Department of Medicine (Tenure Track) James Graham Brown Cancer Center University of Louisville	2012-2013
	Joint Appointment (TenureTrack), Department of Biochemistry and Molecular Biology	2012-2013
	Primary Appointment (TenureTrack), Department of Biochemistry and Molecular Biology	2013-present
Associate Scientist:	James Graham Brown Cancer Center	2009-present
Full Member:	Graduate Faculty, School of Medicine	2010-present

C. Other Positions

None

D. Board Certification and Licensure
N/A

E. Professional Memberships and Activities:

***Judge**,* Jefferson County Public School Regional Science Fair	2003
***Judge**,* Research! Louisville, University of Louisville	2006
Member, Molecular Targets Program, JGBCC	2009-present
Member, American Association for Cancer Research	2010-present

F. Honors and Awards

Travel Award from the American Society for Biochemistry and Molecular Biology	2003
Graduate Dean's Citation, University of Louisville	2005
John Richard Binford Award, Outstanding Performance in Graduate Studies, University of Louisville	2005
2nd Place poster award, Post-doctoral Division, James Graham Brown Cancer Center Retreat	2005
2nd Place poster award, Post-doctoral Division, James Graham Brown Cancer Center Retreat	2007
1st Place, Roger H. Herzig Junior Faculty Research Prize, James Graham Brown Cancer Center Retreat	2009
2nd Place, Poster Division, Ohio Valley Affiliates for Life Sciences (OVALS) 8th Annual Conference	2010
Faculty Award, Potential for Major Clinical Application, ResearchLouisville!, University of Louisville	2010
Junior Faculty Research, James Graham Brown Cancer Center Retreat	2012
Junior Faculty Research, James Graham Brown Cancer Center Retreat	2013

G. Committee Assignments and Administrative Services

***Student Member**,* Biochemistry and Molecular Biology Department Graduate Executive Committee, University of Louisville	2002
***Member**,* Distinguished Teaching Award Committee, University of Louisville	2003
***Student Member**,* Health Science Center Medical Council, University of Louisville	2003-2005
Coordinator, Poa Pratensis JGBCC Molecular Targets Seminar Series	2008-2010
***Member*,** University of Louisville CEGIB Pilot Grant Review Committee	2010
***Member**,* Brown Cancer Center Summer Research Internship Program Selection Committee	2010-present
Voting Member, Brown Cancer Center Clinical Scientific Review Committee	2012-present
Member, Personnel Committee, Dept. Biochemistry and Molecular Biology	2013-present

Member, Curriculum Committee, Dept. Biochemistry and Molecular Biology 2013-present

H. Journal Board Memberships / Peer Reviews

Editorial Board Member, ISRN (Biochemistry) 2012-present
Ad hoc Reviewer, AICR, International Association for Cancer Research 2014

I. Teaching

Course Teaching:
Teaching Assistant, Molecular Biology Graduate Course 2003
Lecturer, BIOC 675, Cancer Biology Course 2012-present
Lecturer, BIOC 647, Biochemistry II 2014
Course Director, Lecturer, BIOC611, Adv. Tech. in Bioch. and Mol. Biol. 2014

Research/Laboratory Teaching:

Ph.D. Students:
Kaitlyn Wendland, Dept. Biochemistry 2013
James Bradley, Dept. Biochemistry 2014
Stephanie Metcalf 2014

Master Students:
Miriam Reynolds, Dept. Biochemistry, University of Louisville 2011-2014

Residents:
Umesh Goswami, M.B.B.S., University of Louisville 2007-2008

Medical Students:
Whitney Goldsberry, University of Louisville 2011

Undergraduates:
Janelle Fassbender, B.S., University of Louisville 2005-2006
Harini Chenna, B.S., University of Louisville 2008
Adam Morrison, University of Louisville 2009-2011
Margaret Means, Vanderbilt University 2010
Samantha Carlisle, University of Louisville 2011
Chelsea Rinnert, University of Louisville 2012
Brian Robertson, Hanover University 2012
Samantha Manning, University of Louisville 2013
Elizabeth Long, Hanover University 2013
Andrew Carroll, University of Louisville 2013

High School Students:
Student Science Fair Projects 2003-2004

Mary Richardson	2010
HaiHeng Cheav	2013
Veeresh Rai	2013, 2014
Ben Green	2014

Thesis Committees:

Department of Biochemistry:

M.S.	Miriam Reynolds	2011-2014

Department of Pharmacology/Toxicology

M.S.	Morgan Stathem	2014

J. Abstracts and Presentations

Oral Presentations, International/National:

10/18/06 **"PFKFB3 and Tumor Metabolism: Targeting Mr. Embden and Mr. Meyerhoff's Accelerator"**, Oral Presentation, 4th International Conference on Tumor Cell Metabolism, Louisville, KY.

4/4/11 **"Characterization of a Novel Small Molecule Antagonist of 6-Phosphofructo-2-Kinase (PFK-015) That Suppresses Glucose Metabolism and Tumor Growth"**, AACR 102nd Annual Meeting, Orlando, FL – Oral Presentation (*first author - presentation given by co-author Gilles Tapolsky*)

11/15/11 "**Loss of the retinoblastoma protein alters glucose and glutamine metabolism"**, AACR-NCI-EORTC International Conference: Molecular Targets and Cancer Therapeutics, San Francisco, CA – Proffered Oral Presentation

5/16/12 **"Retinoblastoma protein regulation of glucose and glutamine metabolism"**, Invited Speaker, Banbury Conference – Energy Metabolism and the Cell Cycle, Cold Spring Harbor Laboratory, Lloyd Harbor, NY

1/31/13 **"Preclinical Characterization of Antagonists of 6-Phosphofructo-2-Kinase that Suppress Glucose Metabolism and Tumor Growth"**, Invited Speaker, Target Cancer Metabolism Conference, Boston, MA

Oral Presentations, Regional:

11/21/09 **"Translating Metabolomics into Novel Cancer Therapeutics"**, Invited Oral Presentation, 1st UL/UK Joint Symposium on Lung Cancer, Louisville, KY.

3/27/10 **"Inhibition of Choline Kinase As a Novel Anti-Neoplastic Approach"**, Invited Oral Presentation, 2nd UL/UK Joint Symposium on Lung Cancer, Lexington, KY

8/1/10 **"Targeting Glycolysis as an Anti-Neoplastic Strategy"**, Department of Pharmaceutical Sciences, Invited Speaker, Host: Dr. Younsoo Bae, Department of Pharmaceutical Sciences, University of Kentucky, Lexington, KY

10/24/13 **"RB and Tumor Metabolism"**, Department of Cancer and Cell Biology, Invited Speaker, Host: Dr. David Plas, University of Cincinnati, Cincinnati, OH

9/4/14 "**Role for pRB in Regulating Tumor Metabolism and Potential Therapeutic Targets"** Department of Cancer Biology, Invited Speaker, Host: Dr. Jun-Lin Guan, University of Cincinnati, Cincinnati, OH

Oral Presentations, University of Louisville:

11/19/02 **"XIAP Inhibits Apoptosis by Promoting Proteasome Degradation of Smac"**, Department of Biochemistry Seminar Series

5/13/04 **"Inhibition of HIV Infection by Blocking Its Entry"**, Department of Biochemistry Seminar Series

07/13/06 **"Pharmacological Inhibition of PFKFB3 Suppresses Tumor Growth"**, Poa Pratensis Molecular Targets Seminar Series.

07/8/08 **"Targeting Metabolism to Fight Cancer"**, JGBCC Undergraduate Internship Seminar Series

12/4/08 **"Sex, Violence, and Choline Kinase"**, Poa Pratensis Molecular Targets Seminar Series

7/14/09 **"Fighting Cancer by Targeting Its Food"**, JGBCC Undergraduate Internship Seminar Series

11/6/09 **"Translating Metabolomics into Novel Cancer Therapeutics"**, James Graham Brown Cancer Center Retreat

1/27/10 **"Fighting Cancer by Targeting Its Food"**, JGBCC Outreach Program, Manual High School

3/10/11 **"An Update on PFKFB3 Inhibitors – A Tale of Two Paths"**, JGBCC Molecular Targets Seminar

4/29/11 **"Regulation of Tumor Metabolism by the Retinoblastoma Protein Family"**, Department of Ophthalmology & Visual Sciences Seminar Series

6/23/11 **"Non-coding RNA transcript mediates p53 escape in Rb-mediated immortalization"**, JGBCC Molecular Targets Retreat

7/26/11 **"Drug Design for New Cancer Therapies"**, JGBCC Undergraduate Internship Seminar Series

7/24/12 **"Drug Design Towards New Cancer Therapies"**, JGBCC Undergraduate Internship Seminar Series

6/6/13 **"A Role for the Retinoblastoma Protein in Tumor Metabolism"**, Department of Pharmacology/Toxcicology Seminar Series

7/9/13 **"Cancer Initiation to Progression"**, JGBCC Summer Internship Seminar Series

7/29/14 **"Development of Small Molecule Inhibitors as Cancer Therapies"**, JGBCC Summer Internship Seminar Series

8/20/14 **"Can Metabolic Suppression Sensitize ER+ Breast Cancer to anti-Estrogen Therapy"**, Colloquia on Cancer Biology and Therapeutics Seminar Series

Poster Presentations, National/International:

6/8/03 **"Identification of Steroidogenic Acute Regulatory Protein (StAR) Promoter DNA-binding and Associating Proteins by DNA-affinity Chromatography"**, Poster Presentation, Endocrine Society's 85th Annual Meeting Philadelphia, PA

06/14/04 **"Sp3, mSin3A, and HDAC1/2 Functionally Repress Basal Transcription of The Steroidogenic Acute Regulatory Protein Gene Promoter"**, Poster Presentation, American Society for Biochemistry and Molecular Biology Annual Meeting Boston, MA

11/14/05 **"Immortalization is Sufficient to Cause the Major Metabolic Alterations of Cancer"**, Poster Presentation, American Association for Cancer Research, NCI-EORTC International Conference, Philadelphia, PA

03/06/07 **"Pharmacological Inhibition of 6-Phosphofructo-2-kinase Suppresses Tumor Growth"**, Poster Presentation, 4th International Conference on Tumor Microenvironment, Florence, Italy

10/22/07 **"Small Molecule Inhibition of 6-Phosphofructo-2-Kinase Activity Suppresses Glycolytic Flux and Tumor Growth"**, Poster Presentation, AACR-NCI-EORTC International Conference on Molecular Targets and Cancer Therapeutics, San Francisco, CA

06/28/08 **"Inhibition of 6-Phosphofructo-2-Kinase Decreases Breast Cancer Growth"**, Poster Presentation, Department of Defense Era of Hope Meeting, Baltimore, MD

10/14/08 **"Small Molecule Inhibition of 6-Phosphofructo-2-Kinase Decreases Breast Tumor Growth"**. Poster Presentation. AACR/JCA Chemical and Biological Aspects of Inflammation and Cancer, Ko Olina, HI

12/10/08 **"Inhibition of 6-Phosphofructo-2-Kinase Suppresses Breast Cancer Growth In Vivo"**, Poster Presentation, San Antonio Breast Cancer Symposium, San Antonio, TX

2/08/09 **"Inhibition of 6-Phosphofructo-2-Kinase Suppresses Breast Cancer Growth In Vivo"**, Poster Presentation, CDMRP, Breast Cancer Research Program, LINKS Meeting, Washington D.C.

2/25/13 **"Loss of Rb Function Enhances Glutamine Metabolism"**, Poster Presentation, Keystone Symposia – Tumor Metabolism (X4), Keystone, CO

10/7/13 "**Genetic Loss of the Rb Family Leads to Increased Glutamine Metabolism"**, Poster Presentation, 3rd International RB Meeting, Monterrey, CA

5/28/14 **"Troglitazone Suppresses Tumor Cell Growth and Glutamine Metabolism through a PPAR-Independent Mechanism"**, Poster Presentation, Metabolism, Diet, and Disease Conference, Washington, DC

Poster Presentations, Regional:

2/25/10 **Southern Society for Clinical Investigation Annual Meeting, New Orleans, LA**
Targeting Choline Kinase as an Anti-Neoplastic Approach

3/27/10 **Joint UK/UofL Lung Cancer Conference, Lexington, KY**
1. Small Molecule Targeting of Choline Kinase Decreases Tumor Growth In Vitro and In Vivo
2. Requirement of 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase Isoform 4 (PFKFB4) for Anchorage Independent Growth and Tumorigenesis
3. Small Molecule Inhibition of 6-Phosphofructo-2-Kinase Activity Suppresses Glycolytic Flux and Tumor Growth

4/15/10 **Ohio Valley Affiliates for Life Sciences (OVALS) 8th Annual Conference, Louisville, KY**
Development of Small Molecule Inhibitors of Choline Kinase As a Novel Anti-Tumor Therapeutic Approach – 3rd Place Award Winner

4/14/11 **Ohio Valley Affiliates for Life Sciences (OVALS) 9th Annual Conference, Cincinnati, OH**
Characterization of a Novel Small Molecule Antagonist of 6-Phosphofructo-2-Kinase (PFK-015) That Suppresses Glucose Metabolism and Tumor Growth

Poster Presentations, University of Louisville:

11/09/02 **Research! Louisville, University of Louisville**
"Steroidogenic Acute Regulatory Protein (StAR) Promoter DNA-binding and Associating Proteins"

11/04/03 **Research! Louisville, University of Louisville**
"Cyclic Adenosine 3',5'-Monophosphate (cAMP) Enhances cAMP-Responsive Element Binding (CREB) Protein Phosphorylation and Phospho-CREB Interaction with the Mouse Steroidogenic Acute Regulatory (StAR) Protein Gene Promoter"

11/02/04 **Research! Louisville, University of Louisville**
"Sp3, mSin3A, and HDAC1/2 Functionally Repress Basal Transcription of The Steroidogenic Acute Regulatory Protein Gene Promoter"

09/14/05 **JGBCC, University of Louisville Fourth Annual Retreat (The Olmstead)**

1. "Pharmacologic Inhibition of 6-Phosphofructo-2-Kinase (PFKFB3) Suppresses Cancer Cell Proliferation"
2. "High Choline Kinase Activity is Essential for Neoplastic Proliferation"
3. "Nuclear Compartmentalization of a Key Regulator of Glycolysis, 6-Phosphofructo-2-Kinase (PFKFB3)"

05/15/06 **JGBCC Molecular Targets Program Annual Retreat (The Brown Hotel)**

1. Pharmacologic Targeting of 6-Phosphofructo-2-Kinase
2. The Inducible Isozyme of 6-Phosphofructo-2-Kinase Is an Essential Downstream Effector of the Oncogene Ras

11/29/06 **JGBCC, University of Louisville Fifth Annual Retreat (The Olmstead)**

1. Pharmacological Inhibition of 6-phosphofructo-2-kinase (PFKFB3) Suppresses Tumor Growth
2. The p16INK4a/Rb Family Pathway and Cancer Stem Cell Formation
3. Requirement of 6-phosphofructo-2-kinase/fructose-2,6- bisphosphatase- 4 (PFKFB4) for Anchorage Independent Growth and Tumorigenesis
4. PFKFB3 Interacts with C-RAF

11/28/07 **JGBCC, University of Louisville Sixth Annual Retreat (The Olmstead)**

1. Small Molecule Inhibition of 6-Phosphofructo-2-Kinase Activity Suppresses Glycolytic Flux and Tumor Growth
2. Requirement of 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase- 4(PFKFB4) for Tumorigenesis
3. 6-Phosphofructo-2-Kinase (PFKFB3) Traffics to the Nucleus and Stimulates Cell Proliferation

10/29/08 **JGBCC, University of Louisville Seventh Annual Retreat (The Olmstead)**

1. Inhibition of 6-Phosphofructo-2-Kinase Suppresses Breast Tumor Growth *In Vivo*
2. Small Molecule Targeting of Choline Kinase Decreases Tumor Growth *In Vitro* and *In Vivo*
3. Requirement of 6-Phosphofructo-2-Kinase/Fructose-2,6-Bisphosphatase-4 (PFKFB4) for Tumorigenesis
4. 6-Phosphofructo-2-Kinase/Fructose-2,6-Bisphosphatase-3 (PFKFB3) Localizes to the Nucleus and Enhances Cyclin-Dependent Kinase Activity and the Phosphorylation of the Cell Cycle Inhibitor $p27^{Kip1}$
5. Selective Inhibition of Choline Kinase Interrupts Ras Signaling and Tumor Growth

11/6/09 **JGBCC, University of Louisville Eighth Annual Retreat (The Olmstead)**

1. P27 Is Required for Growth Defects and Apoptosis Caused by PFKFB3 Inhibition
2. Selective Inhibition of Choline Kinase Simultaneously Attenuates MAPK and PI3K/AKT Signaling
3. Small Molecule Targeting of Choline Kinase Decreases Tumor Growth In Vitro and In Vivo
4. Regulatory subunit Vb of cytochrome c oxidase is required for malignant

transformation
5. Requirement of 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase Isoform 4 (PFKFB4) for Anchorage Independent Growth and Tumorigenesis

10/14/10 **RESEARCH! Louisville, University of Louisville**
1. Small Molecule Targeting of Choline Kinase Decreases Tumor Growth In Vitro and In Vivo
   – Faculty Award Winner: Potential for Major Clinical Application

11/5/10 **JGBCC, University of Louisville Ninth Annual Retreat (The Olmstead)**
1. Micelle Encapsulation of the Glycolytic Inhibitor 3PO as a Therapeutic Delivery Formulation
2. Small Molecule Targeting of Choline Kinase Decreases Tumor Growth In Vitro and In Vivo

10/10/11 **RESEARCH! Louisville, University of Louisville**
Loss of the Retinoblastoma Protein Alters Glucose and Glutamine Metabolism

10/28/11 **JGBCC, University of Louisville Tenth Annual Retreat (The Olmstead)**
1. Loss of the Retinoblastoma Protein Alters Glucose and Glutamine Metabolism
2. Glutathione Synthetase Is Required for the Anchorage Independent Growth of A549 Lung Adenocarcinoma Cells
3. Estradiol stimulates 6-phosphofructo-2-kinase (PFKFB3) expression and glycolysis by breast cancer cells
4. Characterization of a novel small molecule antagonist (PFK-015) of 6-Phosphofructo-2-kinase/ fructose-2,6-bisphosphatase-3 (PFKFB3) that suppresses glucose metabolism and tumor growth

9/20/12 **RESEARCH! Louisville, University of Louisville**
Control of Glutamine Metabolism By the Tumor Suppressor Rb

10/26/12 **JGBCC, University of Louisville 11th Annual Retreat**
1. Control of Glutamine Metabolism By the Tumor Suppressor Rb
2. Stimulation of Glucose Metabolism by Estradiol Is Mediated by 6-Phosphofructo-2-Kinase (PFKFB3)
3. Troglitazone Decreases Glutaminolysis and Suppresses Proliferation in Cells Dependent on Glutamine Metabolism for Cell Growth
4. Targeting 6-Phosphofructo-2-Kinase (PFKFB3) as a Therapeutic Strategy Against Cancer
5. Combined effects of choline kinase inhibition and suppression of PEMT on cell proliferation

10/25/13 **JGBCC, University of Louisville 12th Annual Retreat**
1. Estradiol stimulates glucose metabolism via 6-phosphofructo-2-kinase (PFKFB3)
2. 6-Phosphofructo-2-Kinase (PFKFB3) Induces Autophagy as a Survival Mechanism
3. An anti-glycolytic small molecule inhibitor (PFK158) cooperates with a mutant B-RAF inhibitor (vemurafenib) to induce cell death in melanoma cells
4. Genetic Loss of the Rb Family Leads to Increased Glutamine Metabolism
5. Troglitazone Decreases Glutaminolysis and Suppresses Proliferation in Cells Dependent on Glutamine Metabolism for Cell Growth

6. Effect of Potential Phosphoserine Aminotransferase (PSAT1) Inhibitors on the Growth of Lung and Colon Cancer Cells

K. Patents

Issued United States Patents:

PFKB3 inhibitor for the treatment of a proliferative cancer
Inventors: Brian Clem, Jason Chesney, John O. Trent, Jason Meier, and Sucheta Telang
United States Patent #8,088,385, issued January 3, 2012

Family of PFKFB3 Inhibitors With Anti-Neoplastic Activities
Inventors: Brian F. Clem, Gilles Tapolsky, Pooran Chand, John O. Trent, Sucheta Telang, Jason A. Chesney
United States Patent #8,557,823, issued October 15, 2013
Entered Phase I Clinical Trials, March 2014 – Clinical Trial.gov - NCT02044861

Submitted Patent Applications

Family of PFKFB3 Inhibitors With Anti-Neoplastic Activities
Inventors: Brian F. Clem, Gilles Tapolsky, Pooran Chand, John O. Trent, Sucheta Telang, Jason A. Chesney
European Patent Application serial no. 08 768 587.1; filed January 8, 2010.
Australian Patent Application serial no. 2008266856; filed January 18, 2010.
Japanese Patent Application serial no. (tbd); filed December 17, 2009.
Indian Patent Application serial no. 1100/DELNP/2010; filed February 17, 2010.

Small Molecule Inhibition of Choline Kinase Suppresses Tumor Growth
Inventors: Brian Clem, Jason Chesney, John O. Trent, Pooran Chand, and Sucheta Telang
United States Provisional Patent Application serial no. 61/220,620; filed June 26, 2009

Novel Anti-Cancer Compounds
Inventors: Brian Clem, Jason Chesney, Pooran Chand, Gilles Tapolsky, Sucheta Telang, and John Trent
United States Provisional Patent Application serial no. 61/306,759; filed February 22, 2010

New Anti-Cancer Compounds and Methods to Treat Cancer
Inventors: Brian Clem and Gilles Tapolsky
United States Provisional Patent Application serial no. 61/324,441; filed April 15, 2010

L. Research Funding

Past Support:

1. Center for Genetics and Molecular Medicine Fellowship
(*University of Louisville, Mentor: Barbara Clark, Ph.D.*)
Title: **Transcriptional Regulation of StAR**
Role: *Principal Investigator*

Period of Support: 05/01/02-4/31/03
Total Award: $18,000

2. NIEHS T32 ES011564 Training Grant Fellowship
(*University of Louisville, Mentor: Barbara Clark, Ph.D.)*
Title: **Mechanisms of Transcriptional Regulation of the Mouse Steroidogenic Acute Regulatory (StAR) Protein Gene Promoter**
Role: *Project Investigator*
Period of Support: 1/01/04-01/31/05
Total Award: $20,000

3. Department of Defense Breast Cancer Multi-Disciplinary Post-doctoral Award
Title: **Targeting of Inducible 6-Phosphofructo-2-Kinase in Breast Cancer**
Role: *Principal Investigator (100% Effort)*
Period of Support: 05/01/06-04/30/09
Total Award: $262,604
Total Direct Costs: $262,604

4. 3P20RR018733-07S109 Center of Biomedical Research Excellence in Molecular Targets
Title: **Administrative Supplement to Advance Translational Research**
Role: *Co-Investigator* (20%) for Projects 1+3
Period of Support: 10/01/09-09/30/11
Total Award: $759,342
Projects 1+3
Direct Costs: $398,983 (out of total Direct Costs of $513,069)
2009-2010 Direct Costs: $208,560 (out of total 2009-2010 Direct Costs of $267,098)

5. University of Louisville Advanced Translational Award
Title: **Pre-Clinical Testing of 3-(3-Pyridinyl)-1-(4-Pyridinyl)-2-Propen-1-One In Autoimmunity**
Role: *Co-Investigator*
Period of Support: 06/01/10-05/31/11 (no cost extension: 4/30/12)
Total Award: $96,192
Total Direct Costs: $94,306
2010-2011 Direct Costs: $94,306

6. Sponsored Research Grant (Un-restricted) – Advanced Cancer Therapeutics
Title: **Pre-Clinical Analysis of 3PO and CK37 Derivatives**
Role: *Co-Investigator (1%)*
Period of Support: 08/01/10-04/30/12
Total Award: $224,661
Total Direct Costs: $149,823
2010-2011 Direct Costs: $74,838

7. Commonwealth of Kentucky Lung Cancer Research Program Grant

Title: **Novel Small Molecular Inhibitors of Choline Kinase as a Therapeutic Strategy against Lung Cancer**
Role: *Principal Investigator* (10% effort)
Period of Support: 11/01/09-10/31/12 – no cost extension
Total Award: $150,000
Total Direct Costs: $136,364
2011-2012 Direct Costs: $38,528

8. 8P20GM103482-10 Center of Biomedical Research Excellence in Molecular Targets (Principal Investigator: Donald Miller)
Role: *Project Leader* (40%)
Period of Support: 10/01/08-06/30/13
Total Award: $11,038,973
2012-2013 Direct Costs: $168,619

9. 1 R43 CA165300-01 (NCI) Center for Scientific Review Special Emphasis Panel
Small Business: Cancer Drug Development and Therapeutics (PI: Gilles Tapolsky, Advanced Cancer Therapeutics)
Title: **PFK-015: An inhibitor of PFKFB3 to treat Glioblastomas**
Role: Project Investigator (Sub-contract)
Period of Support 10/1/12-6/30/13
Total Award: $115,000
2012-2013 Direct Costs: $33,500 (sub-contract to UofL)

Current Support:

1. 1R01CA149438 (NCI, PI: Chesney)
Title: **Activation of Cyclin-Dependent Kinases by Fructose-2,6-Bisphosphate**
Role: Co-Investigator (10%)
Period of Support: 4/01/11-3/31/16
Total Award: $1,552,500
2014-2015 Direct Costs: $207,500

This grant funds the characterization of fructose-2,6-bisphosphate as a novel allosteric regulator of cyclin dependent kinases and cell cycle progression.

2. 1R01CA166327 (NCI)
Title: **Regulation of Tumor Metabolism by Retinoblastoma Protein**
Role: Principal Investigator (20%)
Period of Support 6/1/13-5/31/18
Total Award: $1,095,000
2014-2015 Direct Costs: $130,000

This grant will characterize metabolic pathways and downstream mediators regulated by the retinoblastoma protein in MEF cells, mouse transgenic and human tumors.

3. RSG 13-139-01 (American Cancer Society)
Title: **Control of Glucose and Glutamine Metabolism by the Retinoblastoma Protein**
Role: Principal Investigator (25%)

Period of Support 7/1/13-6/30/17
Total Award: $720,000
2014-2015 Direct Costs: $150,000

This grant will fund an examination of the role of Rb in regulating glucose and glutamine metabolism in lung cancer.

4. 1P30GM106396 (Pilot Grant: Molecular Targets Phase III CoBRE grant: NIH)
Title: **Targeting Phosphoserine Aminotransferase (PSAT1) in the Treatment of Lung Cancer**
Role: Principal Investigator (5%)
Period of Support 11/1/13-6/30/15
Total Award: $150,000
2014-2015 Direct Costs: $75,000

Pending Support:

1. R21 CA194894-02 (NCI, PI: Clem)
Title: **Targeting Phosphoserine Aminotransferase in Squamous Cell Lung Cancer**
Role: Co-Investigator (10%)
Period of Support 4/1/15-3/31/17
Total Award: $412,500
Direct Costs / year: $125,000

M. Publications

Peer-Reviewed Research Publications:

1. **Clem, B.F.**, Hudson, E., Clark, B.J. Cyclic Adenosine 3',5'-Monophosphate (cAMP) Enhances cAMP-Responsive Element Binding (CREB) Protein Phosphorylation and Phospho-CREB Interaction with the Mouse Steroidogenic Acute Regulatory (StAR) Protein Gene Promoter. *Endocrinology*.146(3):1348-1356. 2005. PMID: 15550512

2. **Clem, B.F.**, Clark, B.J. Association of the mSin3A-histone deacetylase 1/2 Co-Repressor Complex with the Mouse Steroidogenic Acute Regulatory Protein Gene. *Molecular Endocrinology.* 20(1): 100-113. 2006. PMID: 16109738

3. **Clem, B.F.**, Telang, S., Clem, A., Yalcin, A., Meier, J., Simmons, A., Rasku, M., Arumugam, S., Dean, W.L., Eaton, J., Lane, A., Trent, J.O., and Chesney, J. Small Molecule Inhibition of 6-Phosphofructo-2-Kinase Activity Suppresses Glycolytic Flux and Tumor Growth. *Mol. Cancer Therapeutics*, 7(1):110-20, 2008. PMID: 18202014

4. Liu, Y., El-Naggar, S., **Clem B.**, Chesney. J., Dean, D.C. The Rb/E2F pathway and Ras activation regulate RecQ helicase gene expression. *Biochemical Journal*, 412(2):299-306, 2008. PMID: 18215118

5. Thornburg, J., Nelson, K., **Clem, B. F.**, Lane, A., Arumugam, S., Simmons, A., Eaton, J. W., Telang, S. and Chesney, J**.** Targeting Aspartate Aminotransferase in Breast Cancer. *Breast Cancer Research*, 10(5):R84, 2008. PMCID: 2614520

6. Liu Y., **Clem, B. F.**, Zuba-Surma, E., El-Naggar, S., Telang, S., Jenson, A.B., Ratajczak, M., Chesney, J., and Dean, D. C. Mouse Fibroblasts Lacking RB1 Function Form Spheres and Undergo Reprogramming to a Cancer Stem Cell. *Cell Stem Cell,* Apr 3; 4(4):336-47, 2009. PMCID: 2743858

7. Yalcin, A., **Clem, B.F.**, Simmons, A, Lane, A., Nelson, K., Clem, A., Brock, E., Siow, D., Wattenburg, B., Telang, S., and Chesney, J. Activation of Cyclin-Dependent Kinases By Fructose-2,6-Bisphosphate. *Journal of Biological Chemistry* , Sep. 4;284(36):24223-32, 2009. PMCID: 2782016

8. Yalcin, A., **Clem, B.F.**, Makoni, S., Clem, A., Nelson, K., Thornburg, J., Siow, D., Lane, A.N., Brock, S.E., Goswami, U., Eaton, J.W., Telang, S., and Chesney, J. Selective Inhibition of Choline Kinase Simultaneously Attenuates MAPK and PI3K/AKT Signaling. *Oncogene*, Jan 7;29(1):139-49, 2010. PMID: 19855431

9. **Clem, B.F.**, Clem, A.L., Yalcin, A., Goswami, U., Telang, S., Trent, J.O., and Chesney, J. A Novel Small Molecule Antagonist of Choline Kinase-α That Simultaneously Suppresses MAPK and PI3K/AKT Signaling. *Oncogene*. Jul 28;30(30):3370-80, 2011. PMCID: 3136659

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