Mythreye Karthikeyan MSc. PhD

631 Sumter Street
Columbia SC 29208
mailto:mythreye@sc.edu

Tel: Office: (803) 576-5806
Lab :(803) 777-6323
Fax: (803) 777-9521

ACADEMIC APPOINTMENTS

2013 Aug- Assistant Professor (tenure track) Department of Chemistry and Biochemistry (Primary)
2013 Aug- Assistant Professor, Dept. of Drug Discovery and Biomedical Sciences, University of South Carolina at Columbia (Secondary)

RESEARCH TRAINING AND EDUCATION

2009-2013 Research Assistant Professor of Medicine, Div. of Medical Oncology, Dept. of Medicine, Duke University, Durham NC.
2006-2009 **Post Doctoral Fellow**, Div. of Medical Oncology, Duke University, Durham NC (**Gerard Blobe M.D Ph.D**.)
2005-2006 **Post Doctoral Fellow**, Dept. of Medicine, Duke University, Durham NC (Pascal Goldschmidt M.D)
2000-2005 **Ph.D**., University of North Carolina, Chapel Hill, NC (Kerry S Bloom Ph.D.)
1998-1999 **Research Trainee** Indian Institute of Science, Bangalore
1993-1996 **B.Sc**. Honors (Bio Chemistry), University of Delhi, Delhi, India

HONORS AND AWARDS

2016 Nominee for the USC 'Distinguished Undergraduate Research Mentor Award
2013-2017 Liz Tilberis Scholar Award, Ovarian Cancer Research Fund.
2014 University of South Carolina Nominee for the Searle Scholars Program
2009-2012 Career Development Award for Ovarian Cancer Research (Dept. of Defense)
2008 Best Poster Award. Pharmacology Retreat and Symposium, Duke University.
2006 Keystone Symposia Postdoctoral Travel Award (Molecular Biology of the Vasculature).
1998 National fellowship for Research and Training from Govt. of India, CSIR

PUBLICATIONS

2016 Sanjay Kumar, Christopher C. Pan[1], Nirav Shah[1], Sarah E. Wheeler1, Kari R. Hoyt1, Nadine Hempel, **Karthikeyan Mythreye**, and Nam Y. Lee. Activation of mitofusin2 by Smad2-RIN1 complex during mitochondrial fusion. *Molecular cell in press.*

2016 Christopher C. Pan[1], Nirav Shah, Sanjay Kumar[1], Sarah E. Wheeler, Jason Cinti, Dale G.Hoyt, Christine E. Beattie, Min An, **Karthikeyan Mythreye**, L. Harinantenaina Rakotondraibe, Nam Y. Lee. Angiostatic actions of capsicodendrin through selective inhibition of VEGFR2-mediated AKT signaling and disregulated autophagy. *Oncotarget. In press*

2015 Varadaraj A, Patel P, Serrao A, Bandyopadhay T, Lee NY, Jazaeri AA, Huang Z, Murphy SK, **Mythreye K.** Epigenetic regulation of GDF2 suppresses anoikis in ovarian and breast epithelia *Neoplasia.* 2015 Nov; 17(11):826-38. doi: 10.1016/j.neo.2015.11.003

2015 Pan CC, Kumar S, Shah N, Bloodworth JC, Hawinkels LJ, **Mythreye** K, Hoyt DG, Lee NY. Endoglin regulation of Smad2 function mediates beclin1 expression and endothelial autophagy. *J Biol Chem.* 2015 Jun 12;290(24):14884-92. doi: 10.1074/jbc.M114.630178. Epub 2015 Apr 30

2014 Osborne LD, Li GZ, How T, O'Brien ET, Blobe GC, Superfine R, **Mythreye** K**.** TGF-β regulates LARG and GEF-H1 during EMT to impact stiffening response to force and cell invasion. *Mol. Biol. Cell 2014* 25:22 3528-3540

2014 Pan CC, Kumar S, Shah N, Hoyt DG, Hawinkels LJ, **Mythreye** K, Lee NY. Src-mediated post-translational regulation of endoglin stability and function is critical for angiogenesis. *J Biol Chem*. 2014 Sep 12; 289(37): 25486-96

2013 Knelson EH, Gaviglio AL, Tewari AK, Armstrong MB, ***Mythreye K, ***Blobe GC. Type III TGF-beta receptor promotes FGF2-mediated neuronal differentiation in neuroblastoma. *J Clin Invest*. 2013 Nov 1; 123(11):4786-98 **(****equal senior author)*

2013 Oh SY, Knelson EH, Blobe GC, **Mythreye** K**.** The type III TGFβ receptor regulates filopodia formation via a Cdc42-mediated IRSp53-N-WASP interaction in epithelial cells. *Biochem J***.** 2013 Aug 15; 454(1):79-89.

2013 **Mythreye** K, Knelson EH, Gatza CE, Gatza ML, Blobe GC. TβRIII/β-arrestin2 regulates integrin α5β1 trafficking, function, and localization in epithelial cells.. *Oncogene*. 2013 Mar 14; 32(11):1416-27.

2012 Tian H, **Mythreye** K, Golzio C, Katsanis N, Blobe GC. Endoglin mediates fibronectin/α5β1 integrin and TGF-β pathway crosstalk in endothelial cells. *EMBO J*. 2012 Oct 3;31(19):3885-900.

2012 Christopher C. Pan, Jeffrey C. Bloodworth, Karthikeyan Mythreye and Nam Y. Lee Endoglin Inhibits ERK-induced c-Myc and Cyclin D1 Expression to Impede Endothelial Cell Proliferation. *Biochem Biophys Res Commun*. 2012 Aug 3;424(3):620-3

2011 Swaminathan V, **Mythreye** K, O'Brien ET, Berchuck A, Blobe GC, Superfine R (***equal first author).*** Mechanical stiffness grades metastatic potential in patient tumor cells and in cancer cell lines. *Cancer Research 2011* Aug 1;71 (15):5075-80.

2011 Lambert KE, Huang H, **Mythreye** K, Blobe GC. The type III transforming growth factor-β receptor inhibits proliferation, migration, and adhesion in human myeloma cells**.** *Mol Biol Cell*. 2011 May;22(9):1463-72

2009 **Mythreye K** and Blobe GC. The type III TGFbeta receptor regulates directional migration: new tricks for an old dog. *Cell Cycle***.** 2009 Oct 1;8(19): 3069-70

2009 **Mythreye K** and Blobe GC. Proteoglycan signaling co-receptors: roles in cell adhesion, migration and invasion. *Cell Signal*. 2009 Nov; 21(11): 1548-58.

2009 **Mythreye K,** Blobe GC. The type III TGF-beta receptor regulates epithelial and cancer cell migration through beta-arrestin2-mediated activation of Cdc42. *Proc Natl Acad Sci* USA. 2009 May 19; 106(20): 8221-6

2008 **Mythreye K,** Satterwhite LL, W. Sean Davidson and Goldschmidt-Clermont PJ ApoA-I induced CD31 in bone marrow-derived vascular progenitor cells increases adhesion: implications for vascular repair. *Biochim Biophys Acta*. 2008 Nov-Dec; 1781(11-12):703-9

2008 Gardner MK, Haase J, **Mythreye K,** Molk JN, Anderson M, Joglekar AP, O'Toole ET, Winey M, Salmon ED, Odde DJ, Bloom K. The microtubule-based motor Kar3 and plus end-binding protein Bim1 provide structural support for the anaphase spindle. *J Cell Biol. 2008 Jan 14;180(1):91-100*

2007 **Mythreye K** and Blobe G.C TGF-β Type I receptor Receptor. AFCS *Nature Molecule Pages.* 25, April 2007. doi10 1038/mp.a002272.01

2006 Moldovan L, **Mythreye K,** Goldschmidt-Clermont PJ, Satterwhite LL Reactive oxygen species in vascular endothelial cell motility. Roles of NAD (P) H oxidase and Rac1. *Cardiovascular Res*.2006. Jul15; 71(2): 236-46.

2003 **Mythreye K** and Bloom KS Differential kinetochore protein requirements for establishment versus propagation of centromere activity in Saccharomyces cerevisiae.. *J Cell Biol.* 2003 Mar 17; 160(6):833-43

BOOK CHAPTERS

Emerging roles of TGF-β co-receptors in human disease. A.E. Meyer, **K. Mythreye** and G. C. Blobe.

Springer Book Chapter in ' TGF-β in human disease'.

PATENTS
MECHANICAL STIFFNESS PROFILING OF CANCER CELLS; Provisional Patent Application (U.S. Patent and Trademark Office) No.: 61/543,633Filing Date: October 5, 2011

SELECT INVITED ORAL PRESENTATIONS

2016 Hershey Medical Center, Penn State University. Feb 2016
2015 **FASEB summer research Conference** July 2015, TGF-β superfamily: Signaling in Development and Disease, Keystone Colorado
2014 **University of South Carolina School of Medicine**." *TGF-β signaling and Biology in cancer"*
2013 **University of South Carolina, College of Pharmacy** Seminar Series "*Mechanotransduction mediated regulation of TGF-β induced EMT*
2013 **University of South Carolina**, Department of Chemistry and Biochemistry.
2013 **University of Virginia, Charlottesville**, Cancer Center Seminar Series *" Beyond Coreception: Type III TGF-β receptors in Cancer"*
2012 **Duke Cancer Institut**e, Breast Cancer Research Forum.
2012 Ovarian Cancer: Prevention, Detection and Treatment of the Disease and Its Recurrence Molecular Mechanisms and Personalized Medicine Pittsburgh, PA "*Role of TβRIII /betaglycan in Regulating Adhesion and Mechanotransduction in Ovarian Cancer*"
2011 **Duke University Grand Rounds**: Division of Medical Oncology, Dept. of Medicine,

POSTER PRESENTATIONS (presenter underlined)

(Since Tenure Track Appointment at USC*)*

1. Laura M. Jenkins, Archana Varadaraj, Priyanka Singh, Haley Flores and Karthikeyan Mythreye. Altering the proteoglycan state of TBRIII/Betaglycan modulates canonical Wnt/B-catenin signaling. Gprdon Research Conference, Proteoglycans July 2016
2. Priyanka Singh, Ashley Wilson and K.Mythreye. Defining mechanisms of Inhibin action in cancer. 2015 Southeast Regional IDeA meeting, November 11-13, Biloxi Mississippi
3. Laura M. Jenkins, Archana Varadaraj, Haley Flores and Karthikeyan Mythreye. "Transforming Growth Factor β Type III (TβRIII/Betaglycan) suppresses canonical Wnt signaling in ovarian cancer". American Association of Cancer Research, Developmental Biology and Cancer Conference, Nov 30th –Dec 3rd 2015
   Note: Student received AACR minority scholar award**.**
4. Archana Varadaraj, P. Patel, J. Snider, A. Chanda and K. Mythreye TGF-β triggers rapid Fibrillogenesis via a novel TGFBR2 dependent fibronectin recycling mechanism. Triangle Cytoskeleton Meeting ASCB sponsored second annual Triangle Cytoskeleton Meeting. Chapel Hill NC
5. Anne Serrao, N. Lenze, J. Snider, I. Roninson, and K. Mythreye. CDK8 and CDK19 switch BMP2/4 from a growth suppressor to an EMT inducer via distinct and overlapping functions. FASEB summer research Conference July 2015, TGF-β superfamily: Signaling in Development and Disease
   Note**:** One of 100 posters featured in the journal *Science Signaling* as part of the meeting review that appeared in Fall 2015.
6. Archana Varadaraj, P. Patel, J. Snider, A. Chanda and K. Mythreye TGF-β triggers rapid Fibrillogenesis via a novel TGFBR2 dependent fibronectin recycling mechanism. FASEB summer research Conference July 2015, TGF-β superfamily: Signaling in Development and Disease.

7. Varadaraj A, Patel P, Serrao A, Bandyopadhyay T, Lee N.Y, Jazaeri A, Murphy S.K and Mythreye K. GDF2 promotes anoikis susceptibility in ovarian and breast epithelia. American Association of Cancer Research (AACR) Annual Meeting 2015. Philadelphia, PA.
8. Anne Serrao, J. Snider and K. Mythreye. Defining Mechanisms of BMP4 Induced Epithelial to Mesenchymal Transition. CCCR retreat, Jan 2015 Columbia SC
9. L. Jenkins and K. Mythreye. Elucidating the Role of the TypeIII TGF-β receptor in Wnt Signaling. CCCR retreat, Jan 2015 Columbia SC
10. Caleb Snider, A. Varadarj, and Karthikeyan Mythreye. Cellular response to TGF-β and the mechanical environment via tunable Hydrogel substrates. Discovery Day 2015
    Note: Best Poster award for Caleb Snider (undergraduate researcher)
11. D.J Oliver, H.Ji, S.Lee, K. Mythreye, H.Valafar, M. Shtutman. miRNA-148/152 family members concordantly target genes important for tumor progression and chemoresistance, American Society for Cell Biology (ASCB) Annual Meeting, Dec6-10, Philadephia PA
12. K. Mythreye**,** Luke Osborne, George Li, E.T.O Brian, G.C Blobe, R. Superfine and**.** TGF-β regulates RhoGEF's during EMT to coordinately impact cellular stiffness, mechanical response to force and cellular migration and invasion. **FASEB** Summer conference, Aug 2013. TGF-β signaling in disease.

(Post Doctoral/ Research Faculty)

6. Luke Osborne, George Li, E.T.O Brian, G.C Blobe, R. Superfine and K. Mythreye**.** Altered stiffness and mechanical response to force on integrins is a consequence of TGF-β induced epithelial to mesenchymal transition. BMES Annual Meeting, 2013.
7. E.Knelson, K. Mythreye and G.C. Blobe Stromal derived soluble TβRIII promotes neuronal differentiation in neuroblastoma. FASEB conference 2011
8. Ruane EJ, Mythreye K, Blobe GC. Role of the Type III TGF-β Receptor in Collective Cell Migration. 2011 Meeting of Medical Fellows and Research Scholars; Chevy Chase, MD.
9. Ruane EJ, Mythreye K, Blobe GC. Role of the Type III TGF-β Receptor in Collective Cell Migration. Duke University School of Medicine AOA Day, August 2011
10. K. Mythreye, E. Knelson, C.E.Gatza and G.C Blobe TβRIII/β-arrestin2 regulates integrin α5β1 trafficking and function during epithelial cell adhesion. FASEB conference 2011.
11. V. Swaminathan, K. Mythreye, G. C. Blobe; E. OBrien; R. Superfine. TβRIII Restores Normal Cytoskeleton Mechanics in Ovarian Cancer Cells.. American Society for Cell Biology, annual meeting 2008
12. K. Mythreye and G.C. Blobe. Role of the tumor suppressor T □RIII/betaglyca directional migration during epithelial and cancer cell movement. Keystone symposia, TGF □ family in homeostasis and disease, 2008
13. K. Mythreye, Satterwhite LL and Goldschmidt PC. ApoA-I induced differentiation of adult bone marrow derived vascualar progenitor cells. Keystone symposia, Molecular Biology of the Vasculature 2006.

(Pre- Doctoral)

14. K. Mythreye and Bloom K.S .A Bim1p dependent detachment attachment kinetochore-microtubule cycle. FASEB Summer Research Conference for yeast chromosome structure, replication and segregation 2004
15. K. Mythreye and Bloom K.S. Functional Dissection of kinetochore components utilizing a quantitative dicentric chromosome breakage assay. American Society for Cell Biology, annual meeting 2002
16. K. Mythreye and Bloom K.S. Distinct Requirements for *de novo* Assembly versus Propagation of *S. cerevisiae* Kinetochores American Society for Cell Biology, annual meeting 2001.

17. K. Mythreye and Bloom K.S. Chl4/mcm17/ctf17 is required for the epigenetic propagation of centromeres in *S.cerevisiae*. FASEB Summer Research Conference for yeast chromosome structure, replication and Segregation 2000.

ACTIVE RESEARCH SUPPORT

EXTRAMURAL

2016 **NSF** EPSCor Research infrastructure (Faculty support grant)
2013-2017 **Liz Tilbers Scholars award**, Ovarian Cancer Research Fund *"Investigating the TGFß Superfamily as Therapeutic Targets in Ovarian Cancer"*
2014-2017 **NIH/NIGMS: COBRE** Center for Targeted therapeutics -Target Project.

INTRAMURAL

2014-2015 **USC** Advanced Support Programs for Innovative Research Excellence-II (ASPIRE-II).

COMPLETED RESEARCH SUPPORT

2014-2015 **Marsha Rivkin Center for Ovarian Cancer research, "***Specific targeting of Inhibin in ovarian cancers lacking the Type-III TGF-β receptor"*
2009-2012 **Department of Defense,** Career Development Award " *Role of the tumor suppressor TβRIII/Betaglycan in regulating directional migration and polarity in ovarian cancer and ovarian surface epithelial cells"*

TRAINEE AWARDS/RESEARCH SUPPORT:

2016-2017 ASPIRE I, Track 2 B proposal, Postdoctoral fellowship
5/2016 SPARC Graduate student award Type III TGFβ Receptor Regulation of Wnt/β-catenin Signaling in Ovarian Cancer
2014-2015 USC Research Foundation Magellan Scholar Program (Undergraduate Fellowship)
2014-current USC, Science Undergraduate Research Fellowships (multiple undergraduates)
2014 USC, Colon Cancer Research fellowship for Graduate Student
2015 Discovery day, Best Poster award, Caleb Snider

PROFESSIONAL ACTIVITIES

Peer Review Activities

Scientific Journals *Journal of Cell Science, Oncotaget, Journal of Biological Chemistry, Breast Cancer Research, Stem cell Research, FASEB Journal, Oncogene, International Journal of Cancer, PLOS One, Molecular cancer, Journal of Molecular Signaling, Molecualar Biology of the Cell.*
Funding Agencies Susan Komen Foundation, National Institutes of Health Study section (ECR), USC SPARC Graduate Fellowship Review committee, USC School of Medicine Research Development Funds

Professional Active Memberships

2014- present Member, American Association for Cancer Research
2014- present Member, American Society of Cell Biology

Departmental/University Services

2013Fall- McNairs Scholars Program Mentor

2013	SPARC Graduate Fellowship review committee
2013-	Departmental Safety Committee
2013-	USC Post-baccalaureate Research Education Program (PREP) Mentor
2014 fall-	Top Scholar Program Mentor
2015-	Women in Science network
2015Fall-	IBMS admissions committee
2015 Fall-	Stamps Scholar Program Mentor
2015, 2016-	Discovery Day Judge

TEACHING EXPERIENCE

(As a Graduate Student)

2000,2003	Teaching Assistant, BIOL 50, UNC Chapel Hill
2004	Teaching Assistant, Special Lab Course, MBL, Woodshole, Massachusetts

(Since Appointment at USC)

Chem 360	Dept. of Biochemistry
Chem D650	Medical Biochemistry (USC School of Medicine)
Chem D651	Medical Biochemistry (USC School of Medicine)
CHEM556/BIOL546	Biochemistry II

Research Courses

Chem 496,497,498,499	Undergraduate Research
Chem 898	Research in Chemistry II
Chem 899	Dissertation Preparation
Chem 790	Introduction to Research
Chem791	Introduction to Research

RESEARCH TRAINING RECORD

Postdoctoral Scholars:

Dr. Priyanaka Singh	12/14- ongoing
Dr. Arachana Varadaraj	06/14-5/16 (Current position: Tenure track Assistant Professor, Northern Arizona University)

Graduate Students/ Theses:

Laura Jenkins	2/14-

M.S. Theses

2014 Anusha Chaparala, Role of miR148/152 family in cancer progression (co-advisor with Michael Shtutman, DDBS)

2015 Tirthankar Bandyopadhyay. Defining the effects of GDF2 on TGF-β signaling in tumorigenic epithelial cells

2015 Anne Serrao. Cdk8 and Cdk19 as Novel Regulators of BMP4 Induced EMT in Cancer

Current Undergraduate Trainees at USC

1. Mariah Humphrey B.S. Candidate, Biochemistry University of South Carolina
2. Shreya Shah B.S. Candidate, Biochemistry University of South Carolina
3. Victoria Alers B.S. Candidate, Biochemistry University of South Carolina
4. Juliet Joseph B.S. Candidate, Biochemistry University of South Carolina

5. Haley Flores B.S. Candidate, Biochemistry University of South Carolina

Prior Undergraduate Trainees since at USC

Name	Date	Current Position
1. Ashley Wilson (SC)	B.S. Candidate 2016	Medical School, MUSC
2. Nicholas Lenze (SC)	B.S. Candidate 2016	Medical School, UNC
3. Caleb John Snider, (SC)	B.S. Candidate 2015	*Graduate student, Vanderbilt.*