

RAVI GOYAL, M.D., Ph.D.

Primary Appointment

- Assistant Professor of Basic Sciences
- Division of Pharmacology
- Center for Perinatal Biology

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Education

Institution and Location	Dates Attended	Degree (if applicable)	Conferred (mm/yyyy)	Field of Study
Armed Forces Medical College, Pune, India	1992-1996	MD	1996	Medicine / Surgery
Command Hospital, Southern Command, Pune, India	1997-1998	Internship		Medicine/ Surgery
Pramukhswami Medical College, Gujarat, India	1999-2001	Residency (M.D.)	2001	Internal Medicine
Pramukhswami Medical College, Gujarat, India	2002-2003	Fellow		Infectious Disease
The University of Mississippi, MS	2004-2007	Ph.D.	2007	Vascular Pharmacology
Loma Linda University, CA	2008-2009	Fellow		Perinatal Vascular Biology

Professional Certifications

June 2010	Flow Cytometry Training Course, Center for Health Disparities and Molecular Medicine, Loma Linda University, Loma Linda, CA
May 2010	Frontiers in Reproductive Sciences Marine Biology Laboratory, Woods Hole, MA
Jan 2010	Transgenic Technology: Methods and Application, BioTrac 12, NIH, Bethesda, MD
Oct 2009	Workshop: Next Generation Sequencing, University of California, Riverside, CA
July 2009	Microarray Data Analysis Course, Affymetrix University, Santa Clara, Ca Partek Genomic Suite Analysis Course, Affymetrix University Ingenuity Pathway Analysis Course, Affymetrix University

Professional Experience

2009-Present	Assistant Professor, Center for Perinatal Biology, Loma Linda University
2012 - Present	Chief Scientific Officer, Epigenuity LLC Loma Linda, CA
2008-2009	Research Associate, Center for Perinatal Biology, Loma Linda University, School of Medicine, Loma Linda, CA
2004-2008	Research Scientist, Department of Pharmacology, University of Mississippi, University, MS
2003-2004	Lecturer, Pramukhswami Medical College, Gujarat, India
2001-2003	Post-Doctoral Fellowship in Clinical Pharmacology, Pramukhswami Medical College, Gujarat, India
1998-2001	Medical Residency, Internal Medicine, Pramukhswami Medical College, Gujarat, India
1997-1998	Medical Internship, Internal Medicine, Command Hospital, Southern Command, Pune, India

Teaching Experience

Presently Teaching	BCHM 515: Introduction to Bioinformatics MICR 515: Bioinformatic/Genomics Loma Linda University
Fall 2007	Pharmacology 343, Biochemical Foundations of Therapeutics. University of Mississippi
2006	Pharmacology 342, Problem Based Learning, University of Mississippi
2004 - 2005	Pharmacology 341, Human Physiology and Pathophysiology, University of Mississippi

2003 - 2004	Basic and Clinical Pharmacology, Pramukhswami Medical College, India
2001-2003	Clinical Pharmacology & Therapeutics Evidence Based Medicine, Pramukhswami Medical College, Gujarat, India

Professional Affiliations

American Heart Association
 American Physiological Society
 American Society of Pharmacology and Experimental Therapeutics
 Society of Gynecologic Investigation
 Phi Kappa Phi honor society
 Sigma Xi
 Fetal and Neonatal Physiological Society
 Indian Medical Council

Honors & Awards

2011 - 2014 Grant Reviewer - Genetics and Epigenetic Study Section, AHA

2014	Judge, Poster Session, Loma Linda University Basic Science Symposium.
2012	Represented as a researcher from 41st Congressional District for AHA Research Saves Life Fly-In against NIH funding cuts at Capitol Hill, Washington DC.
2011	Judge, Poster Session, Society for Gynecologic Investigation Annual Meeting, Miami, FL
2010	Who's Who – Frontiers of Epigenomics
2010	Society for Gynecologic Investigation, Best New Investigator Poster Presentation Award
2010	Marine Biology Laboratory Scholarship
2007	Neuroscience Research Fellowship Award, University of Mississippi
2006	Travel Awards, (UM), Exp. Biol Conference, Washington DC
2006	Sigma Xi Pre-Doctoral Grant Award
2005	Summer Research Grant, Graduate Council, University of Mississippi
2005	Travel Award 2005, (UM), FASEB Summer Conference Snowmass – Colorado
2005	Best Poster Award (Health Sciences Section) Sigma Xi, MS
1992	National Talent Search Scholarship (NTSE), New Delhi, India

Research Students Mentored (Current and Past)

2013	Jonathan Prest, MD
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2012: Zachary Herzfeld
 Amy Eun Jang, MD
 Kenneth Young (Undergraduate Student)

2011: David Fisher (MD Student)
 Sharon Wiravan (MD Student)
 Tae Hun Kim (MD Student)
 Jonathan Van-Wickle (MD, PhD Student)

2010: Ross Harris (MD Student)
 Chau Van (MD Student)
 Julie Thompson (PhD Student)
 Nina Chu (PhD Student)

2009: Christine Wong (MD Student)
 Ellen Kim (MD Student)
 Jamie Tarouilly (MD Student)
 John Stewart (Undergraduate Student)
 Afiba Arthur Rebecca, MD (OB/GYN Resident)

2008: Andrew Galffy (MD student)
 Toni-Ann Wright (MD student)
 Amy Eun Jang (MD student)
 Arthur Leitzke (MD student)
 Stephnie Field (Undergraduate Student)
 Rolanda Lister, MD (OB/GYN Resident)

Editorial Boards

Associate Editor – Frontiers in Epigenomics (2010 – Present)
 Associate Editor – Biomed Central Journals (2010 – Present)
 Pharma Bulletin (2001-2002)

Reviewer:

PlosOne, American Journal of Physiology, Frontiers of Epigenomics, British Journal of Clinical Pharmacology, Canadian Journal of Physiology and Pharmacology, Biomed Central Journals, AHA Journals.

Meetings/Workshop (organized or chaired):

Feb 2004: Chaired a session in Second Annual Meeting of the Association of Physiologists and Pharmacologists of India

Feb 2003: Chaired a session in First Annual Meeting of the Association of Physiologists and Pharmacologists of India

August 2000: Workshop on Rational Drug Therapy – Organized

International Meeting Presentations:

April 2013: Experimental Biology, Boston, MA

August 2012: Gordon Research Conference, Brain Energy Metabolism and Blood Flow, Colby College, Waterville, ME

April 2012: Society for Gynecologic Investigation, San Diego, CA

March 2012: Experimental Biology, San Diego, CA

March 2010: Society for Gynecologic Investigation, Orlando, FL

Sept 2009: Fetal and Neonatal Physiological Society, Lake Arrowhead, CA

April 2009: Experimental Biology, New Orleans, LA

April 2008: Experimental Biology, Washington DC

June 2006: FASEB Summer Conference, Aspen, CO
 May 2005: American Association of Pharmaceutics Conference, Mississippi, MS
 March 2005: SigmaXi Conference at University of Mississippi, MS
 Feb 2004: XVIII Annual Conference of Indian Pharmacological Society, India
 Jan 2003: 17th Annual Conference of Indian Pharmacological Society, India
 Dec 2002: Symposium on Hospital Acquired Infections, India
 April 2002: CME on Neuroradiology, India
 Jan 2001: 22nd Annual Conference of Association of Physicians, India

Clinical Fellowship Dissertation Title: A Drug Utilization Study of Antibacterial in a Tertiary Care Teaching Hospital

PhD Dissertation Title: Maturational and Aging Related Changes in Calcium Homeostasis and Hypoxia induced Alterations in Serotonergic Contractility in Arterial Smooth Muscle

Published Book Chapters

1. Longo LD & **Goyal R**. The Stress of Chronic Hypoxia in Fetal Growth Restriction: Some Physiological Considerations. *Stress and Developmental Programming of Health and Disease: Beyond Phenomenology*. Nova Science Publishers. 2014 p. 131-168 https://www.novapublishers.com/catalog/product_info.php?products_id=51278
2. Longo LD & **Goyal R**. Fetal Stress and Growth Restriction at High Altitude. *Stress and Developmental Programming of Health and Disease: Beyond Phenomenology*. Nova Science Publishers. 2014 p. 169-238 https://www.novapublishers.com/catalog/product_info.php?products_id=51278
3. Longo LD, Zhang L, **Goyal R**. The Developing Brain: What is the Role of Antenatal Stress-Mediated Epigenetics? *Stress and Developmental Programming of Health and Disease: Beyond Phenomenology*. Nova Science Publishers. 2014 p. 239-340 https://www.novapublishers.com/catalog/product_info.php?products_id=51278
4. Longo LD, **Goyal R**. Maternal Stress-Mediated Gene Expression Changes in the Mouse Placenta: A Mosaic Hypothesis of Epigenesis. In: Croy A, Yamada AT, DeMayo FJ, Adamson SL, editors. *The Guide to Investigation of Mouse Pregnancy*. Academic Press; Elsevier Inc. 2014. p. 443–462. <http://www.sciencedirect.com/science/book/9780123944450#ancpt03>
5. Longo LD, Gheorghe CP, **Goyal R**. Dietary and Hypoxic Protocols That Alter Placental Gene Expression in Response to Maternal Stress. In: Croy A, Yamada AT, DeMayo FJ, Adamson SL, editors. *The Guide to Investigation of Mouse Pregnancy*. Academic Press; Elsevier Inc. 2014. p. 761–762. <http://www.sciencedirect.com/science/book/9780123944450#ancpt03>
6. Manual of Practical Pharmacology for Medical students, Department of Pharmacology, Pramukhswami Medical College, Karamsad, Gujarat, INDIA.
7. Question Bank of Multiple Choice for Medical Students, Department of Pharmacology, Pramukhswami Medical College, Karamsad, Gujarat, INDIA.

Published Manuscripts

1. **Goyal R**, Goyal D, Chu N, Van Wickle J, Longo LD. Cerebral Artery Alpha-1 AR Subtypes: High Altitude Long-Term Acclimatization Responses. *PLoS ONE*, 2014 9(11): e112784. PMID: 25393740
2. **Goyal R**, Longo LD (2014) Acclimatization to Long-Term Hypoxia: Gene Expression in Ovine Carotid Arteries. *Physiol Genomics*, 2014, 1;46(19):725-34. PMID: 25052263

3. **Goyal R**, Van Wickle J, Goyal D, Matei N, Longo LD. Antenatal maternal long-term hypoxia: acclimatization responses with altered gene expression in ovine fetal carotid arteries. *PlosOne*, 2013. PMID: 24367503
4. **Goyal R**, Wong C, Wickle, JV, Longo LD. Antenatal maternal protein deprivation: Sexually dimorphic programming of the pancreatic renin-angiotensin system. *J. Ren Ang Ald Sys*. 14:137-145, 2013. PMID: 22898440
5. **Goyal R** and Longo LD. Maternal Protein Deprivation: Sexually Dimorphic Programming of Hypertension in the Mouse. *Hypertension Res*. 36:29-35, 2013. PMID: 22932874
6. **Goyal R**, Zhang L, Blood AB, Baylink DJ, Longo LD, Oshiro B, Mata-Greenwood E. Characterization of an animal model of pregnancy-induced vitamin D deficiency due to metabolic gene dysregulation. *Am J of Physiol Endocrinol Metab*, 306:E256-66, 2014. PMID: 24326417
7. Longo LD and **Goyal R**. Cerebral Artery Signal Transduction Mechanisms: Developmental Changes in Dynamics and Ca²⁺ Sensitivity. *Current Vascular Pharmacology*, 2013 11(5): 655-711. PMID: 24063382
8. **Goyal R** and Longo LD. Gene Expression in Sheep Carotid Arteries: Major Changes with Maturational Development. *Pediatric Res*. 72:137-46, 2012. PMID: 22565503
9. Hartman RE, Kamper J, **Goyal R**, Stewart JM, Longo LD. Motor and Cognitive Deficits in Mice Bred to have Low or High Blood Pressure. *Physiology and Behavior*. 105:1092-1097, 2012. PMID: 22154805
10. **Goyal R**, Henderson DA, Chu, N, Longo LD. Ovine Middle Cerebral Artery Characterization and Quantification of Ultrastructure and Other Features: Changes with Development. *Am J Physiol Regul Integr Comp Physiol*. 302:R433-445, 2012. PMID: 22116510
11. **Goyal, R.**, Papamatheakis, D., Loftin, M., Vrancken, K., Dawson, A., Osman, N., Blood, AB, Pearce, W., Longo, L. & Wilson, S. (2011c) Long-Term Maternal Hypoxia: The Role of Extracellular Ca²⁺ Entry During Serotonin-Mediated Contractility in Fetal Ovine Pulmonary Arteries. *Reprod Sci*. 18:948-62, 2011. PMID: 21960509
12. Papamatheakis DG, Vemulakonda S, Blood Q, **Goyal R**, Rbalcava M, Vrancken K, Bennett A, Dawson A, Osman NJ, Blood AB, Pearce WJ, Longo LD, Wilson SM. Preservation of serotonin-mediated contractility in adult sheep pulmonary arteries following long-term high-altitude hypoxia. *High Alt Med Biol*. 12:253-64, 2011. PMID: 21962069
13. **Goyal R**, Lister R, Leitzke A, Goyal D, Gheorghe CP, Longo LD. Antenatal Maternal Hypoxic Stress: Adaptations of the Placental Renin-Angiotensin System in Mouse. *Placenta* 32:134-9, 2010. PMID: 21130492
14. **Goyal R**, Leitzke A, Goyal D, Gheorghe CP, Longo LD. Antenatal Maternal Hypoxic Stress: Adaptations in Fetal Lung Renin-Angiotensin System. *Reproductive Sci*. 18(2):180-189, 2011. PMID: 20978179
15. **Goyal R**, Mittal A, Chu N, Arthur RA, Zhang L, Longo LD. Maturation and Long-Term Hypoxia-Induced Acclimatization Responses in PKC-Mediated Signaling Pathways in Ovine Cerebral Arterial Contractility. *Am J Physiol*, 299:R1377-86, 2010. PMID: 20702800
16. **Goyal R**, Mittal A, Chu N, Zhang L, Longo LD. Alpha1-Adrenergic Receptor Subtype Function in Fetal and Adult Cerebral Arteries. *Am J Physiol*, 298:H1797-806, 2010. PMID: 20348219
17. **Goyal R**, Yellon S, Longo LD, Greenwood EM, Placental gene expression in a rat 'model' of placental insufficiency. *Placenta*, 31:568-575, 2010. 20621762

18. Gheorghe CP, **Goyal R**, Mittal AS, and Longo LD. Gene expression in the placenta: Maternal stress and epigenetic responses. *Intl J Devel Biol*, 54:507-523, 2010. PMID: 19876832
19. **Goyal R**, Goyal D, Leitzke A, Longo L.D. Brain renin-angiotensin system: Fetal epigenetic programming by maternal low protein diet. *Reprod Sci*, 17:227-238, 2010. PMID: 19923380
20. **Goyal R**, Galffy A, Fields, SA, Mittal A, Longo LD. Maternal protein deprivation-mediated alterations in systemic renin-angiotensin system in fetal mice. *Reprod Sci*, 16:894-904, 2009. PMID: 19516079
21. **Goyal R**, Angermann JE, Ostrovskaya O, Buchholz JN, Smith GD, Wilson, SM. Enhanced capacitative calcium entry and sarcoplasmic-reticulum calcium storage capacity with advanced age in murine mesenteric arterial smooth muscle cells. *Exp Gerontol* 44:201-207, 2009. PMID: 19017540
22. Gheorghe CP, **Goyal R**, Holweger JK, and Longo LD. Placental gene expression responses to maternal protein restriction in the mouse. *Placenta*, 30(5):411-7, 2009.
23. **Goyal R**, Mittal A, Chu N, Zhang L, Longo LD. Maturation and role of PKC-mediated contractility in ovine cerebral arteries *Am J Physiol*, 294:H2242-52, 2009. PMID: 19749163
24. **Goyal R**, Creel KD, Chavis EJ, Smith GD, Longo LD and Wilson SM. Maturation of intracellular calcium homeostasis in sheep pulmonary arterial smooth muscle cells. *Am J Physiol Lung Cell Mol Physiol* 295:L905-L914, 2008. PMID: 18776056
25. Ostrovskaya O, **Goyal R**, Osman N, McAllister CE, Pessah IN, Hume JR and Wilson SM. Inhibition of ryanodine receptors by 4-(2-aminopropyl)-3,5-dichloro-N,N-ethylaniline (FLA 365) in canine pulmonary arterial smooth muscle cells. *J Pharmacol Exp Ther* 323:381-390, 2007. PMID: 17640951
26. **Goyal R**, Desai SV. The Aminopenicillins: Ampicillin and amoxicillin. *Pharma Bulletin* 4:25, 2003.
27. **Goyal R**, Desai SV, Lakhani JD. A survey of the use of essential drugs by physicians. *Bulletin of Society of Rational Drug Therapy* 14:2, 2003.
28. Desai SV, **Goyal R**. Surgical prophylaxis in a tertiary care teaching hospital. *Pharma Bulletin* 2:12, 2002.

Published Abstracts

1. Goyal R, Nathanael Matei, and Longo LD. Gene expression in adult ovine carotid arteries. *Faseb J*. 27:1189.12, 2013.
2. Goyal R, Christine Wong, and Longo LD. Antenatal Maternal Protein Deprivation and Sexually Dimorphic Programming of the Pancreatic Renin-Angiotensin System. *Faseb J*. 26:686.9, 2012.
3. Goyal R, Leitzke A, Goyal D, Longo LD. Antenatal Protein Deprivation in the Mouse: Epigenetic Changes and Developmental Origin of Hypertension in Adult *FASEB J*. 24:982.15, 2010.
4. Goyal R, Leitzke A, Goyal D, Gheorghe CP, and Longo LD. Antenatal Maternal Hypoxic Stress: Epigenetic Adaptations in Fetal Lung Renin-Angiotensin System. *FASEB J*. 24:1023.13, 2010.
5. Goyal R, Chu N, Goyal D, Longo LD. Organ Culture: Effect on Fetal and Adult Cerebral Arterial Contractility *FASEB J*. 24:985.11, 2010
6. Stewart JM, Goyal R, Longo LD. Alterations to the Liver RAS in Antenatal Induced MLPD Systemic Hypertension *FASEB J*. 24:786, 2010.
7. Stewart JM, Kamper J, Hartman RE, Goyal R, and Longo LD. Hyperactivity and Associated

- Memory Deficit in Hyper- and Hypo-tensive Mice. *FASEB J.* 24:786.7, 2010.
8. Chu N, Goyal R, Goyal D, Longo LD. Maturation and Differential Role of PKC Isoforms in Adrenergic, Serotonergic, and Phorbol Ester–Mediated Cerebral Artery Contractility. *FASEB J.* 24:620.8, 2010.
 9. Goyal R, Vemulakonda S, Mittal A, Loftin M, Vranken K, Nguyen D, Webster M, Blood AB, Pearce WJ, Longo LD, and Wilson SM. Maternal chronic hypoxic stress influences the role of extracellular Ca²⁺ influx to serotonin-mediated contractility of pulmonary arteries from fetal sheep. 2009.
 10. Goyal R, Mittal A, Nguyen D, Loftin M, Derrick A, Pearce WJ, Longo LD, and Wilson SM. Roles of PKC, RhoA and ERK signaling to serotonergic contractility of pulmonary arteries from chronic hypoxic fetal and adult sheep. 2009.
 11. Goyal R, Vemulakonda S, Mittal A, Loftin M, Vranken K, Nguyen D, Blood AB, Pearce WJ, Longo LD, and Wilson SM. Chronic hypoxia influences the role of extracellular Ca²⁺ influx during serotonin-mediated contractility of pulmonary arteries from adult sheep. *FASEB J.* 23:619.6, 2009.
 12. McCrate B, Webster M, Osman N, Nguyen D, Goyal R, Pearce WJ, Longo LD, and Wilson SM. Changes in pulmonary arterial smooth muscle structure with maturation and chronic hypoxia in sheep. *FASEB J.* 2009.
 13. Mittal A, Goyal R, Wedhas N, Shi L, and Longo LD. Differential role of alpha-adrenergic receptor subtypes in Ca²⁺-dependent and Ca²⁺-independent contraction in developing cerebral arteries. *FASEB J.* 23:613.23, 2009.
 14. Mittal A, Goyal R, Wedhas N, Shi L, and Longo LD. Role of ERK1/2 and Rho A/Rho kinase in PKC-induced contractions in ovine cerebral arteries: A developmental study. *FASEB J.* 23:613.26, 2009.
 15. Goyal R, Mittal A, Wedhas N, Shi L, and Longo LD. High altitude acclimatization responses in cerebral artery PKC-dependent signaling pathway proteins: Changes with development. *FASEB J.* 23:616.14, 2009.
 16. Goyal R, Leitzke A, Goyal D, and Longo LD. Maternal low protein diet: Developmental origin of adult hypertension. *FASEB J.* 23:776.6, 2009.
 17. Goyal R, Creel KD, Chavis E, Smith GD, Longo LD and Wilson SM. Effects of maturation on intracellular Ca²⁺ homeostasis in ovine pulmonary arterial smooth muscle cells. *FASEB J* 22: 1150, 2008.
 18. Goyal R, Loftin M, Derrick A, Nguyen D, Pearce WJ, Longo LD and Wilson SM. 5-HT_{2A} receptor mediated contractility of Ovine pulmonary arteries: Effects of maturation and chronic hypoxia. *FASEB J* 22: 1150, 2008.
 19. Goyal R, Loftin M, Derrick A, Pearce WJ, Longo LD and Wilson SM. Role of calcium to serotonergic mediated contractility in ovine pulmonary arteries: effects of maturation and chronic hypoxia. *FASEB J* 22: 1150, 2008.
 20. Goyal R, Nguyen D, Loftin M, Derrick A, Pearce WJ, Longo LD and Wilson SM. Contributions of PKC, RhoA and ERK signaling to serotonergic contractility of pulmonary arteries from chronic hypoxic fetal and adult sheep. *FASEB J* 22: 1150, 2008.
 21. Goyal R, Nguyen D, Pearce WJ, Longo LD and Wilson SM. Role of reverse-mode sodium-calcium exchange to serotonergic contractility in pulmonary arteries of hypoxic sheep. *FASEB J* 22: 1150, 2008.
 22. Nguyen D, Goyal R, Derrick A, Loftin M, Osman NJ, Pearce WJ, Longo LD and Wilson SM. Acetylcholine receptor-mediated contractility of ovine pulmonary arteries: Changes with maturation and chronic hypoxia. *FASEB J* 22: 1150, 2008.
 23. Osman NJ, Goyal R, Pearce WJ, Longo LD and Wilson SM. Serotonin mediated Ca²⁺ events are reduced in pulmonary arterial myocytes of chronic hypoxic fetal sheep. *FASEB J* 22: 1149, 2008.
 24. Goyal R, Goyal D, Leitzke A, Mittal A, Longo LD. Maternal Protein Deprivation Mediated changes in Brain Renin-Angiotensin System. The 11th Annual Research Symposium, Loma Linda University, Loma Linda, CA, 2008.

25. Goyal R, Pearce WJ, Longo LD and Wilson SM. Chronic hypoxia and the influence of maturation on serotonergic contractility in Ovine pulmonary arteries. FASEB J 21: A1339-A133a, 2007.
26. Goyal R., Longo, LD., Pearce, W.J. Wilson, SM. (2007, August). Ca²⁺ independent regulation of pulmonary arterial tone in CH fetal and adult. Poster presented at: National Center for Natural Products Research, University of Mississippi, University, MS.
27. Goyal, R. Pearce, WJ. Longo, LD. Wilson, SM. (2007, August). Ca²⁺ regulation of pulmonary arterial tone & changes with CH and maturation.. Poster presented at: National Center for Natural Products Research, University of Mississippi, USA; University, MS.
28. Goyal R, Pearce, WJ. Longo, LD. Wilson, SM. (2007, March). Chronic hypoxia and influence of maturation on serotonergic signaling in Ovine pulmonary arteries. Poster presented at: Sigma Xi; University, MS.
29. Goyal R, Wilson S.M. (2006, April). Development of a fluorescent assay to screen natural products modulating ca²⁺-permeable transient receptor potential channels. Poster presented at: Natural Products Neuroscience Fellows Program, University of Mississippi; University, MS.
30. Goyal R, Creel, K. Chavis, E. Longo, LD. Wilson, SM. (2006, June). Developmental regulation of serotonin signaling in chronic hypoxic Ovine pulmonary arterial myocytes. Poster presented at: FASEB, SUMMER CONFERENCE; Aspen, CO.
31. Goyal, R. Creel, K. Longo, LD, Wilson, SM. (2006, Nov) Maturation of serotonergic signaling in ovine pulmonary arteries.
32. Goyal R. Creel, K. Chavis, E. Longo, LD, Wilson, SM. (2006, April). Maturation of calcium signaling in ovine pulmonary arterial smooth muscle cells. Poster presented at: SigmaXi; Univeristy, MS.
33. Goyal R, Creel KD, Chavis E, Longo LD and Wilson SM. Maturation of Ca²⁺ signaling in Ovine pulmonary arterial myocytes. FASEB J 20: A1289-A128d, 2006.
34. Goyal R. Ostrovskaya, O. McAllister, C. Pessah, IN. Hume, JR. Wilson, SM. (2005, May). FLA 365 as an inhibitor of ryanodine but not IP₃ receptors in arterial smooth muscle. Poster presented at: American Association of Pharmaceutics; University, MS.
35. Goyal, R. Ostrovskaya, O. McAllister, CE. Pessah, IN. Hume, JR. Wilson, SM. (2005, March). FLA 365 as an inhibitor of ryanodine but not IP₃ receptors in arterial smooth muscle. Poster presented at: SigmaXi; University, MS.
36. Goyal R, Desai, S.V. (2003, January). Surgical Prophylaxis versus therapeutic use of antibacterials in a tertiary care teaching hospital. Poster presented at: Indian Pharmacological Society; Kherva, Gujarat, India.
37. Goyal R, Lakhani, JD. Desai, SV. (2001, January). A survey of the use of essential drugs by Physicians. Poster presented at: Association of Physicians, Gujarat; Karamsad, Gujarat, India.

Manuscripts in preparation/in review

- **Goyal R**, Wickle JV, Goyal D, Longo LD. Antenatal maternal low protein diet: ACE-2 in the mouse lung and sexually dimorphic programming of hypertension. BMC Cardiovascular, In review.
- **Goyal R**, Dobyns A, Carpenter, LG, Oshiro A, Yellon, SM. Microarray and pathway analysis of macrophage-related gene expression profiles in the prepartum rat cervix. In preparation.
- **Goyal R**, Goyal D, Leitzke A, Longo LD. Micro-RNA 27 and developmental programming of hypertension. In preparation.
- **Goyal R**, Longo, LD. Differential role of PKC isoforms in agonist-induced contractility in ovine cerebral arteries and effects of maturation.
- **Goyal R**, Longo LD. Molecular adaptations in the signal transduction pathways with organ culture in ovine cerebral arteries.

Invited Research Presentation (oral):

1. Nutrition During Pregnancy and Heart Disease. American Heart Association, Riverside, CA. August, 2010
2. Developmental Origins of Adult Health and Disease, Jerry L. Pettis Memorial Veterans Affairs Medical Center. July, 2010
3. Antenatal Protein Malnutrition in the Mouse: Epigenetic Changes and Developmental Origin of Hypertension in Adult. Frontiers in Reproduction, 13th Annual Symposium, Woods Hole, MA, June, 2010
4. Antenatal Protein Malnutrition in the Mouse: Epigenetic Changes and Developmental Origin of Hypertension in Adult. 36th Annual Meeting of Fetal and Neonatal Physiological Society, Sept, 2009, Lake Arrowhead, CA
5. Differential Role of A1-Adrenergic Receptor Subtypes in Developing Cerebral Arteries. 36th Annual Meeting of Fetal and Neonatal Physiological Society, Sept, 2009, Lake Arrowhead, CA
6. Antenatal Stress and Developmental Origins of Disease: Epigenetic Mechanisms and their Consequences, Obstetrics and Gynecology Grand Rounds, May, 2009. Loma Linda University, Loma Linda, Ca
7. Chronic Hypoxia and the influence of maturation on serotonergic contractility in ovine pulmonary arteries. Experimental Biology Conference, Washington, DC 2006.
8. Serotonergic contractility in ovine pulmonary arteries. 27th Southern Experimental Pharmacological Society Meeting, Nov, 2006, University of Mississippi, MS.
9. Surgical prophylaxis versus therapeutic use of antibacterial in a tertiary care teaching hospital. Indian Pharmacological Society; Kherva, Gujarat, India, January 2003.
10. A survey of the use of essential drugs by physicians. Association of Physicians, Gujarat, Karamsad, India, January 2001.

Research Support

Active/Current Support

1 R21 HD081283-01 (Goyal) 07/10/2014-07/09/2016

Role of LincRNA in Developmental Regulation of Angiogenesis

Role: PI

Link: [http://projectreporter.nih.gov/project_info_description.cfm?](http://projectreporter.nih.gov/project_info_description.cfm?aid=8768569&icde=22527956&ddparam=&ddvalue=&ddsub=&cr=1&csb=default&cs=ASC)

[aid=8768569&icde=22527956&ddparam=&ddvalue=&ddsub=&cr=1&csb=default&cs=ASC](http://projectreporter.nih.gov/project_info_description.cfm?aid=8768569&icde=22527956&ddparam=&ddvalue=&ddsub=&cr=1&csb=default&cs=ASC)

1 PO1 HD31226-16 (Longo) 08/01/10-07/31/15

NIH/NICHD

Fetal and Adult Cerebrovascular Contractile Responses to Long-Term Hypoxia

Role: Co-investigator

Link: [http://projectreporter.nih.gov/project_info_description.cfm?](http://projectreporter.nih.gov/project_info_description.cfm?aid=8704963&icde=22527970&ddparam=&ddvalue=&ddsub=&cr=2&csb=default&cs=ASC)

[aid=8704963&icde=22527970&ddparam=&ddvalue=&ddsub=&cr=2&csb=default&cs=ASC](http://projectreporter.nih.gov/project_info_description.cfm?aid=8704963&icde=22527970&ddparam=&ddvalue=&ddsub=&cr=2&csb=default&cs=ASC)

5 R01 HD03807-39 (Longo)

04/01/11-03/31/15

NIH/NICHD

Cerebral Artery Alpha1 Adrenergic and PKC Regulatory Mechanisms

Role - Co-investigator

Link: [http://projectreporter.nih.gov/project_info_description.cfm?](http://projectreporter.nih.gov/project_info_description.cfm?aid=8606474&icde=22527970&ddparam=&ddvalue=&ddsub=&cr=1&csb=default&cs=ASC)

[aid=8606474&icde=22527970&ddparam=&ddvalue=&ddsub=&cr=1&csb=default&cs=ASC](http://projectreporter.nih.gov/project_info_description.cfm?aid=8606474&icde=22527970&ddparam=&ddvalue=&ddsub=&cr=1&csb=default&cs=ASC)

Pending

1R01HL126778-01A1 (PI - Goyal) 2015-2020
NIH/NHLBI
RAF KINASE AND EPIGENETIC REGULATION OF FETAL VASCULAR DEVELOPMENT

PPG (PI- Zhang) 2015-2020
NIH/NICHHD
Fetal and Adult Cerebral Artery Alpha 1 (α_1 -AR) -Adrenergic Receptor Subtypes: Epigenetic Mechanisms of Acclimatization Responses to Long-Term Hypoxia
Role: Sub Project PI

Completed/Past Support

Grants to Promote Collaborative and Translational Research (PI - Goyal) 2012-2013
Title: Identification and Functional Analysis for Regenerative Potential of Very Small Embryonic-Like Stem Cells in Sheep
The major goal of this project is to develop sheep as a model of VSEL identification and analyze their differentiation ability in different organs and with developmental maturation.
Role: PI
Status – Completed

Sigma Xi Grant in Aid (PI - Goyal) 2006
Title: Developmental regulation of Serotonin Signaling in Ovine Pulmonary Arteries.
Role PI
Status - Completed

Natural Product Neuroscience Fellowship (PI - Goyal) 2006
Title: Development of a Fluorescent Assay to Screen Natural Products Modulating Calcium Permeable Transient Receptor Potential Channels.
Role PI
Status - Completed

Summer Research Grant, GC, University of Mississippi (PI - Goyal) 2005
Title: Chronic Hypoxia and developmental regulation of pulmonary arterial contractility.
Role PI
Status - Completed.