

CURRICULUM VITAE

Wuqiang Zhu, MD, PhD

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VISA STATUS: United States permanent resident

RESEARCH INTEREST

1. Myocardial regeneration:
 - 1) Regulation of cardiomyocyte cell cycle activity
 - 2) Activation of the cardiogenic fate of cardiac progenitor cells
2. Molecular dissection of anthracycline-induced cardiotoxicity
3. Alternative RNA splicing and cardiac hypertrophy
4. Regulation of cardiac function by septin GTPase

RESEARCH EXPERTISE

Mouse: surgery (myocardial infarction, trans-aortic constriction, et al); echocardiography

Cell biology: isolation and primary culture of fetal and neonatal cardiomyocytes, ckit+ or sca1+ progenitor cells from mouse hearts, mesenchymal cells from mouse bone; injection of cells into myocardial infarct area; isolation of mitochondria and nuclear fraction from mouse heart and liver

Histology: cryosection; paraffin section; immunohistochemistry; immunocytology; confocal microscopy

Molecular biology: DNA isolation and purification; PCR; gene cloning and sub-cloning; generation of adenovirus vectors for gene delivery; western blot; immunoprecipitation; ELISA; flow cytometry

EDUCATION/DEGREE

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| 1990-1995 | MB (Bachelor of Medicine) degree in Clinical Medicine, Hubei Medical University, China |
| 1997-2002 | MD (Doctor of Medicine) degree in Internal Medicine-Cardiology, Tongji Medical College, Huazhong University of Science and Technology, China. Mentors: Lingsheng Cao, MD; Qiutang Zeng, MD, PhD |
| 2002-2007 | PhD degree in Cellular and Integrative Physiology, Indiana University School of Medicine, Indianapolis. Mentor: Loren J. Field, PhD |

WORKING EXPERIENCE

1995-1997	Resident in Internal Medicine, the 3 rd Hospital of Wuhan City, China
1997-2002	Fellow in General Cardiology and Interventional Cardiology, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China
2007-2008	Postdoctoral fellow , Feinberg Cardiovascular Research Institute, Northwestern University Feinberg School of Medicine. Mentor: Gangjian Qin, MD
2008-2014	Research associate , Riley Heart Research Center, Indiana University School of Medicine. Mentor: Loren J. Field, PhD
2014-Present	Research associate , Lillehei Heart Institute, Division of Cardiology, University of Minnesota. Mentor: Jop van Berlo, MD, PhD

AWARD

1991	Academic Excellence Award, Hubei Medical University
1995	Excellent Clinical Clerkship Award, Hubei Medical University
1998	Academic Excellence Award, Tongji Medical College, Huazhong University of Science and Technology
2002	Honored Graduate Student Award, Division of Cardiology, Department of Medicine, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology
2002	University Fellowship, Indiana University
2006	Travel Award, Indiana University School of Medicine Graduate Student Organization
2011	Travel Award, American Heart Association Scientific Session
2013	Postdoctoral Scientist Award (Runner-up), American Society for Pharmacology & Experimental Therapeutics
2013	Platform Presentation Award (Finalist), American Association of Anatomists
2013	Travel Award, American Association of Anatomists
2013	Caroline tum Suden/Frances Hellebrandt Professional Opportunity Award, American Physiology Society
2015	Postdoctoral Scientist Award (Runner-up), American Society for Pharmacology & Experimental Therapeutics
2015	Platform Presentation Award (Finalist- among the six top ranked abstract in the postdoctoral category), American Association of Anatomists

2015 Travel Award, American Association of Anatomists

RESEARCH GRANT

2011-2013 Molecular dissection of acute vs. chronic DOX-induced cardiotoxicity, American Cancer Society Postdoctoral Fellowship (121101), \$102,000

MEMBERSHIP

2005-Present	American Physiology Society
2008-Present	American Heart Association
2011-Present	American Association for Cancer Research
2012-Present	American Association of Anatomists
2012-Present	American Society for Pharmacology & Experimental Therapeutics
2005-2010	Sigma Xi Association

VOLUNTEER ACTIVITY

2011-Present	Manuscript reviewer for PLoS ONE, Cardiovascular Research
2013-2016	Member of American Physiology Society Cardiovascular Section Trainee Committee

TEACHING ACTIVITY

1995-1997	Medical students in the 3 rd Hospital of Wuhan City
2000-2002	Medical students and residents in Union Hospital, Tongji Medical College of Huazhong University of Science and Technology
2007	Medical Physiology (F613), Indiana University School of Medicine, Course director: Dr. George A. Tanner
2008	Hyojin Kim (rotating Ph.D. student at Dr. Field lab, Indiana University)
2011	Joshua Lee Dilley (summer intern, Indiana University)
2013	Marc Lynch (exchange student from University of Ulster)
2014	Ingrid Binder (lab technician at Dr. van Berlo lab, University of Minnesota)

CONFERENCE AND PRESENTATION

1. The 47th Annual Meeting of the Midwest Society for Pediatric Research. Indianapolis, IN. 2006.
Oral presentation. Title: Myocardial expression of mutant p53 protects against doxorubicin-induced cardiomyocyte apoptosis and preserves heart function

2. American Heart Association Scientific Session. Chicago, IL. 2006. **Oral presentation.** Title: Cardiac expression of a mutant p53 protects against doxorubicin-induced cardiomyocyte apoptosis and preserves heart function
3. The 14th Annual Weinstein Conference on Cardiovascular Development. Indianapolis, IN. 2007. Poster presentation. Title: Myocardial expression of mutant p53 protects against doxorubicin-induced cardiomyocyte apoptosis and preserves heart function
4. Riley Heart Center Symposium on Cardiac Development. Indianapolis, IN. 2008
5. Riley Heart Center Symposium on Cardiac Development. Indianapolis, IN. 2009
6. American Heart Association Scientific Session. Chicago, IL. 2010. Poster presentation. Title: Cardiomyocyte-restricted inhibition of p53 activity exacerbates late stage doxorubicin cardiotoxicity in a juvenile mouse model
7. Riley Heart Center Symposium on Cardiac Development. Indianapolis, IN. 2010
8. The 34th Annual Midwest Pediatric Cardiology Society Scientific Session. Indianapolis, IN. 2010. **Oral presentation.** Title: Cardiomyocyte-restricted inhibition of p53 activity exacerbates late stage doxorubicin cardiotoxicity in a juvenile mouse model
9. Riley Heart Center Symposium on Cardiac Development. Indianapolis, IN. 2011
10. American Heart Association Scientific Session. Orlando, FL. 2011. **Oral presentation.** Title: The pivotal role of p53 in doxorubicin-induced acute versus chronic cardiotoxicity
11. American Association for Cancer Research Annual Meeting. Chicago, IL. 2012. Poster presentation. Title: The pivotal role of p53 in doxorubicin-induced acute versus chronic cardiotoxicity
12. American Association for Cancer Research Annual Meeting. Washington DC. 2013. Poster presentation. Title: Cyclin D2- mediated cardiomyocyte cell cycle activity reverses doxorubicin-induced cardiotoxicity
13. Experimental Biology Meeting. Boston, MA. 2013. Poster presentation. Title: The pivotal role of p53 in doxorubicin-induced acute versus chronic cardiotoxicity
14. Experimental Biology Meeting. Boston, MA. 2013. Poster presentation. Title: Cyclin D2- mediated cardiomyocyte cell cycle activity reverses doxorubicin-induced cardiotoxicity
15. Experimental Biology Meeting. Boston, MA. 2015. Poster presentation. Title: Activation of cardiogenic fate of c-kit⁺ cardiac progenitor cells in doxorubicin induced cardiotoxicity
16. Experimental Biology Meeting. Boston, MA. 2015. Poster presentation. Title: Heart specific deletion of RNA binding protein rbox1 sensitizes mice to pressure overload induced cardiac dysfunction

PEER-REVIEWED ARTICLE

1. Hanying Chen, Weidong Yong, Shuxun Ren, Weihua Shen, Yongzheng He, Karen A. Cox, **Wuqiang Zhu**, Wei Li, Mark Soonpaa, R. Mark Payne, Diego Franco, Loren J. Field, Vicki Rosen, Yibin Wang, Weinian Shou. Overexpression of bone morphogenetic protein 10 in myocardium disrupts cardiac postnatal hypertrophic growth. **Journal of Biological Chemistry**. 2006. 281(37):27481-91
2. Joshua D. Dowell, Shih-Chong Tsai, Dora C. Dias-Santagata, Hidehiro Nakajima, Zhuo Wang, **Wuqiang Zhu**, Loren J. Field. Expression of a mutant p193/CUL7 molecule confers resistance to MG132- and etoposide-induced apoptosis independent of p53 or Parc binding. **Biochimica et Biophysica Acta**. 2007. 1773 (3):358-66
3. **Wuqiang Zhu**, Weinian Shou, R. Mark Payne, Randall L. Caldwell, Loren J. Field. A mouse model for juvenile doxorubicin-induced cardiac dysfunction. **Pediatric Research**. 2008. 64(5):488-94
4. Xinsong Xu, Antonio Sarikas, Dora C. Dias-Santagata, Georgia Dolios, Pascal J. Lafontant, Shih-Chong Tsai, **Wuqiang Zhu**, Hidehiro Nakajima, Hisako O. Nakajima, Loren J. Field, Rong Wang, Zhen-Qiang Pan. The CUL7 E3 ubiquitin ligase targets insulin receptor substrate 1 for ubiquitin-dependent degradation. **Molecular Cell**. 2008. 30(4):403-414
5. Wei-Hua Shen, Zhuang Chen, Shu Shi, Hanying Chen, **Wuqiang Zhu**, Anne Penner, David W. Boyle, Loren J. Field, Robert Abraham, Edward A. Liechty, Weinian Shou. Cardiac restricted overexpression of kinase-dead mammalian target of rapamycin (mTOR) mutant impairs the mTOR-mediated signaling and cardiac function. **Journal of Biological Chemistry**. 2008. 283(20):13842-13849
6. **Wuqiang Zhu**, Rutger J. Hassink, Michael Rubart, Loren J. Field. Cell cycle-based strategies to drive myocardial repair. **Pediatric Cardiology**. 2009. 30(5):710-715
7. **Wuqiang Zhu**, Hanying Chen, Weihua Shen, R. Mark Payne, Edward A. Liechty, Randall L. Caldwell, Weinian Shou, Loren J. Field. Acute doxorubicin cardiotoxicity results from p53-induced inhibition of the mTOR pathway. **Circulation**. 2009. 119(1):99-106
8. Yao Liang Tang, **Wuqiang Zhu**, Min Cheng, Leping Shen, Keping Qian, M. Ian Phillips, Douglas W. Losordo, Gangjian Qin. Hypoxic preconditioning enhances the homing of cardiac progenitor cells to infarct myocardium through CXCR4. **Circulation Research**. 2009;104(10):1209-1216
9. Qian Chen, Hanying Chen, Dawei Zheng, Chenzhong Kuang, Hong Fang, Bingyu Zou, **Wuqiang Zhu**, Guixue Bu, Ting Jin, Zhenzhen Wang, Xin Zhang, Ju Chen, Loren J. Field, Michael Rubart, Weinian Shou, Yan Chen. Smad7 is required for the development and function of heart. **Journal of Biological Chemistry**. 2009. 284(1):292-300

10. Karl Toischer, Adam G. Rokita, Bernhard Unsöld, **Wuqiang Zhu**, Samuel Sossalla S, Sean Reuter, Alexander Becker, Nils Teucher, Tim Seidler, Cornelia Grebe, Lena Preuß, Shamindra N. Gupta, Kathie Schmidt, Stephan E. Lehnart, Ralph Knöll, Katrin Schäfer, Loren J. Field, Lars S. Maier, Gerd Hasenfuss. Differential cardiac remodeling in preload versus afterload. **Circulation**. 2010. 122(10):993-1003 (**Circulation's Best Paper Award for Basic Science, 2010**)
11. Deqiang Li, Mark Hallett, **Wuqiang Zhu**, Ying Liu, Zhengyun Yang, Hanying Chen, Michael Rubart, Rebecca Chan, Loren J. Field, Simon Atkinson, Weinian Shou. Dishevelled associated activator of morphogenesis 1 (Daam1) is required for heart morphogenesis. **Development**. 2011. 138(2):303-315
12. Deqiang Li, Ying Liu, Mitsunori Maruyama, **Wuqiang Zhu**, Hanying Chen, Wenjun Zhang, Sean Reuter, Shien-Fong Lin, Laura Haneline, Loren J. Field, Peng-Sheng Chen, Weinian Shou. Restrictive loss of Plakoglobin in murine cardiomyocytes leads to Arrhythmogenic Right Ventricular Cardiomyopathy. **Human Molecular Genetics**. 2011. 20(23):4582-4596
13. Mitsunori Maruyama, Baiyan Li, Hanying Chen, Xuehong Xu, **Wuqiang Zhu**, Weidong Yong, Longsheng Song, Guixue Bu, Loren J. Field, Michael Rubart, Peng-Sheng Chen, Weinian Shou. FKBP12 is a critical regulator of the heart rhythm and the cardiac voltage-gated sodium current in mice. **Circulation Research**. 2011. 108(9):1042-1052
14. Marc-Michael Zaruba, **Wuqiang Zhu**, Mark Soonpaa, Sean Reuter, Wolfgang-Michael Franz, Loren J. Field. G-CSF treatment and DPP-IV/CD26 inhibition augments myocardial regeneration in mice with targeted expression of cyclin D2 in adult cardiomyocytes. **European Heart Journal**. 2012. 33(1):129-137
15. Yong Wang, Wenjun Zhang, Hanying Chen, **Wuqiang Zhu**, Yunlong Liu, Gregory Randall Wagner, R. Mark Payne, Loren J. Field, Hongbo Xin, Weinian Shou. Tbx20 is a downstream mediator for Bmp10 signaling in regulating ventricular wall development and function. **Journal of Biology Chemistry**. 2011. 286(42):36820-36829
16. Eue-Keun Choi, Po-Cheng Chang, Young-Soo Lee, Shien-Fong Lin, **Wuqiang Zhu**, Mitsunori Maruyama, Michael C. Fishbein, Zhenhui Chen, Michael Rubart-von der Lohe, Loren J. Field, Peng-Sheng Chen. Triggered firing and atrial fibrillation in transgenic mice with selective atrial fibrosis induced by overexpression of TGF- β 1. **Circulation Journal**. 2012. 76(6):1354-1362
17. Hanying Chen, Wenjun Zhang, Xiaoxin Sun, Momoko Yoshimoto, Zhuang Chen, **Wuqiang Zhu**, Jijia Liu, Yadan Shen, Weidong Yong, Deqiang Li, Jin Zhang, Yang Lin, Nathan J. VanDusen, Paige Snider, Robert J. Schwartz, Simon J. Conway, Loren J. Field, Mervin C. Yoder, Anthony B. Firulli, Nadia Carlesso, Jeffrey A. Towbin and Weinian Shou. FKBP12 controls ventricular

myocardium trabeculation and compaction via regulating endocardial Notch1 activity.

Development. 2013. 140(9):1946-1957

18. **Wuqiang Zhu**, Wenjun Zhang, Weinian Shou, Loren J. Field. p53 inhibition exacerbates late stage anthracycline cardiotoxicity. **Cardiovascular Research.** 2014. 103(1):81-89
19. Karl Toischer*, **Wuqiang Zhu***, Mark Hunlich, Sean Reuter, Gerd Hasenfuss, Loren J. Field. Cardiomyocyte proliferation enhances survival and cardiac function during chronic pressure overload. 2014. **Submitted** (*Equal contribution)
20. **Wuqiang Zhu**, Wenjun Zhang, Gregory Wagner, R. Mark Payne, Lei Wei, Randall L. Caldwell, Weinian Shou, Loren J. Field. Cyclin D2- mediated cardiomyocyte cell cycle activity reverses doxorubicin-induced cardiotoxicity. 2015. **Manuscript in preparation**
21. **Wuqiang Zhu**, Ingrid Bender, Thomas Nickel, Jop van Berlo. Activation of cardiogenic fate of ckit+ cardiac progenitor cells in doxorubicin-induced cardiotoxicity. 2015. **Manuscript in preparation**

ABSTRACT

1. **Wuqiang Zhu**, Loren J. Field. Myocardial expression of mutant p53 protects against doxorubicin-induced cardiomyocyte apoptosis and preserves heart function. **Pediatric Research.** 2006. 60(4):493
2. **Wuqiang Zhu**, Pascal J. Lafontant, Loren J. Field. Cardiac expression of a mutant p53 protects against doxorubicin-induced cardiomyocyte apoptosis and preserves heart function. **Circulation.** 2006. 114(II):48
3. Min Cheng, Junan Zhou, **Wuqiang Zhu**, Toshikazu Tanaka, Qiutang Zeng, Raj Kishore, Douglas Losordo, Gangjian Qin. CXCR4-mediated bone marrow stem cell homing and niche maintenance is modulated by the functional status of c-kit. **Circulation.** 2008. 118:S412-S413
4. Yao Liang Tang, **Wuqiang Zhu**, Min Cheng, John Zhang, M. Ian Phillips, Gangjian Qin. Transplantation of hypoxia-preconditioned cardiac stem cells improves infarcted heart function via CXCR4 upregulation and improved survival of implanted cells. **Circulation.** 2008. 118:S280
5. **Wuqiang Zhu**, Sean Reuter, Wenjun Zhang, Ronald M Payne, Lei Wei, Randall L. Caldwell, Weinian Shou, Loren J. Field. Cardiomyocyte-restricted inhibition of p53 activity exacerbates late stage doxorubicin cardiotoxicity in a juvenile mouse model. **Circulation.** 2010. 122:A16959
6. **Wuqiang Zhu**, Sean Reuter, Wenjun Zhang, Gregory R Wagner, Alexander Becker, Ronald M Payne, Lei Wei, Randall L. Caldwell, Weinian Shou, Loren J. Field. The pivotal role of p53 in doxorubicin-induced acute versus chronic cardiotoxicity. **Circulation.** 2011. 124:A16127
7. **Wuqiang Zhu**, Mark H Soonpaa, Wenjun Zhang, Weinian Shou, Ronald M Payne, Loren J. Field.

Cyclin D2-mediated cardiomyocyte cell cycle activity reverses doxorubicin-induced cardiotoxicity.
FASEB Journal. 2013. 27:1105.26