

BIOGRAPHICAL SKETCH

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NAME		POSITION TITLE	
Manfred Boehm, M.D.		Investigator, NHLBI	
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
University Heidelberg	M.D.	1986-1993	Medicine
Franz-Volhard-Hospital Berlin	Resident	1994-1996	Internal Medicine
Max-Delbrueck Center Berlin	Fellow	1996-1997	Vascular biology
University of Michigan, Ann Arbor	Fellow	1997-1999	Vascular biology
NIH/NHLBI Bethesda	Fellow	1999-2003	Vascular biology

Professional Training/Appointments

2003-present Investigator (tenure track), Translational Medicine Branch, NHLBI

Honors and Awards

2010 NHLBI Star Award for Excellence in Laboratory Basic and Clinical Research
 2002 FAES Award for Research Excellence. National Institutes of Health
 1998 Dieter Klaus Foerderpreis der Liga zur Bekämpfung von Bluthochdruck
 1998 NAVBO Travel award
 1998 Student Award at the Xth International Vascular Biology Meeting in Cairns,
 1995 MSD Sharp & Dohme Prize for Hypertension Research

Grant Review Activities:

2009 Challenge Grant (RC1), NIH
 2009 Development -2 Study section, NIH/CSR, Ad hoc Member
 2010 Cardiovascular Differentiation and Development Study Section, NIH/CSR, Spring meeting, Ad hoc Member
 2010 NiPSC program award, NIH Intramural Program
 2010 European Research Council, Ad hoc Member
 2010 Cardiovascular Differentiation and Development Study Section, NIH/CSR, Fall meeting, Ad hoc Member

B. Selected peer-reviewed publications (in chronological order).

1. Kaling M, **Boehm M**: Quantitative PCR and digital Autoradiography: *Biotec* 1992, 6: 38-42.
2. Bader M, Zhao Y, Sander M, Lee M, Bachmann J, **Boehm M**, Djavidani B, Peters J, Mullins JJ, Ganten D: Role of tissue renin in the pathophysiology of hypertension in TGR(mREN2)27 rats. *Hypertension* 1992, 19:681-686.
3. Lee MA, Paul M, **Boehm M**, Ganten D: Effects of angiotensin-converting enzyme inhibitors on tissue renin-angiotensin system. *Am J Cardiol* 1992, 70:12C-19C.
4. Lemmer B, Mattes A, **Boehm M**, Ganten D: Circadian blood pressure variation in transgenic hypertensive rats. *Hypertension* 1993, 22:97-101.
5. Lee MA, **Boehm M**, Paul M, Ganten D: Tissue renin-angiotensin system, The role in cardiovascular disease. *Circulation* 1993, 87: IV7-IV13.

6. Lee M, **Boehm M**, Kim S, Bachmann S, Bachmann J, Bader M, Ganten D: Differential gene expression of renin and angiotensinogen in the TGR(mREN-2)27 transgenic rat. *Hypertension* 1995, 25:570-580.
7. **Boehm M**, Lee M, Kreutz R, Kim S, Schinke M, Djavidani B, Wagner J, Kaling M, Wiene W, Bader M, Ganten D: Angiotensin II receptor blockade in TGR(mREN2)27; Effects on renin-angiotensin-system gene expression and cardiovascular functions. *J Hypertens* 1995, 13: 891-899.
8. Langheinrich M, Lee MA, **Boehm M**, Pinto YM, Ganten D, Paul M: The hypertensive REN-2 transgenic rat TGR(mREN2)27 in hypertension research – Characteristics and functional aspects. *Am. J. Hypertens* 1996, 9:506-512.
9. Schinke M, **Boehm M**, Bricca G, Ganten D, Bader M: Permanent inhibition of angiotensinogen synthesis by antisense-RNA expression. *Hypertension* 1996, 27: 508-513.
10. Lee M, **Boehm M**, Paul M, Bader M, Ganten U, Ganten D: Physiological characterization of the hypertensive transgenic rat TGR(mREN2)27 carrying the murin ren-2 gene: *Am.J.Physiol* 1996, 270(6PT 1):E919-E929.
11. **Boehm M**, Lippold A, Wiene W, Ganten D, Bader M: Reduction of cardiac hypertrophy in TGR(mREN2)27 by angiotensin II receptor blockade. *Mol Cell. Biochem* 1996, 163/164: 217-221.
12. Bricca G., Schinke M., **Boehm M.**, Hof H., Ganten D., Bader M., Brain angiotensins in the cardiovascular regulation: Usefulness of transgenic animals. *Fundamental & Clinical Pharmacology* 1997, 11, S53-S57.
13. Schinke M*, Baltatu O*, **Boehm M***, Peters J, Rascher W, Bricca G, Lippold A, Ganten D, Bader M: Blood pressure reduction and Diabetes insipidus in transgenic rats deficient in brain angiotensinogen. *Proc Natl Acad Sci* 1999, 96/7, 3975-3980 *equally contributed to the work.
14. **Boehm M**. Schinke M. [The "Dieter Klaus Price for Hypertension Research 1999". Central angiotensin II is important for blood pressure regulation]. [German] *Fortschritte der Medizin* 1999. 117(8):47-8.
15. Tanner F, **Boehm M**, Akyürek L.M, San H, Yang Z, Tashiro J, Nabel G.J, Nabel E.G. Differential Effects of the Cyclin-Dependent Kinase Inhibitors p27Kip1, p21Cip1, and p16Ink4 on Vascular Smooth Muscle Cell Proliferation. *Circulation* 2000, 101, 2022-2025.
16. Monti J., Schinke M., **Boehm M.**, Ganten D., Bader M., Bricca G. Glial angiotensinogen regulates brain angiotensin II receptors in transgenic rats TGR(ASrAOGEN). *American Journal of Physiology*. 2001, 280(1): R233-R240.
17. **Boehm M.**, Nabel E.G. Cell cycle and Cell Migration: New Pieces to the Puzzle. *Circulation*. 2001, 103: 2879-2881.
18. Duckers H.J., **Boehm M.**, True A.L., Yet S-F, San H., Park J.L., Webb C., Lee M-E, Nabel G.J., Nabel E.J. Heme oxygenase-1 protects against vascular constriction and proliferation. *Nature Med*. 2001, 7(6), 693-698.
19. **Boehm M.**, Nabel E.G. The cell cycle regulatory network, a promising target for antiproliferative therapy in cardiovascular diseases. *The Circulation Frontier* 2001, 5(3), 26-343.
20. **Boehm M.**, Yoshimoto T., Nallamshetty S., True A.G., Crook M.F., Nabel G.J., Nabel E.G. A growth factor-dependent nuclear kinase phosphorylates p27Kip1 and regulates cell cycle progression. *EMBO*. 2002, 21(13) 3390-3401.
21. Engel F., Hauck L., **Boehm M.**, Nabel E.G., Dietz R., vonHarsdorf R. P21Cip1 Control Proliferating Cell Nuclear Antigen Level in Adult Cardiomyocytes. *Mol Cell Biol* 2003 23(2) 555-565.
22. Li R. Faria TN. **Boehm M**. Nabel EG. Gudas LJ. Retinoic acid causes cell growth arrest and an increase in p27 in F9 wild type but not in F9 retinoic acid receptor beta2 knockout cells. *Experimental Cell Research* 2004. 294(1) 290-300.
23. **Boehm M.**, True A.G., Olive M., Crook M., San H., Qu X., Nabel E.G. Bone marrow-derived immune cells regulate vascular disease through a p27kip1-dependent mechanism. *Journal of Clinical Investigation* 2004, 114, 419-426.
24. Nallamshetty S., Crook M., **Boehm M.**, Yoshimoto T., Olive M., Nabel E.G. The cell cycle regulator p27^{Kip1} interacts with MCM7, a DNA replication licensing factor, to inhibit initiation of DNA replication. *FEBS Letter* 2005, 6529-6536.
25. Ganesh L., Yoshimoto T., Moorthy N.C., Akahata W., **Boehm M.**, Nabel E.G., Nabel G.J. Protein Methyltransferase 2 Inhibits NF- κ B Function and Promotes Apoptosis. *Mol. Cell. Biol*. 2006 26: 3864-3874

Applicant Name (Last, first, middle):

26. Matoba S., Kang J-G., Patino W.D., Wragg A., **Boehm M.**, Gavrilova O., Hurley P.J., Bunz F., Hwang P.M. p53 Regulates Mitochondrial Respiration. *Science* 2006 312: 1608-1677
27. Yoshimoto T., **Boehm M.**, Olive M., Crook M.F., San H., Langenickel T., Nabel E.G. The arginine methyltransferase PRMT2 binds RB and regulates E2F function. *Experimental Cell Research* 2006. 312(11):2040-53
28. Quasnichka H, Slater S.C., Beeching C.A., **Boehm M.**, Graciela B. Sala-Newby G.B., and George S.J. Regulation of Smooth Muscle Cell Proliferation by β -Catenin/T-Cell Factor Signaling Involves Modulation of Cyclin D1 and p21 Expression. *Circ Res* 2006 99: 1329 – 1337
29. Hsu L-Y., Wragg A., Anderson, S., Balaban, R.S., **Boehm, M.**, Arai, A.E. Automatic Assessment of Dynamic Contrast-Enhanced MRI in an Ischemic Rat Hind-Limb Model: An Exploratory Study of Transplanted Multi-Potent Progenitor Cells. *NMR Biomed.*

30. True, A.L., Olive, M., **Boehm, M.**, San, H., Westrick, R.J., Raghavachari N., Xu, X., Lynn, E.G., Sack, M.N., Munson, P.J., Gladwin, M.T., Nabel, E.G. Heme Oxygenase-1 deficiency accelerates formation of arterial thrombosis through oxidative damage to the endothelium, which is rescued by inhaled carbon monoxide *Circ Res* 2007; 101: 893-901
31. 12. Crook, M.F., Xue, H-H., Olive, M., **Boehm, M.**, Leonard W.J., Nabel, E.G. GA-Binding Protein regulates KIS gene expression and cell cycle progression. *FASEB Journal* 2008, 22: 225-235.
32. Olive M., Mellad J.A., Beltran L.E., Ma, M., Cimato T., Noguchi A.C., Hong San H., Childs R., Kovacic J.C., **Boehm M.** p21^{Cip1} modulates arterial wound repair through the SDF-1/CXCR4 axis. *Journal of Clinical Investigation* 2008, 118: 2050-2061.
33. Wragg A., Mellad J.A., Beltran L.E., San H., Konoplyannikov M., Boozer S., Deans R.J., Mathur A., Lederman R., Kovacic J.C., **Boehm M.** VEGFR1/ CXCR4 positive progenitor cells modulate local inflammation and augment tissue perfusion by a SDF-1 dependent mechanism. *Journal of Molecular Medicine* 2008, 86:1221-1232.
34. Kovacic J.C. Moore J. Herbert A. Ma D. **Boehm M.** Graham R.M. Endothelial progenitor cells, angioblasts, and angiogenesis--old terms reconsidered from a current perspective. *Trends in Cardiovascular Medicine.* 2008 18(2):45-51
35. Kovacic J.C., **Boehm M.** Resident vascular progenitor cells: An emerging role for non-terminally differentiated vessel-resident cells in vascular biology *Stem Cell Research*, 2009, 2, 2-15.
36. Schieke S.M., Ma, M., Cao, L., McCoy J.P., Liu C., Hensel N.F., Barrett A.J., **Boehm M.**, Finkel T. Mitochondrial metabolism modulates differentiation and teratoma formation capacity in mouse embryonic stem cells *J. Biol. Chem.* 2008, 283(42): 28506-28512.
37. Langenickel T.H., Olive M., **Boehm M.**, San H., Crook M.F., Elizabeth G. Nabel E.G. KIS protects against adverse vascular remodeling by stathmin-mediated inhibition of vascular smooth muscle cell migration. *Journal of Clinical Investigation* 2008, 118(12), 3848-3859.
38. Cimato T., Beers J., Ding S., Ma M., McCoy P. **Boehm M.**, Nabel E.G. Neuropilin-1 Identifies Endothelial Precursors in Human and Murine Embryonic Stem Cells Before CD34 Expression. *Circulation* 2009; 119, 2170-2178.
39. Economopoulou M., Langer H.F., Celeste A., Orlova V.V., Choi E.Y., Ma M., Vassilopoulos A., Callen E., Deng C., Bassing C.H., **Boehm M.**, Nussenzweig A., Chavakis T. Histone H2AX is integral to hypoxia-driven neovascularization. *Nature Med.* 2009; 15(5), 553-558
40. Kovacic J.C., Gupta R., Lee A.C., Ma M., Fang F., Tolbert C.N., Beltran L.E., San H., Chen G., **Boehm M.** STAT3-dependent acute upregulation of RANTES expression in vascular smooth muscle cells modulates inflammation following vascular injury. *Journal of Clinical Investigation* 2010, 120(1), 303-314
41. Akyürek L.M., **Boehm M.**, Olive M., Zhou A.X., San H., Nabel E.G. Deficiency of cyclin-dependent kinase inhibitors p21Cip1 and p27Kip1 accelerates atherogenesis in apolipoprotein E-deficient mice. *Biochemical and Biophysical Research Communications* 2010, (396), 359-363.
42. Ma M., Ding S., Lundqvist A., San H., Fang F., Konoplyannikov M., Berry C., Beltran L., Chen G., Kovacic J.C. **Boehm M.** Major Histocompatibility Complex-I Expression on Embryonic Stem Cell-Derived Vascular Progenitor Cells Is Critical for Syngeneic Transplant Survival, *Stem Cells* 2010, 28(9), 1465-1475.
43. Collins M.T., **Boehm M.** ANKH Necessarily So. *J Clin Endocrinol Metab* 2011 96: 72-74

Applicant Name (Last, first, middle):

44. Cuttica M.J., Langenickel T., Noguchi A., Machado R., Gladwin M., **Boehm M.** Perivascular T Cell Infiltration leads to sustained pulmonary artery remodeling after endothelial cell damage. *American Journal of Respiratory Cell and Molecular Biology*, in press, available online.
45. St. Hilaire C., Ziegler S.G., Markello T., Brusco A., Groden C., Gil F., Carlson-Donohoe H., Lederman R.L., Chen M.Y., Yang D., Siegenthaler M.P., Arduino C., Mancini C., Freudenthal B., Stanescu H.C., Zdebik A.A., Chaganti R.K., Nussbaum R., Kleta R., Gahl W.G., **Boehm M.**, *NT5E* Mutations and Arterial Calcifications. *New England Journal of Medicine*, 2011; 364: 432-42
46. Markello T., Pak L.K., Cynthia St. Hilaire C., Ziegler S., Chen M.Y., Chaganti K., Nussbaum R., **Boehm M.**, Gahl W. A. Vascular pathology of medial arterial calcifications in *NT5E* deficiency: Implications for the role of adenosine in pseudoxanthoma elasticum. *Molecular Genetics and Metabolism*, in press, available online