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Education

B.A. 1991	Grinnell College, Grinnell, Iowa (majors in Biology and Philosophy)
Ph.D. 1998	Stanford University School of Medicine, Graduate Program in Developmental Biology

Positions

1989-1991	Undergraduate Research Assistant - focusing on protein distribution and patterns of glycoprotein synthesis during chick lens induction in Charles Sullivan's laboratory (Grinnell College).
1992-1998	Graduate Research Assistant - in mammalian developmental genetics focusing on molecular mechanisms that pattern the vertebrate skeleton and limb in David Kingsley's laboratory (Stanford University).
1998-2002	Postdoctoral Fellow - molecular control of growth and morphogenesis in the prostate during development and during the progression of cancer in Gerald Cunha's laboratory (University of California San Francisco).
2002 - 2007	Assistant Professor, Department of Genetics, Cell Biology, and Development at the University of Minnesota
2002 - 2007	Associate Director, Mouse Genetics Laboratory, University of Minnesota Cancer Center
2007- 2010	Assistant Professor, Division of Pharmaceutical Sciences, School of Pharmacy, University of Wisconsin-Madison
2010 - present	Associate Professor, Division of Pharmaceutical Sciences, School of Pharmacy, University of Wisconsin-Madison
2011 - present	Vice Chair, Division of Pharmaceutical Sciences, School of Pharmacy, University of Wisconsin-Madison

Publications:

1. Kingsley DM, Bland AE, Grubber JM, Marker PC, Russell LB, Copeland NG, Jenkins NA. The mouse *short ear* skeletal morphogenesis locus is associated with defects in a bone morphogenetic member of the TGF beta superfamily. *Cell*, 1992, 71: 399-410.

2. King JA; Marker PC; Seung KJ; Kingsley DM. BMP5 and the molecular, skeletal, and soft-tissue alterations in short ear mice. *Developmental Biology*, 1994, 166:112-22.

3. Marker PC; King JA; Copeland NG; Jenkins NA; Kingsley DM. Chromosomal localization, embryonic expression, and imprinting tests for *Bmp7* on distal mouse chromosome 2. *Genomics*, 1995, 28:576-80.

4. King JA, Storm EE, Marker PC, Dileone RJ, Kingsley DM. The role of BMPs and GDFs in development of region-specific skeletal structures. *Annals of the New York Academy of Sciences*, 1996, 785: 70-79

5. Marker PC, Seung K, Bland AE, Russell LB, and Kingsley DM. Spectrum of *Bmp5* mutations from germline mutagenesis experiments in mice. *Genetics*, 1997, 145: 435-443

6. Sullivan CH, Marker PC, Thorn JM, Brown JD. Reliability of delta-crystallin as a marker for studies of chick lens induction. *Differentiation*, 1998, 64: 1-9.

7. [Clark RM, Marker PC]*, Kingsley DM. A novel candidate gene for mouse and human preaxial polydactyly with altered expression in limbs of *hemimelic extra-toes* mutant mice. *Genomics*, 2000, 67: 19-27. *equal contribution with first author

8. Marker PC, Stephan JP, Lee J, Bald L, Mather JP, Cunha GR. *fucosyltransferase1* and H-type complex carbohydrates modulate epithelial cell proliferation during prostatic branching morphogenesis. *Developmental Biology*, 2001, 233: 95-108.

9. Settle S, Marker P, Gurley K, Sinha A, Thacker A, Wang Y, Higgins K, Cunha G, and Kingsley DM. The BMP family member GDF7 is required for seminal vesicle growth, branching morphogenesis, and cytodifferentiation. *Developmental Biology*, 2001, 234: 138-150

10. Clark RM, Marker PC, Roessler E, Dutra A, Schimenti JC, Muenke M, and Kingsley DM. Reciprocal mouse and human limb phenotypes caused by gain- and loss-of-function mutations affecting *Lmbr1*. *Genetics,* 2001, 159: 715-726

11. Cunha, GR, Donjacour, AA, Hayward, SW, Thomson, AA, Marker, PC, Abate-Shen, C, Shen, M and Dahiya, R Cellular and Molecular Biology of Prostatic Development. In *Prostate Cancer: Principles and Practice* (ed. P.W. Kantoff, P. Carroll, and A. D'Amico). Lippincott, Williams and Wilkins, Philadelphia. 2002, p. 16-28

12. Cunha, GR, Donjacour, AA, Hayward, SW, Grossfeld, GD, Thomson, AA, Marker, PC and Dahiya, R Role of stroma. *Atlas of Clinical Oncology: Prostate Cancer*. P.R. Carroll and G. D. Grossfeld, eds. BC. Decker, Inc.: London, p. 60-67, 2002

13. Cunha, G. R., Donjacour, A. A., Hayward, S. W., Thomson, A. A., Marker, P. C., Abate-Shen, C., Shen, M., Dahiya, R. Development and Differentiation of the Prostate Gland. In: Prostate Cancer: Scientific and Clinical Aspects. Bridging the Gap. Abel, P. D., Lalani, E-N. (eds.), Imperial College Press, London, 2003

14. Marker, P.C., Donjacour, A.A., Dahiya, R. and Cunha, G.R., Hormonal, cellular, and molecular control of prostatic development, *Developmental Biology*, 2003, 253: 165-174

15. Marker PC, Dahiya R, Cunha GR. Spontaneous mutation in mice provides new insight into the genetic mechanisms that pattern the seminal vesicles and prostate gland, *Developmental Dynamics*, 2003, 226: 643-653

16. Freestone SH, Marker PC, Grace OC, Tomlinson DC, Cunha GR, Harnden P, and Thomson AA, Sonic hedgehog regulates prostatic growth and epithelial differentiation, *Developmental Biology*, 2003, 264:352-362

17. Cunha GR, Ricke WA, Thomson A, Marker PC, Risbridger G, Hayward SW, Wang YZ, Donjacour A, and Kurita T, Hormonal, Cellular, and Molecular Regulation of Normal and Neoplastic Prostatic Development. *Journal of Steroid Biochemistry and Molecular Biology*, 2004, 92: 221-236.

18. Thomson A.A. and Marker P.C., Branching Morphogenesis of the Prostate. In: Branching Morphogenesis, Davies, J. (editor), Landies Bioscience, Georgetown TX, p. 171-180, 2005.

19. Joesting MS, Perrin S, Elenbaas B, Fawell SE, Rubin JS, Franco OE, Hayward SW, Cunha GR, and Marker PC, Identification of *SFRP1* as a candidate mediator of stromal-to-epithelial signaling in prostate cancer, *Cancer Research,* 2005, 65:10423-10430

20. Thomson AA and Marker PC, Branching morphogenesis in the prostate gland and seminal vesicles, *Differentiation,* 2006, 74: 382-392

21. Marker PC, Urologic Oncology Survey, *Urologic Oncology: Seminars and Original Investigations*, 2007, 25: 277-280

22. Thielen JL, Volzing KG, Collier LS, Green LE, Largaespada DA, and Marker PC, Markers of prostate region-specific epithelial identity define anatomical locations in the mouse prostate that are molecularly similar to human prostate cancers, *Differentiation,* 2007, 75: 49-61

23. Lange CA, Gioeli D, Hammes SR, Marker PC, Integration of Rapid Signaling Events with Steroid Hormone Receptor Action in Breast and Prostate Cancer, *Annual Review of Physiology,* 2007, 69: 17.1-17.29

24. Kuslak SL, Thielen JL, and Marker PC, The mouse seminal vesicle shape mutation is allelic with *Fgfr2*, *Development*, 2007, 134: 557-565

25. Kuslak SL and Marker PC, Fibroblast growth factor receptor signaling through MEK-ERK is required for prostate bud induction, *Differentiation,* 2007, 75: 638-651

26. Joesting MS, Cheever TR, Volzing KG, Yamaguchi T, Wolf V, Naf D, Rubin JS, and Marker PC, *Secreted frizzled related protein 1* is a paracrine modulator of epithelial branching morphogenesis, proliferation, and secretory gene expression in the prostate, *Developmental Biology*, 2008, 317: 161-173

27. Ho AM, Marker PC, Peng H, Kingsley DM, and Huard J, Dominant negative *Bmp5* mutation reveals a key role of BMPs in skeletal response to mechanical stimulation*, BMC Developmental Biology*, 2008, 8:35

28. Thomson AA, Cunha GR, Marker PC, Prostate development and pathogenesis, 2008, *Differentiation*, 76:559-64

29. Marker PC, Does prostate cancer co-opt the developmental program? 2008, *Differentiation*, 76:736-44

30. Rahrmann EP*, Collier LS*, Knutson TP, Doyal ME, Kuslak SL, Green LE, Malinowski RL, Roethe L, Akagi K, Waknitz M, Huang W, Largaespada DA, and Marker PC, Identification of *PDE4D* as a proliferation promoting factor in prostate cancer using a *Sleeping Beauty* transposon based somatic mutagenesis screen, *Cancer Research*, 2009, 69:4388-97, *equal contribution

31. Buresh RA, Kuslak SL, Rusch MA, Vezina CM, Selleck SB, and Marker PC, Sulfatase 1 is an inhibitor of ductal morphogenesis with sexually dimorphic expression in the urogenital sinus, *Endocrinology,* 2010, 151(7):3420-31

32. Nicholson TM, Ricke EA, Marker PC, Miano JM, Mayer RD, Timms BG, vom Saal FS, Wood RW, Ricke WA, Testosterone and 17ß estradiol induce glandular prostatic growth, bladder outlet obstruction, and voiding dysfunction in male mice, *Endocrinology*, 2012, 153(11):5556-5565

33. Keil KP, Mehta V, Branham AM, Abler LL, Buresh RA, Joshi PS, Schmitz CT, Marker PC, Vezina CM, Wnt inhibitory factor 1 (Wif1) is regulated by androgens and enhances androgen-dependent prostate development, *Endocrinology*, 2012, available online ahead of print October 18.

34. Buresh-Stiemke RA, Malinowskia RL, Keil KP, Vezina CM, Oosterhofc A, van Kuppevelt TH, and Marker PC, Distinct expression patterns of Sulf1 and Hs6st1 spatially regulate heparan sulfate sulfation during prostate development, *Developmental Dynamics*, 2012, 241: 2005-2013

35. Powers GP and Marker PC, Recent advances in prostate development and links to prostatic diseases, *WIREs Systems Biology and Medicine*, Published Online: Jan 17 2013 ahead of print.

Research Support

Completed Research Projects

Grant 3353-9225-04, Minnesota Medical Foundation
Title: Genetic Analysis of a Candidate Prostate Tumor Suppressor Region in Mice
Principal Investigator: Paul C Marker
Total direct costs: $15,000
09/01/2003-08/31/2004

The major goal of this project was to identify the gene mutated in *seminal vesicle shape* mice.

Grant IRG-58-001-43-IRG50, American Cancer Society Institutional Research Grant
Title: Stromal Genes in Prostate Cancer Progression
Principal investigator: Paul C Marker
Total direct costs: $20,000
01/01/04-12/31/04

The major goal of this project was to investigate the role of *secreted frizzled related protein 1* in prostatic development and cancer progression.

Grant award W81XWH-04-1-053 (proposal PC030537), Department of Defense Congressionally Mandated Research Program
Title: Chromosome Engineering of a Candidate Prostate Tumor Suppressor Region
Principal Investigator: Paul C Marker
Total direct costs: $75,000
01/19/2004-02/18/2005

The major goal of this project was to create new deletions in a candidate prostate tumor suppressor region on mouse chromosome 7.

Grant 1 R21 DK069662-01, NIH/NIDDK
Title: Identification of prostate-specific regulatory elements

Principal Investigator: Paul C Marker
Total direct costs: $200,000
09/29/2004-09/28/2006

The major goal of this project was to identify new prostate-specific regulatory elements with new expression domains including epithelial region-specific promoters and stromal-specific promoters.

Brainstorm Award, University of Minnesota Comprehensive Cancer Center
Title: Fgfr2 alternative splicing in prostate cancer progression
Principal Investigators: Paul C Marker and Kenneth Koenemann
Total direct costs: $50,000
06/01/2005-05/31/2007

The major goals of this project are to investigate human prostate cancers for changes in alternative splicing of the *Fgfr2* transcript, and to functionally test the alternative transcript isoforms for activity in prostatic cells.

Grant award W81XWH-05-1-053 (proposal PC050617), Department of Defense Congressionally Mandated Research Program
Title: Prostate cancer gene discovery using transposon-mediated mutagenesis
Principal Investigator: Paul C Marker
Total direct costs: $375,000
09/01/2005-08/31/2008

The major goals of this project are to develop a new mouse model for prostate cancer using the *Sleeping Beauty* transposon system, and to use the model to discover new prostatic oncogenes and tumor suppressors.

P30 CA77598-08, NIH/NCI
Cancer Center Support Grant
Principal Investigator: John Kersey
Co-Investigator: Paul C Marker
06/01/98-05/31/08

This grant provides Cancer Center infrastructure support for the University of Minnesota Cancer Center, of which John Kersey is the Director.

Grant 5 P30 CA014520-36 NIH/NCI
Title: UWCCC Cancer Center Support Grant
Principal Investigator: Wilding, G
Co-Investigator: Paul C Marker
04/01/2008-03/31/2011

This grant provides Cancer Center infrastructure support for the University of Wisconsin Carbone Cancer Center, of which George Wilding is the Director.

Grant 1R01 AG024278, NIH/NIA
Title: Genetic Analysis of a Prostate Tumor Suppressor Region
Principal Investigator: Paul C. Marker
Annual direct costs: $205,000
Total direct costs: $1,025,000
02/01/06-01/31/11*

*competing renewal awarded as 2R01DK091193-06

Current Research Projects

Grant 2R01DK091193-06 (formerly AG024278) NIH/NIDDK 09/01/11-07/31/16
Title: Steroid hormones and SFRP1 in the age-related incidence of BPH and BOO

The major goals of this project are to investigate the roles of SFRP1 and other developmental regulators in BPH and related urologic diseases.
Role: PI

Grant 1R01 CA140217-01A1, NIH/NCI 03/01/10-12/31/14
Novel prostate cancer oncogenes identified by transposon mutagenesis

The major goals of this project are to investigate PDE4D and other candidate cancer genes identified through transposon mutagenesis for their roles in prostate cancer.
Role: PI