

# Rebecca A. Deaton, PhD

SENIOR SCIENTIST

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## PROFESSIONAL SUMMARY

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Accomplished Senior Scientist with over 7 years of experience leading cutting-edge academic research demonstrated by 10 peer-reviewed publications since 2021. Specialized in animal models of atherosclerosis and cardiovascular disease, with a focus on innovating models that better replicate the advanced clinical stages of human atherosclerotic disease to improve translation of basic science discoveries into clinical practice. With a PhD in Biomedical Science, I am dedicated to advancing the University of Virginia's mission by fostering excellence in research, teaching and collaboration while mentoring and training the next generation of scientists.

## WORK EXPERIENCE

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### Senior Scientist

University of Virginia | Charlottesville, VA | From May 2022 – Present

- PI: Gary K. Owens, PhD
- Responsible for lab management and oversight of postdoctoral fellows, graduate students and undergraduate student projects with direct report to the Principal Investigator (through December 2023)
- Published a highly impactful scientific report validating our autosomal smooth muscle cell (SMC)-specific Cre-driver, *Myh11*-CreER<sup>T2</sup>-RAD which was deposited to Jackson Laboratories and has become the gold standard SMC-Cre driver for studying SMC in vascular biology
- Published a highly impactful scientific study validating our mouse model of coronary atherosclerosis, plaque rupture, myocardial infarction and stroke which better replicates human atherosclerotic disease compared to the traditionally used *ApoE* and *Ldlr* KO mice
- Collaborated as part of a research alliance with AstraZeneca to test novel therapeutics in our new mouse model of coronary atherosclerosis
- Initiated the development and validation of a novel dual SMC and endothelial cell (EC) lineage tracing mouse which will allow simultaneous tracking and analysis of both cell types therefore reducing the number of research animals needed while collecting valuable information
- Initiated new research to understand how irradiation therapy exacerbates atherosclerotic disease (a known complication in cancer survivors)

### Research Scientist

University of Virginia | Charlottesville, VA | From February 2018 – To May 2022

- PI: Gary K. Owens, PhD
- Responsible for lab management and oversight of postdoctoral fellows and graduate student projects with direct report to the Principal Investigator
- Maintained a large colony of research laboratory mice for all laboratory projects as an essential employee during the COVID-19 pandemic
- Initiated a research project to develop a new autosomal SMC-specific Cre-driver, *Myh11*-CreER<sup>T2</sup>-RAD to address the need for a mouse model that permitted SMC-specific lineage tracing and gene knockout in both sexes (previous models was Y-linked and thus only male mice could be studied)

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- Initiated the development and validation of a new mouse model of coronary atherosclerosis the lack of which has been a long standing limitation in the atherosclerosis field
- Techniques used include mouse dissection of vessels including aorta, brachiocephalic and carotid arteries, histological staining and analysis (MOVAT, Picrosirius Red, Ter-119, and Immunofluorescence), Flow Cytometry and sorting, smooth muscle cell culture, PCR and qPCR, genotyping and animal breeding and husbandry.

## Postdoctoral Fellow

University of Virginia | Charlottesville, VA | From August 2004 – To July 2007

- PI: Gary K. Owens, PhD
- Highly productive fellowship resulting in one first author manuscript and two co-author manuscripts
- Awarded a position on the NIH NHLBI Training Grant 5T32HL0084-30 through the Robert M. Berne Cardiovascular Research Center
- Awarded an American Heart Association Mid-Atlantic Affiliate Postdoctoral Fellowship Grant
- Research projects examined the signal transduction pathways regulating the expression of KLF4 in phenotypically modulated vascular smooth muscle cells (SMC)
- Determined the role of KLF4 in PDGF-BB-induced repression of multiple SMC marker genes
- Determined whether the transcription factor Sp1 is involved in increasing expression of KLF4 in phenotypically modulated SMCs
- Techniques used include promoter-reporter assays, siRNA knockdown, western blot, real time RT-PCR, ChIP and in vivo ChIP assays

## EDUCATION

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### Doctor of Philosophy

University of North Texas Health Science Center | Fort Worth, TX | Biomedical Science | August 1998 – May 2004

- PI: Stephen R. Grant, PhD
- Examined molecular mechanisms through which transforming growth factor-beta1 (TGF-beta1) induces differentiation of smooth muscle cells (SMC)
- Determined the effects of TGF-beta1 on cultured SMC by examining changes in actin organization, proliferation, and SMC marker gene expression
- Determined that TGF-beta1 activated RhoA and PKN in SMCs and that RhoA and PKN activity were required for TGF-beta1 effects on SMC differentiation
- Determined that effects of TGF-beta1 and PKN on SMC differentiation required p38 MAP kinase activation
- Techniques used include immunocytochemistry, promoter-reporter and enhancer-reporter assays, RT-PCR, siRNA knockdown and western blot

### Bachelor of Science

Indiana University | Bloomington, IN | Biology | August 1993 – To May 1997

- PI: Stefan J. Surzycki, PhD
- Examined the possible presence of transposable elements in *Chlamydomonas reinhardtii*

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## GRANTS AND FUNDING

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### American Heart Association Mid-Atlantic Affiliate Postdoctoral Fellowship Grant | 2007

- AHA Award number 07538U
- Role: *Principal Investigator (Postdoctoral Fellowship)*

### NIH NHLBI Basic Cardiovascular Training Grant Award | 2004-2007

- NIH Training Grant award 5-T32-HL0084-30; University of Virginia, Robert M. Berne Cardiovascular Research Center
- Role: *Trainee (Postdoctoral Fellowship)*

## PUBLICATIONS

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1. Shamsuzzaman S\*, **Deaton RA\***, Salamon A, Doviak H, Serbulea V, Milosek VM, Evans MA, Karnewar S, Saibaba S, Alencar GF, Shankman LS, Walsh K, Bekiranov S, Kocher O, Krieger M, Kull B, Persson M, Michaëlsson E, Bergenheim N, Heydarkhan-Hagvall S, Owens GK. [Novel Mouse Model of Myocardial Infarction, Plaque Rupture, and Stroke Shows Improved Survival With Myeloperoxidase Inhibition](#). *Circulation*. 2024 Aug 27;150(9):687-705. doi: 10.1161/CIRCULATIONAHA.123.067931. Epub 2024 Jun 17. PubMed PMID: 38881440; PubMed Central PMCID: PMC11347105. **\*these authors contributed equally**
2. Karnewar S, Karnewar V, **Deaton RA**, Shankman LS, Benavente ED, Williams CM, Bradley X, Alencar GF, Bulut GB, Kirmani S, Baylis RA, Zunder ER, den Ruijter HM, Pasterkamp G, Owens GK. [IL-1 \$\beta\$  Inhibition Partially Negates the Beneficial Effects of Diet-Induced Atherosclerosis Regression in Mice](#). *Arterioscler Thromb Vasc Biol*. 2024 Jun;44(6):1379-1392. doi: 10.1161/ATVBAHA.124.320800. Epub 2024 May 2. PubMed PMID: 38695167; PubMed Central PMCID: PMC11111338.
3. **Deaton RA**, Bulut G, Serbulea V, Salamon A, Shankman LS, Nguyen AT, Owens GK. [A New Autosomal Myh11-CreER\(T2\) Smooth Muscle Cell Lineage Tracing and Gene Knockout Mouse Model-Brief Report](#). *Arterioscler Thromb Vasc Biol*. 2023 Feb;43(2):203-211. doi: 10.1161/ATVBAHA.122.318160. Epub 2022 Dec 15. PubMed PMID: 36519470; PubMed Central PMCID: PMC9877184.
4. Serbulea V, **Deaton RA**, Owens GK. [Old bones control smooth muscle clones](#). *Nat Aging*. 2023 Jan;3(1):9-10. doi: 10.1038/s43587-022-00346-1. PubMed PMID: 37118515.
5. Owens GK, **Deaton RA**. [Response by Owens and Deaton to Letter Regarding Article, "Dichotomous Roles of Smooth Muscle Cell-Derived MCP1 \(Monocyte Chemoattractant Protein 1\) in Development of Atherosclerosis"](#). *Arterioscler Thromb Vasc Biol*. 2023 Jan;43(1):e64. doi: 10.1161/ATVBAHA.122.318638. Epub 2022 Dec 21. PubMed PMID: 36542726; PubMed Central PMCID: PMC9976800.
6. Luse MA, Krüger N, Good ME, Biwer LA, Serbulea V, Salamon A, **Deaton RA**, Leitinger N, Gödecke A, Isakson BE. [Smooth muscle cell FTO regulates contractile function](#). *Am J Physiol Heart Circ Physiol*. 2022 Dec 1;323(6):H1212-H1220. doi: 10.1152/ajpheart.00427.2022. Epub 2022 Oct 28. PubMed PMID: 36306211; PubMed Central PMCID: PMC9678421.
7. Owsiany KM, **Deaton RA**, Soohoo KG, Tram Nguyen A, Owens GK. [Dichotomous Roles of Smooth Muscle Cell-Derived MCP1 \(Monocyte Chemoattractant Protein 1\) in Development of Atherosclerosis](#). *Arterioscler Thromb Vasc Biol*. 2022 Aug;42(8):942-956. doi: 10.1161/ATVBAHA.122.317882. Epub 2022 Jun 23. PubMed PMID: 35735018; PubMed Central PMCID: PMC9365248.
8. Hartmann F, Gorski DJ, Newman AAC, Homann S, Petz A, Owsiany KM, Serbulea V, Zhou YQ, **Deaton RA**, Bendeck M, Owens GK, Fischer JW. [SMC-Derived Hyaluronan Modulates Vascular SMC Phenotype in Murine Atherosclerosis](#). *Circ Res*. 2021 Nov 12;129(11):992-1005. doi: 10.1161/CIRCRESAHA.120.318479. Epub 2021 Oct 7. PubMed PMID: 34615369; PubMed Central PMCID: PMC8637935.

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9. Newman AAC, Serbulea V, Baylis RA, Shankman LS, Bradley X, Alencar GF, Owsiany K, **Deaton RA**, Karnewar S, Shamsuzzaman S, Salamon A, Reddy MS, Guo L, Finn A, Virmani R, Cherepanova OA, Owens GK. [Multiple cell types contribute to the atherosclerotic lesion fibrous cap by PDGFR \$\beta\$  and bioenergetic mechanisms](#). *Nat Metab*. 2021 Feb;3(2):166-181. doi: 10.1038/s42255-020-00338-8. Epub 2021 Feb 22. PubMed PMID: 33619382; PubMed Central PMCID: PMC7905710.
10. Bulut GB, Alencar GF, Owsiany KM, Nguyen AT, Karnewar S, Haskins RM, Waller LK, Cherepanova OA, **Deaton RA**, Shankman LS, Keller SR, Owens GK. [KLF4 \(Kruppel-Like Factor 4\)-Dependent Perivascular Plasticity Contributes to Adipose Tissue inflammation](#). *Arterioscler Thromb Vasc Biol*. 2021 Jan;41(1):284-301. doi: 10.1161/ATVBAHA.120.314703. Epub 2020 Oct 15. PubMed PMID: 33054397; PubMed Central PMCID: PMC7769966.
11. **Deaton RA**, Gan Q, Owens GK. [Sp1-dependent activation of KLF4 is required for PDGF-BB-induced phenotypic modulation of smooth muscle](#). *Am J Physiol Heart Circ Physiol*. 2009 Apr;296(4):H1027-37. doi: 10.1152/ajpheart.01230.2008. Epub 2009 Jan 23. PubMed PMID: 19168719; PubMed Central PMCID: PMC2670704.
12. Thomas JA, **Deaton RA**, Hastings NE, Shang Y, Moehle CW, Eriksson U, Topouzis S, Wamhoff BR, Blackman BR, Owens GK. [PDGF-DD, a novel mediator of smooth muscle cell phenotypic modulation, is upregulated in endothelial cells exposed to atherosclerosis-prone flow patterns](#). *Am J Physiol Heart Circ Physiol*. 2009 Feb;296(2):H442-52. doi: 10.1152/ajpheart.00165.2008. Epub 2008 Nov 21. PubMed PMID: 19028801; PubMed Central PMCID: PMC2643880.
13. Pidkovka NA, Cherepanova OA, Yoshida T, Alexander MR, **Deaton RA**, Thomas JA, Leitinger N, Owens GK. [Oxidized phospholipids induce phenotypic switching of vascular smooth muscle cells in vivo and in vitro](#). *Circ Res*. 2007 Oct 12;101(8):792-801. doi: 10.1161/CIRCRESAHA.107.152736. Epub 2007 Aug 17. PubMed PMID: 17704209.
14. Su C, **Deaton RA**, Iglewsky MA, Valencia TG, Grant SR. [PKN activation via transforming growth factor-beta 1 \(TGF-beta 1\) receptor signaling delays G2/M phase transition in vascular smooth muscle cells](#). *Cell Cycle*. 2007 Mar 15;6(6):739-49. doi: 10.4161/cc.6.6.3985. Epub 2007 Mar 8. PubMed PMID: 17374997.
15. **Deaton RA**, Su C, Valencia TG, Grant SR. [Transforming growth factor-beta1-induced expression of smooth muscle marker genes involves activation of PKN and p38 MAPK](#). *J Biol Chem*. 2005 Sep 2;280(35):31172-81. doi: 10.1074/jbc.M504774200. Epub 2005 Jun 26. PubMed PMID: 15980430.
16. Ellis JJ, Valencia TG, Zeng H, Roberts LD, **Deaton RA**, Grant SR. [CaM kinase II \$\delta\$ C phosphorylation of 14-3-3 \$\beta\$  in vascular smooth muscle cells: activation of class II HDAC repression](#). *Mol Cell Biochem*. 2003 Jan;242(1-2):153-61. PubMed PMID: 12619878.

## PRESENTATIONS (ORAL and POSTER)

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1. **Deaton RA**, Shamsuzzaman S, Shankman LS, Karnewar S, Serbulea V, Salamon A, Doviak H, Evans M, Walsh K, Kocher O, Krieger M, Hagvall S, Bergenhem N and Owens GK. [Myeloperoxidase Inhibition Improves Major Adverse Cardiovascular Events in a Novel Mouse Model of Coronary Atherosclerosis, Spontaneous Myocardial Infarction and Stroke](#). Leducq Foundation PlaqOmics Transatlantic Network of Excellence, London UK | May 2023
2. **Deaton RA**, Shamsuzzaman S, Shankman LS, Karnewar S, Serbulea V, Salamon A, Doviak H, Evans M, Walsh K, Kocher O, Krieger M, Hagvall S, Bergenhem N and Owens GK. [Global Inhibition of Myeloperoxidase Improves Survival in a Novel Mouse Model of Coronary Atherosclerosis, Spontaneous Myocardial Infarction and Stroke](#). Leducq Foundation PlaqOmics Transatlantic Network of Excellence, Vancouver CN | October 2022
3. **Deaton RA**, Bulut GB, Serbulea V, Salamon A, Shankman LS, Nguyen A, Owens GK. [Novel new mouse models to assess the normal and pathological functions of smooth muscle cells and endothelial cells simultaneously in both sexes](#). 22<sup>nd</sup> International Vascular Biology Meeting 2022, Oakland, CA | October 2022
4. **Deaton RA**, Aherrahrou R, Diez-Benavente E and Reinberger T. [How do phenotypic changes in endothelial and SMC](#)

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control stability of the ACTA2+ fibrous cap and explain sex-differences in advanced atherosclerotic lesions. Leducq Foundation PlaQOmics Transatlantic Network of Excellence, Noordwijk NL | April 2022

5. Serbulea V, Martin JM, Reddy M, Salamon A, Baylis RA, Newman AAC, Owsiany KN, Alencar G, **Deaton RA**, Owens GK. [Novel Therapeutic Manipulations of Smooth Muscle Cell Metabolism to Enhance Atherosclerotic Fibrous Cap Stability](#). *Free Radical Biology and Medicine* 2020;159:S98.
6. Salamon A, Serbulea V, **Deaton RA**, Owens GK. [Glutamine Metabolism Contributes to Smooth Muscle-to-myofibroblast Transitions and Enriched Extracellular Matrix Production](#). *Free Radical Biology and Medicine* 2020;159:S74.
7. **Deaton, RA**, Pidkovka, N and Owens GK. [Sp1 is required for expression of KLF4 in phenotypically modulated smooth muscle cells](#). *Experimental Biology* 2007, Washington DC.
8. Su, C, **Deaton, RA**, Valencia, TG and Grant SR. [Delineating three functional roles of PKN/p38 MAPK signaling in phenotype switching of arterial smooth muscle cells](#). FASEB summer research conference, 2006, Snowmass CO.
9. Su, C, **Deaton, RA**, Valencia, TG and Grant SR. [TGF-beta 1 delays G2/M phase transition via PKN signaling in vascular smooth muscle cells](#). Keystone Symposia, 2006, Keystone CO.
10. Su C, **Deaton RA**, Grant SR. [TGF-beta 1 Delays Cell Cycle Progression via PKN Signaling in Vascular Smooth Muscle Cells](#). Keystone Symposia, Cell Cycle and Development, Snowbird, UT.
11. **Deaton RA**, Su C, Valencia TG and Grant SR. [TGF-beta 1 Stimulates PKN-mediated Induction of Smooth Muscle-Marker Gene Expression: A Role for p38 MAPK Signaling](#). American Heart Association, Scientific Sessions 2003, Orlando FL.
12. **Deaton RA**, Su C, Valencia TG and Grant SR. [TGF-beta 1 Stimulates Smooth Muscle Cell Differentiation Through the Activation of PKN: A Role for p38 MAPK Signaling](#). FASEB SRC – Smooth Muscle, Snowmass, CO.
13. **Deaton RA**, Grant SR. [Protein kinase N Regulates Transcription of Vascular Smooth Muscle-specific Genes](#). LXVII Cold Spring Harbor Symposium on Quantitative Biology: The Cardiovascular System, Cold Spring Harbor, NY.

## UNIVERSITY SERVICE AND TEACHING

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### Teaching

- Lecturer in Vascular Biology Graduate course PHY8052/8053 | 2023-present
- Lecturer in Physiology Graduate course PHY8040/8041 | 2023-present

### Students/Trainees Mentored

- Katie Owsiany | MD, PhD degrees completed 2020
- Gamze Bulut PhD | Owens Lab Postdoctoral fellow 2017-2020
- Santosh Karnewar PhD | Owens Lab Postdoctoral fellow 2017-2023
- Fiona Cox | Visiting International PhD Student; Heinrich-Heine-Universität Düsseldorf 1/2022-6/2022
- Anika Prinz | Visiting International PhD Student; Heinrich-Heine-Universität Düsseldorf 7/2022-12/2022
- Subhi Saibaba | BA Neuroscience completed 2024
- Fatema Alleham BS | Medical Student, SUNY Downstate Medical School; UVA Summer Medical Research Internship (SMRI) 2024
- April Hippenstiel | UVA Undergraduate Student; Class of 2025 - *Current*
- Kate McCool | UVA Undergraduate Student; Class of 2027 - *Current*
- Alexander Como | UVA Undergraduate Student; Class of 2027 - *Current*
- Victoria Milosek MS | UVA PhD Candidate, Molecular Physiology and Biological Physics - *Current*

# Rebecca A. Deaton, PhD

## PROFESSIONAL MEMBERSHIPS

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American Heart Association | 1999-present

North American Vascular Biology Organization | 2004-present

## AWARDS AND HONORS

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- Finalist for NAVBO Junior Investigator Award | 2007
- Nominee for CGS/University Microfilms International Distinguished Dissertation Award | 2005  
*Field of Competition: Biological and Life Sciences*
- Outstanding Graduate of the Year | 2004  
*University of North Texas Health Science Center*
- First Place Award, poster competition, Research Appreciation Day | 2004  
*University of North Texas Health Science Center*
- Third Place Award, oral competition, Research Appreciation Day | 2003  
*University of North Texas Health Science Center, Sponsored by Alcon Research, Ltd.*
- Outstanding Graduate Student Association Member | 2001, 2002  
*University of North Texas Health Science Center*
- PhD Oral Qualifying Exam awarded passing with distinction | 2000  
*University of North Texas Health Science Center*
- Third Place Award, poster competition, Research Appreciation Day | 2000  
*University of North Texas Health Science Center*
- Outstanding Student of the Year in Biomedical Science | 1999  
*University of North Texas Health Science Center*

## TECHNICAL SKILLS

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|----------------------------|--------------------------|-----------------------|
| * Transgenic mice          | * Gel electrophoresis    | * Brightfield imaging |
| * Mouse colony management  | * Vessel microdissection | * scRNAseq            |
| * ACUC protocol management | * Immunocytochemistry    | * Flow Cytometry      |
| * PCR and qPCR             | * Immunofluorescence     | * Cell Culture        |
|                            | * Tissue embedding       | * Western Blot        |
|                            | * Confocal imaging       | * RNA/DNA isolation   |

## PROFESSIONAL SKILLS

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|--------------------------|-------------------------|----------------------|
| * Strategic Thinking     | * Leadership Management | * Adaptability       |
| * Conflict Management    | * Change Management     | * Negotiation Skills |
| * Problem-Solving Skills | * Teamwork              | * Communication      |

## ADMINISTRATIVE SKILLS

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|-----------------|--------------------|---------------------|
| * MS Word       | * Outlook Calendar | * Adobe Photoshop   |
| * MS Excel      | * Microsoft Teams  | * Adobe Illustrator |
| * MS PowerPoint | * OneNote          | * Zoom              |

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## REFERENCES

### **Gary K. Owens, PhD**

Professor of Molecular Physiology and Biological Physics  
Professor of Internal Medicine, Division of Cardiology  
Robert M. Berne Endowed Professor  
Director of the Robert M. Berne Cardiovascular Research Center  
University of Virginia School of Medicine  
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### **Brant E. Isakson, PhD**

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