

BIOGRAPHICAL SKETCH

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NAME Susan V. Brooks	POSITION TITLE Associate Professor		
eRA COMMONS USER NAME svbrooks			
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 of Michigan, Ann Arbor	B.S.E.	1985	Engineering Science
University of Michigan, Ann Arbor	M.S.	1987	Bioengineering
University of Michigan, Ann Arbor	M.S.E.	1987	Elec. Engin. Systems
University of Michigan, Ann Arbor	Ph.D.	1992	Bioengineering

A. Positions and Honors

Tau Beta Pi Engineering Honor Society, 1984.

University of Michigan: summa cum laude, 1985.

Research Partnership Award, Horace H. Rackham School of Graduate Studies, Univ. of Michigan, 1988.

Distinguished Achievement Award, Outstanding Graduate Student in Bioengineering, Univ. of MI, 1992.

Brookdale National Fellowship, The Brookdale Foundation, New York, NY, 1996-1998.

Cindy Yoder Research Award for Engineering and Biology, University of Michigan, 1996-1998.

Lydia A. Dewitt Research Award, NSF ADVANCE Project, University of Michigan, 2005.

Research and Professional Experience

1992-1995 Postdoctoral Research Fellow, Institute of Gerontology, University of Michigan

1994-1995 Lecturer, Department of Physiology, University of Michigan

1995-2003 Assistant Research Scientist, Institute of Gerontology, University of Michigan

1995-2003 Assistant Professor of Molecular and Integrative Physiology, Univ. of MI School of Medicine

1996-present Assistant Professor of Biomedical Engineering, Univ. of MI College of Engineering

2003-present Research Associate Professor, Institute of Gerontology, University of Michigan

2003-present Associate Professor of Molecular and Integrative Physiology, Univ. of MI School of Medicine

Professional Activities

National Scientific Advisory Council, American Federation for Aging Research, 2001-present.

Member Brookdale Institute on Aging

Professional Societies: *American Association for the Advancement of Science; American College of Sports Medicine; American Physiological Society; Biophysical Society; Gerontological Society of America.*

Ad Hoc Reviewer: *Aging Cell, American Journals of Physiology; Free Radical Research; International Journal of Sports Medicine; Journal of Applied Physiology; Journal of Gerontology, Biological Sciences; Journal of Orthopaedic Research; Journal of Physiology (London); Medicine and Science in Sports and Exercise, The Journal of Cell Biology*

B. Publications (Partial Listing) Peer reviewed original articles:

Brooks S.V. and Faulkner J.A. Contractile properties of skeletal muscles from young, adult, and aged mice. *J Physiol (Lond)* 404:71-82, 1988.

Levine S.P., Kett R.L., Cederna P.S., Bowers L.D., and **Brooks S.V.** Electrical muscle stimulation for pressure variation at the seating interface. *J Rehab Res Devel* 26:1-8, 1989.

Levine S.P., Kett R.L., Cederna P.S., and **Brooks S.V.** Electrical muscle stimulation for the prevention of pressure sores: Tissue shape variation. *Arch Physical Med Rehab* 71:210-215, 1990.

Brooks S.V. and Faulkner J.A. Contraction-induced injury: recovery of skeletal muscles in young and old mice. *Am J Physiol* 258 (*Cell Physiol* 27):C436-C442, 1990.

Brooks S.V., Faulkner J.A., and McCubbery D.A. Power outputs of slow and fast skeletal muscles of mice. *J Appl Physiol* 68:1282-1285, 1990.

- Faulkner J.A., Zerba E., and **Brooks S.V.** Muscle temperature of mammals: Cooling impairs most functional properties. *Am J Physiol* 259 (Reg Integ Comp Physiol 28):R259-R265, 1990.
- Faulkner J.A. and **Brooks S.V.** Skeletal muscle fatigue: implications for cardiac-assist pumps. *Sem Thorac Cardiovasc Surg* 3:149-153, 1991.
- Brooks S.V.** and Faulkner J.A. Maximum and sustained power of extensor digitorum longus muscles from young, adult and old mice. *J Gerontol: Biol Sci* 46:B28-B33, 1991.
- Brooks S.V.** and Faulkner J.A. Forces and powers sustained by slow and fast skeletal muscles of mice during repeated contractions. *J Physiol (Lond)* 436:701-710, 1991.
- Faulkner J.A., Opitck J.A., and **Brooks S.V.** Injury to skeletal muscle during altitude training: induction and prevention. *Int J Sports Med* 13:S160-S162, 1992.
- Brooks S.V.** and Faulkner J.A. Skeletal muscle weakness in old age: underlying mechanisms. *Med Sci Sport Exer* 26:432-439, 1994.
- Brooks S.V.** and Faulkner J.A. Isometric, shortening, and lengthening contractions of muscle fiber segment from adult and old mice. *Am J Physiol* 267 (Cell Physiol 36):C507-C513, 1994.
- Brooks S.V.**, Zerba E., and Faulkner J.A. Injury to fibres after single stretches of passive and maximally stimulated muscles in mice. *J Physiol (Lond)* 488:459-469, 1995.
- Faulkner J.A., **Brooks S.V.**, and Zerba E. Muscle atrophy and weakness with aging: contraction-induced injury as an underlying mechanism. *J Gerontol: Biol Sci* 50:B124-B129, 1995.
- Brooks S.V.** and Faulkner J.A. The magnitude of the initial injury induced by stretches of maximally activated muscle fibers in mice and rats increases in old age. *J Physiol (Lond)* 497:573-580, 1996.
- Brooks S.V.** Rapid recovery following contraction-induced injury to *in situ* skeletal muscles in *mdx* mice. *J Muscle Res Cell Motil* 19:179-187, 1998.
- Brooks S.V.**, Opitck J.A., and Faulkner J.A. Conditioning of skeletal muscles in adult and old mice for protection from contraction-induced injury. *J Gerontol* 56A:B163-B171, 2001.
- Koh T.J. and **Brooks S.V.** Lengthening contractions are not required to induce protection from contraction-induced muscle injury. *Am J Physiol: Reg Integ Comp Physiol* 281:R155-R161, 2001.
- Brooks S.V.** and Faulkner J.A. The severity of contraction-induced injury is affected by velocity only during stretches of large strain. *J Appl Physiol* 91:661-666, 2001.
- Lynch G.S., Hinkle R.T., Chamberlain J.S., **Brooks S.V.** and Faulkner J.A. Force and power output of fast and slow skeletal muscles from *mdx* mice 6-28 months old. *J Physiol (Lond)* 535:591-600, 2001.
- DelloRusso C., Crawford R.W., Chamberlain J.S., and **Brooks S.V.** Tibialis anterior muscles in adult *mdx* mice are highly susceptible to contraction-induced injury. *J Muscle Res Cell Motil* 22:467-475, 2001.
- Harper S.Q., Hauser M., DelloRusso C., Duan D., Crawford R.W., Phelps S., Harper H., Robinson A.S., Engelhart J.F., **Brooks S.V.**, and Chamberlain J.S. Modular flexibility of dystrophin: Implications for gene therapy of Duchenne muscular dystrophy. *Nature Med* 8:253-261, 2002.
- Pizza F.X., Koh T.J., McGregor S.J., and **Brooks S.V.** Muscle inflammation following passive stretches, isometric contractions, and lengthening contractions. *J Appl Physiol* 92:1873-1878, 2002.
- DelloRusso C., Scott J., Hartigan-O'Connor D., Salvatori G., Barjot C., Robinson A.S., Crawford R.C., **Brooks S.V.**, and Chamberlain J.S. Functional correction of adult *mdx* mouse muscle using gutted adenoviral vectors expressing full-length dystrophin. *Proc Nat'l Acad Sci* 99:12979-12984, 2002.
- Koh T.J., Peterson J.M., Pizza F.X., and **Brooks S.V.** Passive stretches protect skeletal muscles of adult and old mice from lengthening contraction-induced injury. *J Gerontol: Biol Sci* 58A:B592-B597, 2003.
- Brooks S.V.** Current topics for teaching skeletal muscle physiology. *Adv Physiol Ed* 27:171-182, 2003.
- Consolino, C.M. and **Brooks S.V.** Susceptibility to injury induced by single stretches of maximally activated muscles of *mdx* mice. *J Appl Physiol* 96:633-638, 2004.
- Consolino C.M., Duclos F., Lee J., Williamson R., Campbell K.P., and **Brooks S.V.** Limb muscles of mice deficient in α -sarcoglycan maintain large muscle masses and near control levels for force throughout the life span. *Physiol Genom* 22:244-256, 2005.
- Lockhart N.C., Baar, K., Mazzeo R.S., and **Brooks S.V.** Activation of Akt as a potential mediator of adaptations that reduce muscle injury. *Med Sci Sport Exer*, 38:1058-1064, 2006.
- Lockhart N.C. and **Brooks S.V.** Protection from contraction-induced injury provided to skeletal muscles of young and old mice by passive stretch is not due to a decrease in initial mechanical damage. *J Gerontol: Biol Sci* 61:527-533, 2006.

Faulkner J.A., Larkin L.M., Claflin D.R., and **Brooks, S.V.** Age-related changes in the structure and function of skeletal muscles. *Clin Exp Pharmacol Physiol* 34(11):1091-1096, 2007.

Brooks S.V. Changes with aging in skeletal muscle damage and repair. In: *Skeletal Muscle Damage and Repair: Mechanisms and Interventions*. P.M. Tiidus, Ed., Human Kinetics Publishers, Champaign, IL, 2007.

Claflin D.R. and **Brooks S.V.** Direct observation of failing fibres provides mechanistic insight into muscular dystrophy. *Am J Physiol: Cell Physiol* 294:C651-C658, 2008.

Lockhart N.C. and **Brooks S.V.** Neutrophil infiltration after passive stretches contributes to adaptations that reduce contraction-induced muscle injury. *Journal of Applied Physiology*, 104:1109-1115, 2008.

Lynch G.S., Faulkner J.A., and **Brooks S.V.** Force deficits and breakage rates after single lengthening contractions of single fast fibers from unconditioned and conditioned muscles of young and old rats. *Am J Physiol: Cell Physiol* 295:C249-C256, 2008.

Brooks S.V., Vasilaki A., Larkin L.M., McArdle A., and Jackson M.J. Repeated bouts of aerobic exercise lead to adaptations in free radical generation and NFκB activation by skeletal muscles of mice. *J Physiol* 596: 3979–3990, 2008

Faulkner J.A., Davis C.S., Mendias C.L., **Brooks S.V.** The aging of elite male athletes: age-related changes in performance and skeletal muscle structure and function. *Clin J Sport Med*. 2008 Nov;18(6):501-7.

C. Research Support

Ongoing Research Support

R01 AR055624, Herzog S. Brooks (PI)

NIH – NIAMS

07/01/08 – 03/31/13

Mechanisms underlying mechanical properties of muscle-tendon units

The goals of this project are to clarify the mechanisms underlying (i) regional differences in mechanical properties along tendons and (ii) changes in mechanical properties with aging, and to determine the impact of tendon changes on muscle function and susceptibility to injury.

Role: Principal Investigator

P01 AG20591 Faulkner (PI)

05/01/08 to 04/30/13

Reactive Oxygen Species: Stress and Damage in Old Muscle

National Institutes of Health, National Institute on Aging

Goal: To test the working hypothesis that the atrophy and weakness of skeletal muscles in old animals is caused by the imbalance between the generation of ROS and the presence of deficiencies in antioxidant systems. Mice with genetically induced deficiencies or enhancements of antioxidant systems are studied.

Role: Co-Investigator

P30-AG13283 Faulkner (PI)

07/01/05 to 06/30/10

National Institutes of Health, National Institute on Aging

Cellular and Molecular Biology of Aging

Goals: The Shock Center of Excellence provides seminars, workshops, seed grants and core facilities for scientists working on cellular and molecular mechanisms of aging. The research emphasis is on three themes: musculoskeletal frailty, molecular biophysics, and signal transduction.

Role: PI, Research & Development Core

P50 AR-049480 DeLancey (PI)

08/01/07 to 07/31/12

Birth, Muscle Injury, and Pelvic Floor Dysfunction

National Institutes of Health, NICHD-ORWH

The goal is to investigate the role of skeletal muscle injury of the pelvic floor muscles during vaginal childbirth in the development of urinary incontinence.

Role: Co-Investigator

Completed Research Support

NNC04AA21A Grotberg, (PI)

Biosciences and Engineering Institute

09/01/03 to 08/31/07

Agency: NASA

The goal is to test hypotheses regarding the effects of un-weighting on skeletal muscle satellite cell function.

Role: Co-Investigator