

Stefano Schiaffino – short CV

Professor Emeritus of General Pathology, University of Padova
Vice President, Venetian Institute of Molecular Medicine (VIMM)

Appointments/Affiliations

2000-2014 Group Leader, VIMM
2002-2010 Head, Laboratory of Neuromuscular Biology and Physiopathology of CNR Institute of Neuroscience
1981-2010 Professor of General Pathology, School of Medicine, University of Padova
1987-2002 Director, CNR Center of Muscle Biology and Physiopathology
1986-87 Visiting scientist, INSERM U 127, Hôpital Lariboisière, and Institut Pasteur, Paris
1971-81 Associate Professor of General Pathology, School of Medicine, Univ. Padova
1965-71 Assistant Professor of General Pathology, School of Medicine, Univ. Padova

Honors/Awards

2010 Member, *Accademia Europaea*
1997 *Doctor honoris causa* in Medicine, Sorbonne (Paris 7 - Denis Diderot)
1996 Member, *Accademia Nazionale dei Lincei* (Roma)
1992 Member, *Istituto Veneto di Scienze, Lettere ed Arti* (Venezia)
1988 *Doctor honoris causa* in Medicine, University of Umeå (Sweden)

Advisory boards (recent)

2014- Member of the Scientific Council of the Stazione Zoologica Anton Dohrn, Naples.
2014- Member of the Scientific Advisory Board of the "Institut Neuro-Myo-Gène", Lyon.
2012- Member of the Selection Committee of the Pathophysiology Section, French National Research Agency (ANR)
2009- Member of the Committee for Fundamental Myology, Association Française contre les Myopathies (AFM)
2012 Review panel, German Research Foundation
2011-12 Member of review panel on Exercise and Metabolism, Danish Council for Independent Research - Medical Sciences
2008-09 Member of review panels of AERES (French evaluation agency for research)

Editorial boards

2006- Editorial Board, *Scandinavian Journal of Medicine & Science in Sports*
1999- Editorial Board, *Journal of Muscle Research and Cell Motility*
2010-2014 Associate Editor, *Skeletal Muscle*
1994-2000 Editorial Board, *Circulation Research*

Publications (last 5 years, selected)

Murgia M*, Nagaraj N, Deshmukh A, Zeiler M, Cancellara P, Moretti I, Reggiani C, Schiaffino S*, Mann M* (2015) Single muscle fiber proteomics reveals unexpected mitochondrial specialization. *EMBO Rep*, 16: 387-395. (* co-corresponding authors) (*cover article*).
Dyar KA, Ciciliot S, Wright LE, Biensø RS, Malagoli Tagliazucchi G, Patel VR, Forcato M, Peña Paz MI, Gudiksen A, Solagna F, Albiero M, Moretti I, Eckel-Mahan KL, Baldi P, Sassone-Corsi P, Rizzuto R, Bicciato S, Pilegaard H, Blaauw B, Schiaffino S (2014) Muscle insulin sensitivity and glucose metabolism are controlled by the intrinsic muscle clock. *Mol Metab*, 3:29-41. (*cover article*)
Schiaffino S, Dyar KA, Ciciliot S, Blaauw B, Sandri M (2013) Mechanisms regulating skeletal muscle growth and atrophy. *FEBS J*, 280:4294–4314.
Blaauw B, del Piccolo P, Hernandez Gonzalez V-H, Agatea L, Mammano F, Pozzan T, Schiaffino S (2012) No evidence for inositol 1,4,5-triphosphate-dependent Ca²⁺ release in adult mouse skeletal muscle fibers. *J Gen Physiol*, 140:235-241.
Schiaffino S (2012) Tubular aggregates in skeletal muscle: Just a special type of protein aggregates? *Neuromuscul Disord*, 22:199-296.
Schiaffino S, Reggiani C (2011) Fiber types in mammalian skeletal muscle. *Physiol Rev*, 91:1447-1531.

- Schiaffino S, Mammucari C (2011) Regulation of skeletal muscle growth by the IGF1-Akt/PKB pathway: insights from genetic models. *Skeletal Muscle*, 1:4.
- Rossi AC, Mammucari C, Argentini C, Reggiani C, Schiaffino S (2010) Two novel/ancient myosins in mammalian skeletal muscles: MYH14/7b and MYH15 are expressed in extraocular muscles and muscle spindles. *J Physiol*, 588:353-64.

Publications (before 2010, selected)

- Masiero E, Agatea L, Mammucari C, Blaauw B, Loro E, Komatsu M, Metzger D, Reggiani C, Schiaffino S, Sandri M (2009) Autophagy is required to maintain muscle mass. *Cell Metab*, 10:507-15.
- Calabria E, Ciciliot S, Moretti I, Garcia M, Picard A, Pallafacchina G, Tothova J, Dyar KA, Schiaffino S, Murgia M. (2009) NFAT isoforms control activity-dependent muscle fiber type specification. *Proc Nat Acad Sci USA*, 106:13335-40.
- Zaglia T, Dedja A, Candiotti C, Cozzi E, Schiaffino S, Ausoni S. (2009) Cardiac interstitial cells express GATA4 and control dedifferentiation and cell cycle re-entry of adult cardiomyocytes. *J Mol Cell Cardiol*, 46:653-62.
- Blaauw B, Canato M, Agatea L, Toniolo L, Mammucari C, Masiero E, Abraham R, Sandri M, Schiaffino S, Reggiani C. (2009) Functional skeletal muscle hypertrophy without satellite cell activation in an inducible Akt transgenic model. *FASEB J*, 23:3896-905.
- Mammucari C, Milan G, Romanello V, Masiero E, Rudolph R, Del Piccolo P, Burden SJ, Di Lisi R, Sandri C, Zhao J, Goldberg AL, Schiaffino S, Sandri M (2007) FoxO3 controls autophagy in skeletal muscle in vivo. *Cell Metab*, 6:458-471.
- Sandri M, Sandri C, Gilbert A, Skurk C, Calabria E, Picard A, Walsh K, Schiaffino S, Lecker SH, Goldberg AL (2004) Foxo transcription factors induce the atrophy-related ubiquitin ligase atrogin-1 and cause skeletal muscle atrophy. *Cell* 117:399-412.
- McCullagh K, Calabria E, Pallafacchina G, Ciciliot S, Serrano AL, Argentini C, Kalhovde JM, Lømo T, Schiaffino S (2004) NFAT is a nerve activity sensor and controls activity-dependent myosin switching. *Proc Nat Acad Sci USA*, 101:10590-95.
- Pallafacchina G, Calabria E, Serrano AL, Kalhovde JM, Schiaffino S (2002) A protein kinase B-dependent and rapamycin-sensitive pathway controls skeletal muscle growth but not fiber type specification. *Proc Nat Acad Sci USA* 99:9213-18.
- Serrano AL, Murgia M., Pallafacchina G, Calabria E, Coniglio P, Lømo T, Schiaffino S (2001) Nerve activity-dependent specification of slow skeletal muscle fibers is controlled by calcineurin. *Proc Nat Acad Sci USA* 98:13108-13.
- Murgia M, Serrano AL, Calabria E, Pallafacchina G, Lømo T, Schiaffino S (2000) Ras is involved in nerve-activity-dependent regulation of muscle genes. *Nature Cell Biol*. 2:142-147.
- Schiaffino S, Reggiani C. (1996) Molecular diversity of myofibrillar proteins: gene regulation and functional significance. *Physiol Rev*, 76:371-423.
- Smerdu V, Karsch-Mizrachi I, Campione M, Leinwand L, Schiaffino S. (1994) Type IIx myosin heavy chain transcripts are expressed in type IIb fibers of human skeletal muscle. *Am J Physiol*. 267: 1723-1728.
- De Nardi C, Ausoni S, Moretti P, Gorza L, Velleca M, Buckingham M, Schiaffino S (1993) Type 2X myosin heavy chain is coded by a muscle fiber type-specific and developmentally regulated gene. *J Cell Biol*. 123: 823-835.
- Caforio A, Grazzini M, Mann JM, Keeling PJ, Bottazzo GF, McKenna WJ, Schiaffino S (1992) Identification of the alpha and beta myosin heavy chain isoforms as major autoantigens in dilated cardiomyopathy. *Circulation* 85:1734-1742.
- Bottinelli R, Schiaffino S, Reggiani C (1991) Force-velocity relation and myosin heavy chain isoform composition in skinned fibres of rat skeletal muscle. *J Physiol*. 437: 655-672.
- Schiaffino S, Gorza L, Sartore S, Saggin L, Ausoni S, Vianello M, Gundersen K, Lømo T (1989) Three myosin heavy chain isoforms in type 2 skeletal muscle fibres. *J Muscle Res Cell Motil*. 10: 197-205.
- Sartore S, Gorza L, Schiaffino S (1982). Fetal myosin heavy chains in regenerating muscle. *Nature* 298:294-296.
- Sartore S, Pierobon Bormioli S, Schiaffino S (1978). Immunohistochemical evidence for myosin polymorphism in the chicken heart. *Nature* 274: 82-83.

Books

- Schiaffino S & Partridge T, eds. (2008) Skeletal muscle repair and regeneration. Springer Netherlands.

Invited speaker (last 5 years, selected)

- Meeting on “Bench to bedside research on muscle wasting. Mechanisms and interventions”, Stockholm, Sept 2015.
- The Saltin Symposium. Exercise and Integrative Physiology, Copenhagen, June 2015.
- EMBO Conference “Molecular Biology of Muscle Development and Regeneration”, Lecce, May 2014.
- August Krogh Symposium “Metabolism in the extreme and extreme metabolism”, Copenhagen 14-15 November 2013.
- Keynote lecture on "The role of circadian rhythms in skeletal muscle", European Muscle Conference, Rhodes (Greece) 1-5 Sept 2012.
- MYOAGE Symposium on "The aging human muscle", Copenhagen 30-31 Aug 2012.
- Conference on "The Biomedical Basis of Elite Performance", London 19-21 March 2012.
- Conference on “Molecular mechanisms of skeletal muscle maintenance, wasting and repair”, Ascona 18-23 Sept 2011.
- 2nd EMBO Congress on “The molecular and cellular mechanisms regulating skeletal muscle development and regeneration”, Wiesbaden, 10-14 May 2011.
- Symposium “Exercise physiology: cellular and molecular aspects”, Annual Meeting of the German Physiological Society, Regensburg 27 March 2011.
- Novartis SPARK Workshop on “Targeting Cardiometabolic Health in Asia”, Singapore 22-23 Sept 2010.
- IARU (International Alliance of Research Universities) Congress on “Aging, longevity and health”, Copenhagen 5-7 Oct 2010.
- XXXIX European Muscle Conference (EMC2010), Abano Terme 12-15 Sept 2010.

Advisory/Evaluation boards (recent, selected)

- Since 2014 Scientific Council, Stazione Zoologica Anton Dohrn, Naples.
- 2014 Scientific Advisory Board of the "Institut Neuro-Myo-Gène", Lyon.
- 2014 Review panel of the European Space Agency (ESA) for “Bed Rest” and “Concordia Station (Antarctic)”, ESTEC, Noordwijk, Netherlands.
- 2014 Musculoskeletal Panel, ILSRA (International Life Science Research Announcement for experiments in International Space Station), meeting organized by spaceflight agencies (NASA, ESA, JAXA and CSA), Washington.
- Since 2013 Selection Committee, Panel Pathophysiology, Agence Nationale de Recherche (ANR), Paris.
- 2011-12 International Peer Review Panel, Danish Council for Independent Research - Medical Sciences, Panel ”Metabolism”, Copenhagen.
- Since 2010 Scientific Council, Panel “Fundamental Myology”, AFM-Téléthon, Paris.
- 2008-09 Member of review panels of AERES (French evaluation agency for research)

MAJOR SCIENTIFIC CONTRIBUTIONS

During the first part of my career I have been interested in defining the heterogeneity of muscle cells in skeletal and cardiac muscle, focusing on myosin isoforms. We prepared a battery of specific anti-myosin monoclonal antibodies that have been widely distributed. The most important result has been the discovery of a novel fast-type myosin, called type 2X, and a corresponding fiber type, in mammalian skeletal muscle. We found that cardiac muscle cells are also heterogeneous in term of myosin composition, thus providing specific molecular markers that for the first time allowed to distinguish between muscle cell populations in atrial and ventricular myocardium and heart conduction tissue. After a sabbatical year in Paris in 1986-87, I started molecular biology analyses of muscle genes. During the last 20 years I shifted my research activity to cell signaling in adult skeletal muscle, focusing on the mechanisms that control fiber type specification and atrophy/hypertrophy changes in response to nerve activity. Using an *in vivo* transfection approach based on intramuscular injection of plasmid DNA, we generated selective perturbations of different signaling pathways with constitutively active or dominant negative constructs. We found that the Ras-ERK and calcineurin-NFAT pathways control activity-dependent fiber type specification, while the Akt-mTOR and Akt-FoxO pathways control the atrophy/hypertrophy processes. Subsequent studies showed that FoxO transcription factors control the two main pathways of protein degradation in muscle cells, the ubiquitin-proteasome and autophagy-lysosome pathways. My recent work deals with circadian rhythms in skeletal muscle, single muscle fiber proteome, and control of myofiber growth in adult skeletal muscle by novel signaling pathways.

IMPACT OF SCIENTIFIC WORK

h-index: 71 (ISI WoS), 75 (Google Scholar:
<http://scholar.google.it/citations?user=x8Y43UYAAAAJ&hl=it&oi=ao>)

ACTIVITIES FOR THE SCIENTIFIC COMMUNITY

In 2000 I founded with some colleagues of the University of Padova a private research center, the Venetian Institute of Molecular Medicine (VIMM) and I have been acting as Vice-President of this institute. The center is now well established, we have been able to recruit many young investigators, including italian scientists working abroad, and have promoted the interaction between basic and clinical scientists.