Curriculum Vitae Emanuele Rizzuto

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Present position

Research fellow at the Department of Mechanical and Aerospace Engineering, University of Rome *La Sapienza*.

Education

Master Degree (5 years) in Mechanical Engineering at the University of Rome *La Sapienza*. Thesis title: "Dynamic analysis of viscoelastic properties of MLC/mIgf-1 transgenic mice Medial Collateral Ligaments", October 21th 2003. Final grade: 105/110. Supervisor: Prof. Z. Del Prete.

PhD in Cell Science and Morphogenesis at the Department of Histology and Medical Embryology, University of Rome *La Sapienza*. Thesis title: "In vitro measuring contractile properties of murine skeletal muscle and viscoelastic behaviour of tendons", March 27th, 2008. Final grade: Excellent. Supervisors: Prof. A. Musarò.

Qualifying exam to professional Engineer, April 2004.

Summary description of scientific activity

2012-17: research fellow at the Department of Mechanical and Aerospace Engineering (DIMA) of the University of Rome, *La Sapienza*: "Contraction measurement of transgenic and ex-vivo engineered muscle fibers through the motorneuron stimulation path".

2012: collaboration with the DAHFMO-Unit of Histology and Medical Embryology of the University of Rome, *La Sapienza*: "Biomechanical analysis of dystrophic muscles functionality and statistical analysis of the results".

2012: collaboration with the DIMA of the University of Rome, *La Sapienza*: "Functional measurements of murine skeletal muscle and statistical analysis of the results".

2010-12: research fellow at the DAHFMO of the University of Rome, *La Sapienza*: "Biomechanical and phonotypical characterization of skeletal muscle from control and pathological animal model after treatment with stem cells".

2011: collaboration with the DIMA of the University of Rome, *La Sapienza*, Italy: "Design and realization of an electronic unit for signal manipulation of ultra-thin pressure sensors".

2010: collaboration with the DAHFMO of the University of Rome, *La Sapienza*: "Morpho-functional analysis of cachectic muscles".

2008-10: research fellow at the DAHFMO of the University of Rome, *La Sapienza*: "Study of the molecular mechanisms involved in sarcopenia and morpho-functional characterization of engineered-muscular tissues".

2008: collaboration with the DAHFMO of the University of Rome, *La Sapienza*: "Statistical analysis of laboratory experiments".

2007: collaboration with the DAHFMO of the University of Rome, *La Sapienza*, "Molecular mechanism involved in muscle atrophy: role of paracrine and endocrine factors in atrophic phenotype modulation".

2008: 2 months post-doctoral fellowship in Dr. N. Peyrieras' laboratories in CNRS, Paris, learning microinjection techniques on zebra-fish embryos.

Participation at scientific projects

2012-2015 IIT-SAPIENZA: *NATURA - Nanotech Approaches for The stUdy and cuRe of Als*. P.I.: Prof. Irene Bozzoni.

2012-2015 FIRB Futuro In Ricerca: *Role of oxidative stress in the modulation of muscle homeostasis and therapeutic approach by antioxidants delivered by targeted liposomes.* P.I.: Dr. Viviana Moresi.

2014 Academic starting research project: *Confronto sperimentale di tre tipologie di batterie agli ioni e ai polimeri di litio in base alle caratteristiche energetiche, economiche, e alla sicurezza d'esercizio.* P.I.: Dr. Stefano Alessandrini.

2012 Academic research project: *Misura della funzionalità biomeccanica del muscolo diaframmatico in modelli murini di Sclerosi Laterale Amiotrofica*. P.I.: Prof. Z. Del Prete.

2011 FARI Academic research project: *Celle a combustibile SOFC ad alimentazione diretta con NH3: studio ed ottimizzazione del processo di reforming interno*. P.I.: Prof. Z. Del Prete.

2010 Academic research project: *Caratterizzazione biomeccanica e funzionale senza contatto di fibre muscolari transgeniche e di costrutti cellulari ingegnerizzati mediante precursori miogenici*. P.I.: Prof. Z. Del Prete.

2009-2011 Academic research project: *Ruolo della nicchia tissutale nella rigenerazione muscolare.* P.I.: Prof. A. Musarò.

2007-2010 TELETHON: *Muscle control of motor neuron degeneration and survival in neuromuscular diseases*. P.I.: Prof. A. Musarò.

2007-2010 Cenci-Bolognetti: *Study of the molecular and cellular mechanisms of sarcopenia: role of mIGF-1 and oxidative stress*. P.I.: Prof. A. Musarò.

2007-2011 7FP MYOAGE: *Understanding and Combating age related muscle weakness.* P.I.: Prof. A. Musarò.

2007-2010 Academic research project: *Studio dei meccanismi molecolari della sarcopenia.* P.I.: Prof. A. Musarò.

2006-2008 Academic research project: *Il contributo del muscolo scheletrico alla patogenesi della Sclerosi Laterale Amiotrofica.* P.I.: Prof. A. Musarò.

Reviewer

- Journal of the Mechanical Behavior of Biomedical Materials
- IEEE Transaction on Instrumentation and Medicine
- Experimental Techniques

Teaching activity

2004-present: continuously involved in teaching and examination activity for the following academic courses:

- *Mechanical and Thermal Measurements*, Prof. Z. Del Prete, faculty of Mechanical Engineering and Energetic Engineering, University of Rome "La Sapienza";
- *Mechanical Measurements*, Prof. Z. Del Prete, faculty of Biomedical Engineering, University of Rome "La Sapienza";
- *Biomechanical characterization of biological and in vitro engineered tissues*, Prof. Z. Del Prete, faculty of Medical Biotechnologies, University of Rome "La Sapienza";
- *Biomechanics and Tissue Engineering Laboratory,* , Prof. Z. Del Prete, faculty of Biomedical Engineering, University of Rome "La Sapienza";

2007-08: Tutorial activity for the academic course *Mechanical and Thermal Measurements*, Prof. Z. Del Prete, faculty of Mechanical Engineering, University of Rome "La Sapienza";

2007-present: tutor of two PhD student in *Morphogenesis & Tissue Engineering*, under the supervision of Prof A. Musarò and Prof. Z. Del Prete;

2013-present: tutor of one PhD student in *Industrial Production Engineering,* under the supervision of Prof. Z. Del Prete;

2012-2013: tutor of two students for the master degree in Biomedical Engineering under the supervision of the Prof. Z. Del Prete:

2006-10: Tutor of six students for the master degree in mechanical engineering under the supervision of the Prof. Z. Del Prete:

2012-present: tutor of two students for the master degree in Medical Biotechnologes under the supervision of the Prof. Z. Del Prete:

2012: tutor of one batchelor degree in Mechanical Engineering under the supervision of the Prof. Z. Del Prete.

Society memberberships

-2015-present: IEEE Instrumentation and Measurement Society Membership

Awards

Poster selected as a finalist in the PhD Student Paper Competition at the 2010 Summer Bioengineering Conference in Naples, Florida: Morpho-functional interaction between muscle and tendon in hypertrophic MLC/MIGF-1 mice.

National Instruments First Prize for the best thesis of "Build your Future 2003" Contest.

Emanuele Rizzuto publication list on peer-reviewed journals

1. **Rizzuto E**.*, Carosio S., Faraldi M., Pisu S., Musarò A. and Del Prete Z. *A DIC Based Technique to Measure the Contraction of a Skeletal Muscle Engineered Tissue*. **Applied Bionics and Biomechanics**. Volume 2016, 2016;
2. Pelosi L., Berardinelli M.G., Forcina L., Spelta E., **Rizzuto E**., Nicoletti C., Camilli C., Testa E., Catizone A., De Benedetti F. and Musarò A. *Increased levels of interleukin-6 exacerbate the dystrophic phenotype in mdx mice.* **Human Molecular Genetics**. Volume 24, 21, 2015;
3. Pigna E., Berardi E., Aulino P., **Rizzuto E**., Zampieri S., Carraro U., Kern H., Merigliano S., Gruppo M., Mericskay M., Li Z., Rocchi M., Barone R., Macaluso F., Di Felice V., Adamo S., Coletti D. and Moresi, V. *Aerobic Exercise and Pharmacological Treatments Counteract Cachexia by Modulating Autophagy in Colon Cancer*. **Scientific Reports**. Volume 6, 31 2016;
4. Biferi M.G., Nicoletti C., Falcone G., Puggioni E.M.R., Passaro N., Mazzola A., Pajalunga D., Zaccagnini G., **Rizzuto E**., Zentilin L., De Luca G., Giacca M., Martelli F., Musio A., Musarò A., Auricchio A. and Crescenzi M. *Proliferation of multiple cell types in the skeletal muscle tissue elicited by acute p21 suppression.* **Molecular Therapy**. Volume 23, Issue 5, 9 2015;
5. **Rizzuto E**. *, Pisu S., Musarò A. and Del Prete Z. *Measuring neuromuscular junction functionality in the SOD1^{G93A} animal model of Amyotrophic Lateral Sclerosis.* **Annals of Biomedical Engineering**. Volume 43, Issue 9, 2015;
6. **Rizzuto E**. *, Carosio S. and Del Prete Z. *Characterization of a Digital Image Correlation system for small biological tissues dynamic strain measurements*. **Experimental Technique**. Volume 40, Issue 2, 2016;
7. **Rizzuto E**. *, Palange P. and Del Prete Z. *Characterization of an ammonia decomposition process by means of a multifunctional catalytic membrane reactor*. **International Journal of Hydrogen Energy**, 2014, 11403-11410;
8. **Rizzuto E**. *, Catizone A., Musarò A. and Del Prete Z. *Dystrophic tendon functionality is recovered by muscle-specific expression of insulin-like growth factor in mdx mice.* **Journal of Biomechanics** 2013; 1;46(3);
9. Carosio S., Barberi L., **Rizzuto E**., Nicoletti C., Del Prete Z.and Musarò A. *Generation of eX vivo-vascularized Muscle Engineered Tissue (X-MET).* **Scientific Reports** 2013; 3:1420;
10. Pierno S., Camerino G.M., Cannone M., Liantonio A., De Bellis M., Digennaro C., Gramegna G., De Luca A., Germinario E., Danieli- Betto D., Betto R., Dobrowolny G., **Rizzuto E**., Musarò A., Desaphy J.F. and Conte Camerino D. *Paracrine Effects of IGF-1 Overexpression on the Functional Decline Due to Skeletal Muscle Disuse: Molecular and Functional Evaluation in Hindlimb Unloaded MLC/mIgf-1 Transgenic Mice.* **PLoS ONE** 2013; 8, 6;
11. Kuraitis D., Ebadi D., Zhang P., **Rizzuto E**., Vulesevic B., Padavan D.T., Al Madhoun A., McEwan K.A., Sofrenovic T., Nicholson K., Whitman S.C., Mesana T.G., Skerjanc I.S., Musarò A., Ruel M. and Suuronen E.J. *Injected matrix stimulates myogenesis and regeneration of mouse skeletal muscle after ischaemic injury.* **European Cells and Materials** 2012 Sep 12, 24: 175-96;
12. Giacinti L., Giacinti C., Gabellini C., **Rizzuto E**., Lopez M. and Giordano A. *Scriptaid effects on breast cancer cell lines.* **Journal of Cellular Physiology** 2011 Dec 29;

13. Aulino P., Berardi E., Cardillo V.M., **Rizzuto E**., Perniconi B., Ramina C., Padula F., Spugnini E.P., Baldi A., Faiola F., Adamo S. and Coletti D. *Molecular, cellular and physiological characterization of the cancer cachexia-inducing C26 colon carcinoma in mouse.* **BMC Cancer**. 2010 Jul 8;10(1):363;
14. Scicchitano B.M., **Rizzuto E**. and Musarò A. Review: *Counteracting muscle wasting in aging and neuromuscular diseases: the critical role of IGF-1.* 2009 **AGING**, vol. 1 (5); p. 451-457;
15. Messina S., Bitto A., Aguennouz M., Mazzeo A., Migliorato A., Polito F., Irrera N., Altavilla D., Vita G.L., Russo M., Naro A, De Pasquale M.G., **Rizzuto E**., Musarò A., Squadrito F. and Vita G. *Flavocoxid counteracts muscle necrosis and improves functional properties in mdx mice: a comparison study with methylprednisolone.* **Experimental Neurology** 2009 Sep 25;
16. **Rizzuto E**., Musarò A., Catizone A. and Del Prete Z. *Measuring tendon properties in mdx mice: cell viability and viscoelastic characteristics.* **Journal of Biomechanics** 2009 Oct 16;42(14):2243-8;
17. Moresi V., Garcia-Alvarez G., Pristerà A., **Rizzuto E.**, Albertini M., Rocchi M., Marazzi G., Sassoon D., Adamo S. and Coletti D. *Vasopressin Rescues TNF-Mediated Inhibition of Muscle Regeneration.* **PLoS ONE**. 2009; 4(5): e5570. Epub 2009 May 18;
18. Messina S., Aguennouz M., Mazzeo A., Migliorato A., Bitto A., Vita G.L., Russo M., **Rizzuto E.**, Musaro A., Squadrito F. and Vita G. *Nuclear factor-kappaB, mitogen-activated protein kinases and cyclooxygenase/5-lipoxygenase pathway inhibition by flavocoxid improves muscle function and morphology in mdx mice: a comparison study with methylprednisolone*. **Neuromuscular Disorders** 2009, vol 19, p 583;
19. Dobrowolny G., Aucello M., **Rizzuto E**., Beccafico S., Mammucari C., Bonconpagni S., Belia S., Wannenes F., Nicoletti C., Del Prete Z., Rosenthal N., Molinaro M., Protasi F., Fanò G., Sandri M. and Musarò A. *Skeletal Muscle Is a Primary Target of SOD1(G93A)-Mediated Toxicity.* **Cell Metabolism** 2008 Nov;8(5):425-36;
20. Denti M.A., Incitti T., Sthandier O., Nicoletti C., De Angelis F.G., **Rizzuto E**., Auricchio A., Musarò A. and Bozzoni I. *Long-term benefit of AAV/antisense-mediated exon skipping in dystrophic mice.* **Human Gene Therapy** 2008 Jun;19(6):601-8;
21. Del Prete Z., Musarò A. and **Rizzuto E**. *Measuring mechanical properties, including isotonic fatigue, of fast and slow MLC/mIgf-1 transgenic skeletal muscle*. **Annals of Biomedical Engineering** 2008, Jul;36(7): 1281–1290;
22. Pelosi L., Giacinti C., Nardis C., Borsellino G., **Rizzuto E**., Nicoletti C., Wannenes F., Battistini L., Rosenthal N., Molinaro M. and Musarò A. *Local expression of IGF-1 accelerates muscle regeneration by rapidly modulating inflammatory cytokines and chemokines*. **FASEB Journal** 2007, May;21(7):1393-402.