

## Marta Murgia

Department of Biomedical Sciences, University of Padova, Italy

Email: [marta.murgia@unipd.it](mailto:marta.murgia@unipd.it), tel: +39 049 8276031

---

### Education

**Ph.D.:** Cell Biology and Pathology, University of Padova, Italy (1997). Dissertation: Calcium homeostasis in the cytosol and in other cellular compartments.

**Bachelor's and Master's degrees:** Biology-Cell Biology, University of Padova. Magna cum Laude. Thesis: Extracellular ATP as a mediator of cell death in mammalian cells.

### Current Research Interests:

Mass-Spectrometry-based proteomics of single muscle fibers. Combining advanced sample preparation methods with new generation instruments and innovative computational, we have provided the first proteome of single muscle fibers, and thus of single cells (Murgia et al, EMBO Rep, 2015). Building on this workflow, we have analysed the effects of aging (Murgia et al, Cell Reports 2017), mitochondrial disorders (Murgia et al, Cell Reports 2019) and disuse on Earth and in space (Murgia et al, PNAS Nexus 2022) on the skeletal muscle fiber proteome. We are also using plasma proteomics to relay the status of skeletal muscle (Murgia et al (JCSM 2022).

### Publications in refereed journals

Plasma proteome profiling of healthy subjects undergoing bed rest reveals unloading-dependent changes linked to muscle atrophy. **Murgia M**, Brocca L, Monti E, Franchi MV, Zwiebel M, Steigerwald S, Giacomello E, Sartori R, Zampieri S, Capovilla G, Gasparini M, Biolo G, Sandri M, Mann M, Narici MV. *J Cachexia Sarcopenia Muscle*. 2022 Dec 14. doi: 10.1002/jcsm.13146.

Signatures of muscle disuse in spaceflight and bed rest revealed by single muscle fiber proteomics

**Marta Murgia**, Stefano Ciciliot, Nagarjuna Nagaraj, Carlo Reggiani, Stefano Schiaffino, Martino V Franchi, Rado Pišot, Boštjan Šimunič, Luana Toniolo, Bert Blaauw, Marco Sandri, Gianni Biolo, Martin Flück, Marco V Narici, Matthias Mann. *PNAS Nexus*, Volume 1, Issue 3, July 2022, pgac086,

HAX1-dependent control of mitochondrial proteostasis governs neutrophil granulocyte differentiation. Fan Y, **Murgia M**, Linder MI, Mizoguchi Y, Wang C, Łyszkiewicz M, Ziętara N, Liu Y, Frenz S, Sciuccati G, Partida-Gaytan A, Alizadeh Z, Rezaei N, Rehling P, Dennerlein S, Mann M, Klein C. *J Clin Invest*. 2022 May 2;132(9):e153153.

Protein profile of fiber types in human skeletal muscle: a single-fiber proteomics study. **Murgia M**, Nogara L, Baraldo M, Reggiani C, Mann M, Schiaffino S. *Skelet Muscle*. 2021 Nov 2;11(1):24.

Multi-Omics Approach to Mitochondrial DNA Damage in Human Muscle Fibers. Elstner M, Olszewski K, Prokisch H, Klopstock T, **Murgia M**. *Int J Mol Sci*. 2021 Oct 14;22(20):11080.

Neuromuscular junction instability and altered intracellular calcium handling as early determinants of force loss during unloading in humans. Monti E, Reggiani C, Franchi MV, Toniolo L, Sandri M, Armani A, Zampieri S, Giacomello E, Sarto F, Sirago G, **Murgia M**, Nogara L, Marcucci L, Ciciliot S, Šimunic B, Pišot R, Narici MV. *J Physiol*. 2021 Jun;599(12):3037-3061.

Deep muscle-proteomic analysis of freeze-dried human muscle biopsies reveals fiber type-specific adaptations to exercise training. Deshmukh AS, Steenberg DE, Hostrup M, Birk JB, Larsen JK, Santos A, Kjøbsted R, Hingst JR, Schéele CC, **Murgia M**, Kiens B, Richter EA, Mann M, Wojtaszewski JFP. *Nat Commun*. 2021 Jan 12;12(1):304.

Yeast homologs of human MCUR1 regulate mitochondrial proline metabolism. Zulkifli M, Neff JK, Timbalia SA, Garza NM, Chen Y, Watrous JD, **Murgia M**, Trivedi PP, Anderson SK, Tomar D, Nilsson R, Madesh M, Jain M, Gohil VM. *Nat Commun*. 2020 Sep 25;11(1):4866.

Proteomics of Cytochrome c Oxidase-Negative versus -Positive Muscle Fiber Sections in Mitochondrial Myopathy. **Murgia M**, Tan J, Geyer PE, Doll S, Mann M, Klopstock T. *Cell Rep.* 2019 Dec 17;29(12):3825-3834.e4.

SILAC-based quantitative proteomics using mass spectrometry quantifies endoplasmic reticulum stress in whole HeLa cells. Itzhak DN, Sacco F, Nagaraj N, Tyanova S, Mann M, **Murgia M**. *Dis Model Mech.* 2019 Nov 11;12(11):dmm040741.

Fiber type diversity in skeletal muscle explored by mass spectrometry-based single fiber proteomics. Schiaffino S, Reggiani C, **Murgia M**. *Histol Histopathol.* 2020 Mar;35(3):239-246. doi: 10.14670/HH-18-170. Epub 2019 Oct 15. PMID: 31612964

Compartment-resolved Proteomic Analysis of Mouse Aorta during Atherosclerotic Plaque Formation Reveals Osteoclast-specific Protein Expression. Wierer M, Prestel M, Schiller H, Yan G, Schaab C, Azghandi S, Werner J, Kessler T, Malik R, **Murgia M**, Aherrahrou Z, Schunkert H, Dichgans M, Mann M. *Mol Cell Proteomics.* 2018 Feb;17(2):321-334.

Single Muscle Fiber Proteomics Reveals Fiber-Type-Specific Features of Human Muscle Aging

**Murgia M**, Toniolo L, Nagaraj N, Ciciliot S, Vindigni V, Schiaffino S, Reggiani C, Mann M. *Cell Rep.* 2017 Jun 13;19(11):2396-2409.

Role of p66shc in skeletal muscle function. Granatiero V, Gherardi G, Vianello M, Salerno E, Zecchini E, Toniolo L, Pallafacchina G, **Murgia M**, Blaauw B, Rizzuto R, Mammucari C. *Sci Rep.* 2017 Jul 24;7(1):6283

Comments on Stuart et al.(2016):“Myosin content of individual human muscle fibers isolated by laser capture microdissection” Schiaffino S, **Murgia M**, Leinwand LA, Reggiani C. *Am J Physiol Cell Physiol.* 2016 Dec 1;311(6):C1048-C1049

MRF4 negatively regulates adult skeletal muscle growth by repressing MEF2 activity. Moretti I, Ciciliot S, Dyar KA, Abraham R, **Murgia M**, Agatea L, Akimoto T, Bicciato S, Forcato M, Pierre P, Uhlén NH, Rigby PW, Carvajal JJ, Blaauw B, Calabria E, Schiaffino S. *Nat Commun.* 2016 Aug 3;7:12397

Calsequestrins in skeletal and cardiac muscle from adult Danio rerio. Furlan S, Mosole S, **Murgia M**, Nagaraj N, Argenton F, Volpe P, Nori A. *J Muscle Res Cell Motil.* 2016 Apr;37(1-2):27-39

Mitochondrial specialization revealed by single muscle fiber proteomics: focus on the Krebs cycle. Schiaffino S, Reggiani C, Kostrominova TY, Mann M, **Murgia M**. *Scand J Med Sci Sports.* 2015 Dec;25 Suppl 4:41-8.

Molecular diversity and pleiotropic role of the mitochondrial calcium uniporter. **M Murgia**, R Rizzuto 2015 *Cell Calcium* 58 (1), 11-17

Deep proteomics of mouse skeletal muscle enables quantitation of protein isoforms, metabolic pathways, and transcription factors. Deshmukh AS, **Murgia M**, Nagaraj N, Trebak JT, Cox J, Mann M. *Mol Cell Proteomics.* 2015 Apr;14(4):841-53

Antisense-mediated exon skipping: a therapeutic strategy for titin-based dilated cardiomyopathy. Gramlich M, Pane LS, Zhou Q, Chen Z, **Murgia M**, Schötterl S, Goedel A, Metzger K, Brade T, Parrotta E, Schaller M, Gerull B, Thierfelder L, Aartsma-Rus A, Labeit S, Atherton JJ, McGaughan J, Harvey RP, Sinnecker D, Mann M, Laugwitz KL, Gawaz MP, Moretti A. *EMBO Mol Med.* 2015 May;7(5):562-76

Single muscle fiber proteomics reveals unexpected mitochondrial specialization. **Murgia M**, Nagaraj N, Deshmukh AS, Zeiler M, Cancellara P, Moretti I, Reggiani C, Schiaffino S, Mann M. *EMBO Rep.* 2015 Mar;16(3):387-95.

Comparative proteome analysis of secreted proteins from insulin-resistant C2c12 cells. AS Deshmukh, **M Murgia**, P Boersema, M Mann. 2012 *The Febs Journal* 279, 238

Multiple signalling pathways redundantly control glucose transporter GLUT4 gene transcription in skeletal muscle. **Murgia M**, Jensen TE, Cusinato M, Garcia M, Richter EA, Schiaffino S. *J Physiol.* 2009 Sep 1;587(Pt 17):4319-27

NFAT isoforms control activity-dependent muscle fiber type specification. Calabria E, Ciciliot S, Moretti I, Garcia M, Picard A, Dyar KA, Pallafacchina G, Tothova J, Schiaffino S, **Murgia M**. *Proc Natl Acad Sci U S A.* 2009 Aug 11;106(32):13335-40

Controlling metabolism and cell death: at the heart of mitochondrial calcium signalling

**M Murgia**, C Giorgi, P Pinton, R Rizzuto. 2009 *Journal of molecular and cellular cardiology* 46 (6), 781-788

Activity-dependent signaling pathways controlling muscle diversity and plasticity. Schiaffino S, Sandri M, **Murgia M**. *Physiology (Bethesda).* 2007 Aug;22:269-78. Review.