BIOGRAPHICAL SKETCH

NAME	POSITION TITLE
Masgras Ionica	CNR Research Scientist
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
University of Padova, Italy	B.Sc.	07/2008	Molecular Biology
University of Leicester, UK University of Padova, Italy	M.Sc.	07/2010	Molecular Biology
University of Padova, Italy	Ph.D.	03/2014	Biosciences and Biotechnology, *curriculum* of Cellular Biology
University of Padova, Italy University of Texas Southwestern, Dallas, USA	Post-doctoral research fellow	2014 - 2019	Tumor metabolism
Institute of Neuroscience, National Research Council (CNR) and University of Padova, Italy	CNR Research Scientist	2019 - current	Tumor metabolism, Molecular oncology, Immunometabolism

A. Personal Statement

I have always been passionate of oncology and I had the chance to approach the field from a very innovative perspective, which is the possibility to exploit metabolic adaptations as novel antineoplastic therapies (Masgras et al., Front Oncol 2017; Cannino et al., Front Oncol 2018; Masgras et al., Cell Death Differ 2022). This strategy is even more relevant to the field of neurofibromatosis type 1 (NF1) as, only recently, the NF scientific community has started to tackled this tumor predisposing syndrome from this angle. My contribution to the field, thanks to the Young Investigator Award Grant sponsored by the *Children's Tumor Foundation* during my Post-doc studies, is based on the identification of TRAP1 inhibition as an anti-neoplastic approach to hinder the growth of neurofibromin-deficient cells (Masgras et al., Cell Rep 2017) which undergo significant mitochondrial adaptations (Masgras et al., CDD 2022). In order to translate these findings to mouse models of NF1 disease and thanks to the Short Term Fellowship from *European Molecular Biology Organization* (*EMBO*), I have been a Visiting Research Scholar in the laboratory of Prof. Lu Le Q. (University of Texas Southwestern, Dallas, USA), a major international expert of NF1. I imported mouse models of NF1 tumors to the University of Padova where I currently utilize them also providing my support to Dr. Rasola's group for the *in vivo* translation of the recently developed TRAP1 inhibitors (Sanchez-Martin et al., Cell Rep 2020) which show unprecedented pharmacological opportunities.

As an independent CNR Research scientist my long-term interest regard the metabolic adaptations in the plasticity of tumors associated to peripheral nerves. My studies are not only aimed at revealing basic mechanisms in the biology of tumors but also point to the development of innovative therapeutic options such as the displacement of the enzyme Hexokinase 2 (HK2) from mitochondria to trigger cancer cell death (Ciscato et al., EMBO Rep. 2020; Ciscato et al., Cells 2024). Furthermore, I am investigating the mitochondrial metabolism of immune system associated with NF1-related neoplasms. Our work, thanks to the My First AIRC grant, has the goal of identifying crucial crosstalk mechanisms between neoplastic Schwann cells and macrophages that could be key in the tumor growth. To this aim I will take advantage of the novel mouse model of MPNST development upon nerve injury that I have conceived in collaboration with Dr. Ciscato F. (CNR) and Dr. Negro S. (University of Padova). By blending transcriptomic and metabolomic approaches and *in vivo* modeling of MPNSTs my scope is to find novel therapeutic targets in the tumor microenvironment that could be exploited for effective anti-neoplastic opportunities.

B. Positions and Honors

Positions and Employment

April – June 2008	**Undergraduate Internship** in Molecular Biology, Laboratory of Prof. Vera Bianchi, Department of Biology, University of Padova, Italy
September – October 2008	**Internship**, Laboratory of Prof. Vera Bianchi, University of Padova, Italy *Funds*: **"Premio di studio"** from Telethon Foundation supporting continuation of my previous research activity.
September 2009 – June 2010	**Master Internship**, Laboratory of Prof. Salvador Macip, Department of Biochemistry, University of Leicester, UK *Funds*: ***Erasmus*** Fellowship achievement from University of Padova supporting an exchange program.
January 2011 – December 2013	**Ph.D. student in Biosciences and Biotechnology,** Laboratory of Prof. Andrea Rasola and Prof. Paolo Bernardi, Department of Biomedical Sciences, University of Padova, Italy *Funds*: **Ph.D. Scholarship** achievement from University of Padova.
January 2014 – June 2016:	**Junior Post-Doc** fellow, Laboratory of Prof. Andrea Rasola, Department of Biomedical Sciences, University of Padova, Italy *Funds*: "**Assegno di Ricerca Junior**" (January 2014 – December 2015) achievement from University of Padova and AIRC grant (January 2016 – June 2016, ended because I was awarded the Young Investigator Grant) for a project titled "Analysis of the role of the mitochondrial chaperone TRAP1 in the metabolic rewiring of tumor cells" (accorded to A. Rasola).
April – September 2016	**Visiting Research Scholar,** Laboratory of Prof. Lu Le Q., Department of Dermatology, University of Texas Southwestern Medical Center, Dallas, Texas, USA *Funds*: ***EMBO* Short Term Fellowship** (ASTF No.: 271-2016) from the *European Molecular Biology Organization* (*EMBO*) supporting 3 months of the Visiting Research Scholar.
July 2016 – July 2018	**Young Investigator**, Department of Biomedical Sciences, University of Padova, Italy *Funds*: Individual **Young Investigator Award** grant (ID: 2016-01-010) sponsored by *Children's Tumor Foundation* on the project entitled "TRAPping the metabolic adaptations of NF1-associated tumors".
July 2018 – November 2019	**Senior Post-Doc** fellow, Laboratory of Prof. Andrea Rasola, Department of Biomedical Sciences, University of Padova, Italy *Funds*: *Neurofibromatosis Therapeutic Acceleration Program* (*NTAP*) grant for a project titled "TRAPping the metabolic adaptations of plexiform neurofibroma" (accorded to A. Rasola).
from November 2019	CNR Researcher (Neuroscience Institute c/o Department of Biomedical Sciences, University of Padova, Italy)

Professional Memberships

2011 –	Member, Bioenergetics Italian Group – GIBB (Gruppo Italiano di Biomembrane e Bioenergetica)
2011 –	Junior Member, Association of Cellular Biology and Differentiation – ABCD (Associazione di Biologia Cellulare e del Differenziamento)
2014 –	Member, Italian Cancer Society – SIC (Società Italiana di Cancerologia)
2014 –	Member, European Association for Cancer Research (EACR)

Honors

"Premio di studio" September – October 2008 from University of Padova (Italy) in collaboration with Telethon Foundation.

Erasmus Fellow September 2009 – June 2010 (University of Leicester, United Kingdom).

Best oral presentation at the Annual meeting of Bioenergetics Italian Group-GIBB (Roma, Italy, 24-27 May, 2011).

Selected poster for oral presentation at Annual CNR Neuroscience meeting (Bressanone, Italy, February 2012).

Seahorse Bioscience Travel Award Winner for Poster presentation at the European Bioenergetics Conference-EBEC (Freiburg, Germany, 15-20 September 2012).

Best oral presentation and **best poster** at PhD day of School of Biosciences and Biotechnology (Padova, June 18, 2013).

Best oral presentation at the Annual meeting of Bioenergetics Italian Group-GIBB (Padova, Italy, 20-22 June 2013).

Selected abstract for oral presentation at the 16th European Scientific Neurofibromatosis Meeting (Barcelona, Spain, 4-7 September 2014).

Selected abstract for oral presentation at EACR-AACR-SIC Special Conference on Anticancer Drug Action and Drug Resistance: from Cancer Biology to the Clinic (Firenze, Italy, 20-23 June 2015).

EMBO Short Term Fellowship from European Molecular Biology Organization (EMBO) for 3 months visit at The University of Texas Southwestern Medical Center in the laboratory of Prof. Lu Le Q. (Dept. of Dermatology).

Young Investigator Award Grant from Children's Tumor Foundation for 2 years research support of the project "TRAPping the metabolic adaptations of NF1-associated tumors", from July 2016 to July 2018.

Selected abstract for oral presentation at 2016 NF conference (Austin, Texas, USA, 18-21 June 2016).

Young Veneto Excellence Award 2017 from "*Padovani nel mondo*" association for bringing regional excellence throughout the world.

***Mario e Lina Austoni* Award (10.000€) - 2017 Edition** from University of Padova for scientific achievements in the field of cancer.

Premio scientifico (scientific award) DSB 2024 (40.000€) for young researchers of the Department of Biomedical Sciences of CNR for the project *"Comunicazione tra cellule di Schwann neoplastiche e macrofagi nei tumori maligni della guaina nervosa: una prospettiva metabolica"*.

C. Peer-reviewed Publications

Total peer-reviewed publications: 20 (plus 2 Book Chapters)

	Google Scholar	Scopus
Total number of citations	1300	1018
***h* index**	15	15

Scopus ID: 55070676900
ORCID ID: https://orcid.org/0000-0002-9768-460X

Scantamburlo F, **Masgras I**, Ciscato F, Laquatra C, Frigerio F, Cinquini F, Pavoni S, Triveri A, Frasnetti E, Serapian SA, Colombo G, Rasola A, Moroni E. Design and Test of Molecules that Interfere with the Recognition Mechanisms between the SARS-CoV-2 Spike Protein and Its Host Cell Receptors. J Chem Inf Model. 2024 Nov 11;64(21):8274-8282.

Ciscato F, **Masgras I**, Gori A, Fantuz M, Bergamaschi G, Komarov D, La Spina M, Ghasemi-Firouzabadi S, Pizzi M, Dei Tos AP, Chiara F, Carrer A, Rasola A. The Use of Hexokinase 2-Displacing Peptides as an Anti-Neoplastic Approach for Malignant Peripheral Nerve Sheath Tumors. Cells. 2024 Jul 8;13(13):1162.

Boso D, Tognon M, Curtarello M, Minuzzo S, Piga I, Brillo V, Lazzarini E, Carlet J, Marra L, Trento C, Rasola A, **Masgras I**, Caporali L, Del Ben F, Brisotto G, Turetta M, Pastorelli R, Brunelli L, Navaglia F, Esposito G, Grassi A, Indraccolo S. Anti-VEGF therapy selects for clones resistant to glucose starvation in ovarian cancer xenografts. J Exp Clin Cancer Res. 2023 Aug 7;42(1):196.

Masgras I, Cannino G, Ciscato F, Sanchez-Martin C, Darvishi FB, Scantamburlo F, Pizzi M, Menga A, Fregona D, Castegna A, Rasola A. Tumor growth of neurofibromin-deficient cells is driven by decreased respiration and hampered by NAD+ and SIRT3. Cell Death Differ. 2022 Oct;29(10):1996-2008.

Cannino G, Urbani A, Gaspari M, Varano M, Negro A, Filippi A, Ciscato F, **Masgras I**, Gerle C, Tibaldi E, Brunati AM, Colombo G, Lippe G, Bernardi P, Rasola A. The mitochondrial chaperone TRAP1 regulates F-ATP synthase channel formation. Cell Death Differ. 2022 Dec;29(12):2335-2346.

Masgras I, Laquatra C, Cannino G, Serapian SA, Colombo G, Rasola A. The molecular chaperone TRAP1 in cancer: From the basics of biology to pharmacological targeting. Semin Cancer Biol. 2021 Jul 6:S1044-579X(21)00196-6.

Ciscato F, Ferrone L, **Masgras I**, Laquatra C, Rasola A. Hexokinase 2 in Cancer: A Prima Donna Playing Multiple Characters. Int J Mol Sci. 2021 Apr 29;22(9):4716.

Laquatra C, Sanchez-Martin C, Dinarello A, Cannino G, Minervini G, Moroni E, Schiavone M, Tosatto S, Argenton F, Colombo G, Bernardi P, **Masgras I***, Rasola A. HIF1α-dependent induction of the mitochondrial chaperone TRAP1 regulates bioenergetic adaptations to hypoxia. Cell Death Dis. 2021 May 1;12(5):434.

Zonta F, Borgo C, Quezada Meza CP, **Masgras I**, Rasola A, Salvi M, Pinna LA, Ruzzene M. Contribution of the CK2 Catalytic Isoforms α and α' to the Glycolytic Phenotype of Tumor Cells. Cells. 2021 Jan 18;10(1):181.

Sanchez-Martin C, Menon D, Moroni E, Ferraro M, **Masgras I**, Elsey J, Arbiser JL, Colombo G, Rasola A. Honokiol Bis-Dichloroacetate Is a Selective Allosteric Inhibitor of the Mitochondrial Chaperone TRAP1. Antioxid Redox Signal. 2021 Mar 1;34(7):505-516.

Ciscato F, Filadi R, **Masgras I**, Pizzi M, Marin O, Damiano N, Pizzo P, Gori A, Frezzato F, Chiara F, Trentin L, Bernardi P, Rasola A. Hexokinase 2 displacement from mitochondria-associated membranes prompts Ca2+ -dependent death of cancer cells. EMBO Rep. 2020;21(7):e49117.

Sanchez-Martin C, Moroni E, Ferraro M, Laquatra C, Cannino G, **Masgras I**, Negro A, Quadrelli P, Rasola A, Colombo G. Rational Design of Allosteric and Selective Inhibitors of the Molecular Chaperone TRAP1. Cell Rep. 2020;31(3):107531.

Guo L, Carraro M, Carrer A, Minervini G, Urbani A, **Masgras I**, Tosatto SCE, Szabò I, Bernardi P, Lippe G. Arg-8 of yeast subunit e contributes to the stability of F-ATP synthase dimers and to the generation of the full-conductance mitochondrial megachannel. J Biol Chem. 2019 Jul 12;294(28):10987-10997.

Cannino G, Ciscato F, **Masgras I**, Sánchez-Martín C, Rasola A. Metabolic Plasticity of Tumor Cell Mitochondria. *Front Oncol.* 2018 Aug 24;8:333.

Chen J, Guccini I, Mitri DD, Brina D, Revandkar A, Sarti M, Pasquini E, Alajati A, Pinton S, Losa M, Civenni G, Catapano CV, Sgrignani J, Cavalli A, D'Antuono R, Asara JM, Morandi A, Chiarugi P, Crotti S, Agostini M, Montopoli M, **Masgras I**, Rasola A, Garcia-Escudero R, Delaleu N, Rinaldi A, Bertoni F, Bono J, Carracedo A, Alimonti A. Compartmentalized activities of the pyruvate dehydrogenase complex sustain lipogenesis in prostate cancer. Nat Genet. 2018 Jan 15.

Masgras I, Sanchez-Martin C, Colombo G, Rasola A. The Chaperone TRAP1 As a Modulator of the Mitochondrial Adaptations in Cancer Cells. Front Oncol. 2017 Mar 29;7:58.

Masgras I, Ciscato F, Brunati AM, Tibaldi E, Indraccolo S, Curtarello M, Chiara F, Cannino G, Papaleo E, Lambrughi M, Guzzo G, Gambalunga A, Pizzi M, Guzzardo V, Rugge M, Vuljan SE, Calabrese F, Bernardi P, Rasola A. Absence of Neurofibromin Induces an Oncogenic Metabolic Switch via Mitochondrial ERK-Mediated Phosphorylation of the Chaperone TRAP1. Cell Rep. 2017 Jan 17;18(3):659-672.

Kowalik MA, Guzzo G, Morandi A, Perra A, Menegon S, **Masgras I**, Trevisan E, Angioni MM, Fornari F, Quagliata L, Ledda-Columbano GM, Gramantieri L, Terracciano L, Giordano S, Chiarugi P, Rasola A, Columbano A (2016) Metabolic reprogramming identifies the most aggressive lesions at early phases of hepatic carcinogenesis. Oncotarget, under minor revision.

Masgras I, Rasola A, Bernardi P. Induction of the permeability transition pore in cells depleted of mitochondrial DNA. Biochim Biophys Acta. 2012 Oct;1817(10):1860-6. PubMed PMID: 22402226.

Masgras I, Carrera S, de Verdier PJ, Brennan P, Majid A, Makhtar W, Tulchinsky E, Jones GD, Roninson IB, Macip S. Reactive oxygen species and mitochondrial sensitivity to oxidative stress determine induction of cancer cell death by p21. J Biol Chem. 2012 Mar 23;287(13):9845-54. PubMed PMID: 22311974; PubMed Central PMCID: PMC3322987.

Book Chapters:

Ionica Masgras* and Andrea Rasola A (2021) Metabolic Features of Neurofibromatosis Type 1-Associated Tumors. In Neurofibromatosis, edited by Nakayama J, IntechOpen.

Ionica Masgras and Salvador Macip (2013) p21 Mediates Senescence by a Mechanism Involving Accumulation of Reactive Oxygen Species. Tumor Dormancy, Quiescence, and Senescence, Volume 1, Pages 153-167. Editors: M.A. Hayat. Publisher: Springer Netherlands.

*** corresponding author**

D. Reviewing Activities

2019 – Reviewer for Frontiers in Physiology, Scientific Reports, Cell Reports, Cell Metabolism, JBC
2021 – Scientific Evaluation of PhD students, University of Padova, Italy
2021 – Editorial Board, Special Issue on Disease Associated Macrophages, International Journal of Molecular Sciences

E. Institutional Responsibilities

2020 – Member of Committee for the selection of Post-Doctoral fellows
2021 – Member of the Animal House Committee, University of Padova, Italy
Oct 2021 – Member of the Faculty Committee of PhD School in Biomedical Sciences, University of Padova, Italy

F. Research Support

2011-2013: Ph.D. scholarship was funded by University of Padova.

2014-2015: 24 months postdoctoral fellowship funded by the University of Padova.

2016-2018: Young Investigator Award Grant ($100.000) from Children's Tumor Foundation for 2 years post-doctoral research support of the project "*TRAPping the metabolic adaptations of NF1-associated tumors*".

2021: CNR (National Research Council) supports the project "*TRAPping immunometabolism in SARS-CoV-2 infection*" (25.500€, role: PI).

2021: MIUR (Italian Ministry of Research) supports the project "*Targeting the SARS-CoV-2/host cell interaction as a potential antiviral strategy*" (79.929€, role: co-PI).

2023: My First AIRC Grant (MFAG) for the project *"Taming the metabolism of tumor associated macrophages to fight peripheral nerve neoplasms"* (499.595 €, role: PI).

G. Teaching Activities

2023- **"**Professore a contratto" for the laboratory activity of Molecular Biology and Genetics of the course in Biology of Human and Environmental Health (University of Padova)

2023-2033 Abilitazione Scientifica Nazionale (ASN) in Molecular Biology and General Biochemistry (II fascia)