

Curriculum Vitae

Research Experience related to the scientific disciplinary sector MEDS/02

15/06/2015–30/08/2015	<p>Internship KIT- Karlsruhe Institute of Technology, Karlsruhe (Germania) Learning of the CRISPR/Cas9 gene manipulation technique and use of the zebrafish as an experimental animal model.</p>
15/06/2016–16/08/2016	<p>Internship University of Greifswald, Greifswald (Germany) Learning of immuno-histochemistry, western-blot and cell culture techniques for the study of cholangio-carcinoma</p>
10/03/2017–20/06/2017	<p>Internship Centre of Biomedical Investigation-University of Granada, Granada (Spain) Learning of techniques regarding tumor stem cells culture and the analysis of microRNAs in order to identify biomarkers for the diagnosis of colorectal cancer</p>
07/03/2018-07/06/2018	<p>Collaboration Department of Biomedical Sciences - University of Padova, Padova (Italy) Learning of cell culture techniques for gene silencing, molecular biology and mitochondrial physiology. Use of the Sea-Horse instrument to study mitochondrial physiology.</p>
7/01/2019 – 29/2/2020	<p>Collaboration VIB - KU Leuven Center for Cancer Biology Catholic University of Leuven, Leuven (Belgium) Learning of in-vivo techniques on mouse models: surgery, subcutaneous injection of tumor cells, gavage injection of compounds and drugs, intra-peritoneal injection. Colonies use and maintenance of genetically modified animals. Metastases staining techniques (INK). Various <i>in-vitro</i> assays to test cytotoxicity (MTT), migration (trans-well) and cell death of cells cultured with tumor-conditioned media. Primary cell cultures of bone marrow-derived macrophages (BMDMs) Analysis (FACS Canto and FACS Verse) and characterization of tumor and primary immune cells. Production and infection of lentiviruses. Production and use of plasmids for gene silencing purposes.</p>
5/04/2021– 5/09/2021	<p>Research Fellow - Autonomous Region of Sardinia <i>Department of Biomedical Sciences, Unit of Oncology and Molecular Pathology- University of Cagliari, Cagliari (Italy)</i> Project title: “Potential therapeutic use of thyroid hormone and its analogs in hepatocellular carcinoma” Study on the ability of HCC cells to respond to treatment with selective THR-beta agonists through in vitro and in vivo experiments.</p>
5/03/2022–09/06/2022	<p>Collaboration Institute Fur Patologie, Universitat Klinikum Regensburg (Germania) <u>Recipient of the European Molecular Biology Organization (EMBO) Scientific Exchange Grant – Short-Term Fellowship.</u> Project title: Study of the role of the Ral-A proto-oncogene in liver tumors.</p>

01/08/2022–30/11/2022	<p>Collaboration Department of Medical Genetics - University of Cagliari, Cagliari DNA and cDNA libraries Preparation and learning of Next Generation Sequencing techniques using the Illumina machinery. Bioinformatic analysis of data obtained by NGS on the IPA platform.</p>
01/03/2023-present	<p>Type A Researcher (RTDa) – PNRR Department of Biomedical Sciences – University of Cagliari, Cagliari (Italy) Project: HEAL ITALIA (Health Extended Alliance for Innovative Therapies, Advanced Lab-Research, and Integrated Approaches of Precision Medicine) SPOKE 1: Holistic Nosology: FROM PATIENTS TO MOLECULES & BACK – Mapping the omics landscape from the clinical to the molecular environment to identify, classify, and refine phenotypes of multifactorial diseases. Work Package 1 (WP1): Population DNA sequencing and exome mapping aimed at identifying pathogenic genetic variants.</p>
15/01/2024 - 30/07/2024	<p>Collaboration <i>Department of Medical Genetics – University of Cagliari, Cagliari (Italy)</i> DNA extraction techniques from human samples, preparation of DNA and cDNA libraries, and Next Generation Sequencing (NGS) using the Illumina platform. Applied to exome analysis and identification of HLA gene variants in patients affected by chronic inflammatory diseases such as idiopathic pulmonary fibrosis.</p>

Teaching Activity

01/09/2021–21/09/2022	<p>Supervisor and co-supervisor activities Department of Biomedical Sciences-University of Cagliari, Cagliari (Italy)- Unit of Oncology and Molecular Pathology</p> <p>Supervisor of the training internship of students of the master's degree course in Pharmacy and of the master's degree course in Cellular and Molecular Biology. Co-supervisor of theses of students of the master's degree course in Pharmacy and of the master's degree course in Cellular and Molecular Biology.</p> <p>Thesis title:</p> <ol style="list-style-type: none"> 1) Possible role of microRNAs in the anti-tumorigenic effect of thyroid hormone. 2) Possible role of macrophages in the different phases of liver carcinogenesis. 3) Metabolic reprogramming is not exclusive to tumor cells, but can be induced in normal hepatocytes. 4) Analysis of metabolic alterations in models of murine hepatocarcinogenesis induced by different oncogenes.
03/2024 - present	<p>Frontal lessons of General Pathology CFU:3 - A.A. 2023/2024 – 24 hours CFU:4 - A.A. 2024/2025 – 32 hours Topics: General Pathology, Physiopathology, Immunopathology</p>

Education and Training

01/10/2012–27/10/2015	Bachelor's Degree in Biotechnology (L-2) University of Sassari, Sassari (Italy) Mark: 106/110
01/11/2015–21/07/2017	Master's Degree in Sanitary, Medical and Veterinary Biotechnology University of Sassari, Sassari (Italy) Mark: 110/110 cum laude and honourable mention
1/10/2017 – 3/3/2021	PhD in Molecular and Translational Medicine Department of Biomedical Sciences- University of Cagliari, Cagliari (Italy) Recipient of 3-years scholarship Mark: Achieved with Honours Thesis title: Metabolic Reprogramming in oncogene-driven Hepatocellular Carcinoma: Effect of LDHA knock-down.
6/09/2021 – present	Specialization School in Pathology and Clinical Biochemistry University of Cagliari, Cagliari (Italy) Recipient of a 4-years Scholarship

Professional Skills

Molecular Biology	CRISPR/Cas9 technique for genome manipulation, PCR, Real-Time PCR. Extraction of total RNA from serum and tissues. Extraction of total RNA from samples previously embedded in paraffin. Extraction of total RNA and DNA from PBMC. Extraction of circulating DNA from human blood samples. miRNA amplification. Preparation of libraries for Next Generation Sequencing (NGS) analysis. Transcriptome and mutasome analysis starting from tumor lesions acquired using a Leica 6500 LMD laser microdissector. Development of techniques for the extraction of nucleic acids from liver sections subjected to microdissection.
Biochemistry	Electrophoresis, Western Blot, analysis of mitochondrial physiology (measurement of oxygen consumption) using the Sea-Horse instrument. ELISA assay on micro-plates.
Flow Citometry	Flow cytometry, analysis and characterization by FACS Canto and FACS Verse of tumor cells and primary immune cells. Cell-sorting techniques using a flow cytometer/sorter for the isolation of specific cell populations.

Cell Culture	Experience with different tumor lines (e.g. liver tumor lines, colon tumor lines, human and murine lung tumor lines), and stem tumor cells. Various in vitro assays to test cytotoxicity (MTT), migration (trans-well) and cell death of cells cultured with tumor-conditioned media. Isolation of primary cell cultures such as bone marrow-derived macrophages (BMDMs). Experience with lentivirus production and infection. Production and use of plasmids for gene silencing purposes.
In-vivo Experience	Use of different experimental animal models (rat, mouse, zebrafish). Surgery techniques on mice and rats, administration of drugs and compounds via gavage. Metastases staining techniques, subcutaneous injection of tumor lines, intraperitoneal injection. Collection of blood sample via retro-orbital puncture. Use and maintenance of colonies of genetically modified animals. Use of the Cre-loxP-tamoxifen system to induce gene silencing in genetically modified animals.
Histology	Processing techniques for formalin-embedded samples. Microtome and cryostat cutting. Main immunohistochemistry and immunofluorescence techniques. Knowledge on the pathological analysis of macroscopic lesions and many years of experience in pathological analysis under the microscope of the following organs: liver, kidney and heart.
Achievement of specialization courses with acquisition of training credits useful ministerial projects for animal testing	<ul style="list-style-type: none"> - Basic elements for researchers' approach to the use of animals for scientific purposes (2021). - Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna - Basic course on the use of aquatic organisms for scientific purposes (2022) Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna - Zebrafish as a model organism: in vitro and in vivo experimental approaches in scientific research (2022) Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna - Biology and management of laboratory animals, modules 3.1,4, 5, 6.1, 7. Ministerial Decree 5 August 2021 rodents and lagomorphs (2022) Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna

License

Achievement of the "Laboratory of Animal Science" course in accordance to the FELASA B Laboratory Animal Science

Component of National Research Groups

Component of the AIRC 20176 Funded Project - Investigator Grant IG 2017 (Principle Investigator Prof. Amedeo Columbano)

01/01/2020 - 31/05/2024

Research activities under the PNRR project - HEAL ITALIA, MUR code: PE000019.

Researcher involved in the activities of SPOKE 1 "Holistic Nosology: FROM PATIENTS TO MOLECULES & BACK - Mapping the omics landscape of clinical to molecular environment, to identify, classify, and refine the phenotypes of multifactorial diseases. WP1: Population mapping, DNA sequencing, Exome Mapping aimed at identifying pathogenic genetic variants.

01/03/2023 – ongoing

Implementation of research activities under the project “Autonomous Region of Sardinia - Development and Cohesion Fund”. Project title: “Potential therapeutic use of thyroid hormone and its analogs in hepatocellular carcinoma.”

05/04/2021 – 05/09/2021

Prizes and Awards

- Winner of “Full Bursary” Award at the EASL: The International Liver Congress 2021
- Winner of EMBO scientific exchange Grant Short Term Fellowship (3 months) (2022).
- Winner of Travel Grant at the Italian Cancer Society - Società Italiana di Cancerologia (SIC) 2022.

Poster and Abstract

- Selected Abstract for poster presentation at: Metabolism in Cancer and Stromal Cells, Leuven (Belgium) – November 2018
Title: **Thyroid hormone inhibits Hepatocellular Carcinoma (HCC) Development by interfering with the metabolic profile of cancer cells.**
Authors: **Serra M.**, Cabras L., Columbano A., et al.
- Selected Abstract for oral presentation at: GIBB Gruppo Italiano di Biomembrane e Bioenergetica, Modena (Italia) - June 2018
Title: **Targeting the oncogenic role of the chaperone TRAP1 in tumor cell mitochondria**
Authors: Sanchez C., **Serra M.**, Columbano A., Rasola A., et al.
- Selected Abstract for poster presentation at: EASL 2021, THE INTERNATIONAL LIVER CONGRESS.
Title: **Metabolic reprogramming in oncogene-driven hepatocellular carcinoma**
Authors: **Serra M.**, Di Matteo M, Mazzone M, Columbano A
- Selected Abstract for poster presentation at: ISCaM , International Society of Cancer Metabolism, Turin - Italy (28/06-02/07 2022)
Title: **Inhibitory effect of LDHA knock-out on metabolic reprogramming in c-Myc/h-Ras driven hepatocellular carcinoma**
Authors: **Serra M.**, Di Matteo M, Serneels J, Pal R, Cafarello ST, Lanza M, Sanchez-Martin C, Evert M, Castegna A, Calvisi DF, Mazzone M, Columbano A
- Selected Abstract for poster presentation at: SIPMET 2022 PATHOPHYSIOLOGY OF DISEASE, Ancona (Italy) 16/11-18/11 2022
Title: **Metabolic alterations of HCC are dependent upon different oncogene activation**
Authors **Serra M.**, Di Matteo M, Mazzone M, Columbano A

- Selected Abstract for poster presentation at: SIC, 62nd annual meeting of the Italian Cancer Society , Venezia (Italy) 16/11-18/11 2022
Title: **Oncogene-dependent HCC metabolic reprogramming**
Authors **Serra M.**, Di Matteo M, Serneels J, Pal R, Cafarello ST, Lanza M, Sanchez-Martin C, Evert M, Castegna A, Calvisi DF, Mazzone M, Columbano A
- Selected Abstract for poster presentation at: “Forum nazionale sulla Medicina di Precisione: il modello HEAL ITALIA ed il contributo della ricerca al sistema sanitario del futuro 13-15/06/2024.

Oral Communications

- Invited Speaker at the virtual congress: MMF Metabolism Meets Function 14/06/2021
Title: **Metabolic reprogramming in oncogene-driven Hepatocellular Carcinoma: effect of LDHA knock-down**
- Selected Abstract for oral presentation at: SIPMeT Young Scientists Meeting Perugia (Italy) 10- 11/11/ 2021
Title: **INHIBITORY EFFECT OF LDHA KNOCK-DOWN ON METABOLIC REPROGRAMMING IN C-MYC/H-RAS DRIVEN HEPATOCELLULAR CARCINOMA**
- Invited Speaker at: “Adiponcosis: Paving the road between cancer and obesity”
Title: **NRF2-driven liver cell proliferation and metabolic reprogramming in normal hepatocytes**

Publications

- Che L, Fan B, Pilo MG, Xu Z, Liu Y, Cigliano A, Cossu A, Palmieri G, Pascale RM, Porcu A, Vidili G, **Serra M**, Dombrowski F, Ribback S, Calvisi DF, Chen X.
Jagged 1 is a major Notch ligand along cholangiocarcinoma development in mice and humans. *Oncogenesis*. 2016 Dec 5;5(12):e274. doi: 10.1038/oncsis.2016.73. PMID: 27918553; PMCID: PMC5177771.
- Song X, Liu X, Wang H, Wang J, Qiao Y, Cigliano A, Utpatel K, Ribback S, Pilo MG, **Serra M**, Gordan JD, Che L, Zhang S, Cossu A, Porcu A, Pascale RM, Dombrowski F, Hu H, Calvisi DF, Evert M, Chen X.
Combined CDK4/6 and Pan-mTOR Inhibition Is Synergistic Against Intrahepatic Cholangiocarcinoma. *Clin Cancer Res*. 2019 Jan 1;25(1):403-413. doi: 10.1158/1078-0432.CCR-18-0284. Epub 2018 Jul 3. PMID: 30084835; PMCID: PMC6423983.
- Farace C, Pisano A, Griñan-Lison C, Solinas G, Jiménez G, **Serra M**, Carrillo E, Scognamillo F, Attene F, Montella A, Marchal JA, Madeddu R.
Deregulation of cancer-stem-cell-associated miRNAs in tissues and sera of colorectal cancer patients. *Oncotarget*. 2020 Jan 14;11(2):116-130. doi: 10.18632/oncotarget.27411. PMID: 32010426; PMCID: PMC6968784.
- **Serra M**, Columbano A, Ammarah U, Mazzone M, Menga A.
Understanding Metal Dynamics Between Cancer Cells and Macrophages: Competition or Synergism? *Front Oncol*. 2020 Apr 30;10:646. doi: 10.3389/fonc.2020.00646. PMID: 32426284; PMCID: PMC7203474.

- Menga A, **Serra M**, Todisco S, Riera-Domingo C, Ammarah U, Ehling M, Palmieri EM, Di Noia MA, Gissi R, Favia M, Pierri CL, Porporato PE, Castegna A, Mazzone M. Glufosinate constrains synchronous and metachronous metastasis by promoting anti-tumor macrophages. *EMBO Mol Med*. 2020 Oct 7;12(10):e11210. doi:10.15252/emmm.201911210. Epub 2020 Sep 4. PMID: 32885605; PMCID: PMC7539200.
- **Serra M**, Columbano A, Perra A, Kowalik MA. Animal Models: A Useful Tool to Unveil Metabolic Changes in Hepatocellular Carcinoma. *Cancers (Basel)*. 2020 Nov 10;12(11):3318. doi: 10.3390/cancers12113318. PMID: 33182674; PMCID: PMC7696782.
- Caddeo A, Kowalik MA, **Serra M**, Runfola M, Bacci A, Rapposelli S, Columbano A, Perra A. TG68, a Novel Thyroid Hormone Receptor- β Agonist for the Treatment of NAFLD. *Int J Mol Sci*. 2021 Dec 3;22(23):13105. doi: 10.3390/ijms222313105. PMID: 34884910; PMCID: PMC8657920.
- Mattu S, Zavattari P, Kowalik MA, **Serra M**, Sulas P, Pal R, Puliga E, Sutti S, Foglia B, Parola M, Albano E, Giordano S, Perra A, Columbano A. Nrf2 Mutation/Activation Is Dispensable for the Development of Chemically Induced Mouse HCC. *Cell Mol Gastroenterol Hepatol*. 2022;13(1):113-127. doi: 10.1016/j.jcmgh.2021.08.011. Epub 2021 Sep 14. PMID: 34530178; PMCID: PMC8593617.
- Pal R, Kowalik MA, **Serra M**, Migliore C, Giordano S, Columbano A, Perra A. Diverse MicroRNAs-mRNA networks regulate the priming phase of mouse liver regeneration and of direct hyperplasia. *Cell Prolif*. 2022 Apr;55(4):e13199. doi:10.1111/cpr.13199. Epub 2022 Feb 17. PMID: 35174557; PMCID: PMC9055901.
- **Serra M**, Di Matteo M, Serneels J, Pal R, Cafarello ST, Lanza M, Sanchez-Martin C, Evert M, Castegna A, Calvisi DF, Mazzone M, Columbano A. Deletion of Lactate Dehydrogenase-A Impairs Oncogene-Induced Mouse Hepatocellular Carcinoma Development. *Cell Mol Gastroenterol Hepatol*. 2022;14(3):609-624. doi: 10.1016/j.jcmgh.2022.06.003. Epub 2022 Jun 15. PMID: 35714859; PMCID: PMC9307943.
- **Serra M**, Pal R, Puliga E, Sulas P, Cabras L, Cusano R, Giordano S, Perra A, Columbano A, Kowalik MA. mRNA-miRNA networks identify metabolic pathways associated to the anti-tumorigenic effect of thyroid hormone on preneoplastic nodules and hepatocellular carcinoma. *Front Oncol*. 2022 Sep 20;12:941552. doi:10.3389/fonc.2022.941552. PMID: 36203462; PMCID: PMC9530455
- Caddeo A*, **Serra M***, Sedda F, Bacci A, Manera C, Rapposelli S, Columbano A, Perra A, Kowalik MA. Potential use of TG68 - A novel thyromimetic - for the treatment of non-alcoholic fatty liver (NAFLD)-associated hepatocarcinogenesis. *Front Oncol*. 2023 Feb 23;13:1127517. doi: 10.3389/fonc.2023.1127517. PMID: 36910628; PMCID: PMC9996294.
- Smiriglia A, Lorito N, **Serra M**, Perra A, Morandi A, Kowalik MA. Sex difference in liver diseases: How preclinical models help to dissect the sex-related mechanisms sustaining

NAFLD and hepatocellular carcinoma. iScience. 2023 Oct 30;26(12):108363. doi: 10.1016/j.isci.2023.108363. PMID: 38034347; PMCID: PMC10682354.

- Kowalik MA, Taguchi K, **Serra M**, Caddeo A, Puliga E, Bacci M, Koshiba S, Inoue J, Hishinuma E, Morandi A, Giordano S, Perra A, Yamamoto M, Columbano A. Metabolic reprogramming in Nrf2-driven proliferation of normal rat hepatocytes. Hepatology. 2024 Apr 1;79(4):829-843. doi: 10.1097/HEP.0000000000000568. Epub 2023 Aug 21. PMID: 37603610.
- Mi W., Cigliano A., Gigante I., Steinmann S., **Serra M.**, Pes G.M., Pizzuto E., Siegmund H., Fischer C., Giannelli G., Evert M., Van der Laan L., Verstegen M.A. and Calvisi D.F. The eIF4A inhibitor Zotatfin displays robust antitumor activity in human intrahepatic cholangiocarcinoma. Journal of Experimental & Clinical Cancer Research 2024.
- Calvisi D.F.; Cigliano A; Gigante I.; **Serra M.**; Vidili G.; Simile M.M.; Steinmann S.; Urigo F.; Cossu E.; Pes G.M.; Dore M.P.; Ribback S.; Milia E.P.; Pizzuto E.; Mancarella S.; Che L.; Pascale R.M.; G.; Evert M.; Chen X. HSF1 is a prognostic determinant and therapeutic target in intrahepatic cholangiocarcinoma. Journal of Experimental & Clinical Cancer Research 2024.
- **Serra M**, Mocci S, Deidda S, Melis M, Chessa L, Lai S, Giuressi E, Mereu C, Sanna C, Lorrain M, Murgia M, Cannas F, Mascia A, Perra A, Littera R, Giglio S. Impact of the Human Leukocyte Antigen Complex on Idiopathic Pulmonary Fibrosis Development and Progression in the Sardinian Population. Int J Mol Sci. 2025 Mar 19;26(6):2760. doi: 10.3390/ijms26062760. PMID: 40141400; PMCID: PMC11942992.

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Monserrato, 13/05/2025