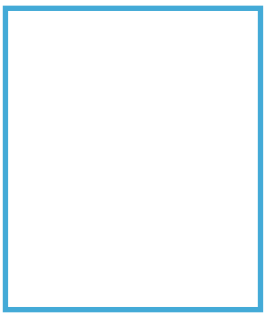

Chiara De Cesari

Date of birth | Nationality

WORK EXPERIENCE

Feb 2020 – June 2022 — Research Associate

Biology department, University of Pisa. Pisa, Italy

Research on the project: “Understanding and correcting SETD5 haploinsufficiency correlated to intellectual disability”

- Generation of transgenic Zebrafish models. Zebrafish behavioral assays. Molecular biology, immunohistochemistry techniques.

Aug 2019 – Dec 2019 — Contract of professional performance

Institute of Life Science, Sant’Anna School of Advanced Studies. Pisa, Italy

Research on the project: “Generation of 3D mouse retinal organoids”.

- Cell culture, mESCs differentiations. Retinal organoids. Molecular biology, single-cell qRT-PCR, immunocytochemistry techniques.

Oct 2015 – June 2019 — Research trainee for PhD program

Institute of Life Science, Sant’Anna School of Advanced Studies. Pisa, Italy

Research on the project: “Molecular and functional characterization of rod precursors for retinal regenerative medicine”.

- Cell culture, mESCs differentiations. Retinal organoids. Molecular biology, single-cell qRT-PCR, immunocytochemistry techniques.

April 2015 – Sep 2015 — Post Graduate Fellowship

Institute of Life Science, Sant’Anna School of Advanced Studies. Pisa, Italy

Research on the project “Molecular and cellular characterization of space flight effects on microvascular endothelial cell function”.

- Participation in the project 'ENDOTHELIAL CELLS', and the related launch campaign from Baikonur to the International Space Station with SDM Soyuz mission 44S/42S.

Feb 2014 – March 2015 — Research trainee for graduation program

Institute of Life Science, Sant’Anna School of Advanced Studies. Pisa, Italy

Research on the project: "Cell and Molecular Biology Characterization of the Effects of Space Flight on the Endothelium - Preparatory Work for the Project 'ENDOTHELIAL CELLS'."

- Cell culture, molecular biology and proteomics protocols. Use of Kayser Italia s.r.l. experimental units for automatic cells culture. Preparation of the project 'ENDOTHELIAL CELLS', and the related launch campaign from Baikonur to the International Space Station with SDM Soyuz mission 44S/42S.

Sep 2009 – Dec 2012 — Research trainee for graduation program

University of Pisa, Pisa, Italy

Research on the project: ”Determination of human protein BRCA1 level in yeast Saccharomyces cerevisiae”

- Yeast culture, molecular aspects of BRCA1 expression, proteins extraction and analysis. Western blot.

EDUCATION AND TRAINING

Oct 2015 – June 2019 — P.h.D. in Translational Medicine

Sant’Anna School of Advanced Studies, Pisa, Italy

Research project: “Molecular and functional characterization of rod precursors for retinal regenerative medicine”.

May 2015 – Sep 2015 — Post Graduate Fellowship

Sant'Anna School of Advanced Studies, Pisa, Italy

Research project "Molecular and cellular characterization of space flight effects on microvascular endothelial cell function".

- Participation in the project 'ENDOTHELIAL CELLS', and the related launch campaign from Baikonur to the International Space Station with SDM Soyuz mission 44S/42S.

Dec 2012 – Mar 2015 Master's Degree in Molecular and Industrial Biotechnology

University of Pisa, Pisa, Italy

Final thesis: "Cell and Molecular Biology Characterization of the Effects of Space Flight on the Endothelium - Preparatory Work for the Project 'ENDOTHELIAL CELLS'."

Sep 2009 – Dec 2012 Bachelor Degree in Biotechnology

University of Pisa, Pisa, Italy

Final thesis: "Determination of human protein BRCA1 level in yeast Saccharomyces cerevisiae"

Sep 2011 – June 2012 European Erasmus program

Universidad Complutense de Madrid, Madrid, Spain.

European Erasmus program in biology

PERSONAL SKILLS

Languages Italian (mother tongue), English (C1), Spanish (B2).
Course: Certificate of Scientific and Academic English (2016)

Job-related skills

- During my apprenticeships I achieved full autonomy in the realization of experimental protocols.

Computer skills

- Microsoft Windows and Mac OS operating systems
- Microsoft Office™, Adobe Photoshop, Adobe Acrobat, ImageJ, GraphPad Prism, Media Recorder 4.0, EthoVision.

Other skills

- Good communication skills gained through my experience in different Scientific Conferences. Good capacity to work in a scientific research team acquired during the thesis internship and the PhD Program.

Driving licence B

TECHNICAL SKILLS AND COMPETENCES

Mice colony menagement Including the breeding and genotyping of different strains.

Zebrafish colony menagement Including the breeding and genotyping of different strains.
Zebrafish behavioral assays: Open Field, Social Preference, Shoaling, Social Orienteering, T-maze.
Recognitions and analysis of unusual swimming behaviors.

Cellular biology techniques Prokaryotic cell cultures, eukaryotic cell cultures (primary and immortalized cell lines) handling under sterile conditions.
Transformation of prokaryotic cells.
Transfection of eukaryotic cells.
Functional assays on eukaryotic cells (viability assay, wound healing assay, invasion assay, transwell migration assay, adhesion assay, tube formation assay).
Nanoparticles administration to eukaryotic cells.
Isolation of mononuclear cells from human peripheral blood.
Dissociation of rod photoreceptor precursors from NRL-GFP mice retinas at different postnatal (PN) days (PN0, PN2, PN4, PN8). Cell cultures of rod photoreceptor precursors.
Culture of mouse embryonic stem cells in the presence of mouse fibroblast feeder cells.

Molecular biology techniques DNA and RNA manipulation: in vitro transcription, molecular cloning, extraction and purification, bacterial transformation, basic electrophoresis techniques, restriction analysis, reverse transcription, cDNA synthesis, PCR, RT-PCR, qRT-PCR.
Single cell isolation and Single-cell expression profiling using quantitative real-time PCR.

Organotipic culture Manipulation of mouse embryonic stem cell to generate Three-Dimensional Retinal Organoids

Immunofluorescence techniques Fixing and labeling of tissues and cells monolayer.

***In-Situ* hybridization**	Fixing an labeling of tissues and whole organisms by *In-Situ* assay.
Protein extraction and analysis	Extraction from biological samples. SDS-PAGE, Western blot.
Post-genomic methods	Experimental and bioinformatics skills with the SELDI ProteinChip BioRad platform.
Laboratory instruments	Independent use of PCR thermo-cyclers, centrifuges, spectrophotometers, microscope, autoclave, chemical and biological hood and Coy O2 Controlled Glove- Box - Hypoxia Chamber and Nanosight to quantify nanoparticles and exosomes.
Space research	• Use of Kayser Italia experimental units for endothelial cells culture. Experimental activity in preparation of the Soyuz flight of Endothelial Cells at the Biotecnology Space Support Center (BioTesc) in Hergiswill, Lucern (CH); June 2015. Experimental activity for Soyuz flight of Endothelial Cells at Baikonur Cosmodrome in Baikonur, Kazakistan; August/September 2015. • Experimental design and experimental activity for the ESA Spin Your Thesis! 2016 campaign. Cell culture, cell fixing and analysis in hypergravity conditions.
IVTech-Bioreactor	Use of Cell culture systems for 3D dynamic in-vitro models, to study co-cultures of different cell line simultaneously (multi-organ on chip model). Suitable also for tests of toxicology and pharmacology and organoids studies.
Bioinformatics	Protein and nucleic acids sequence alignments (CLUSTAL), main on line sequence database (i.e. NCBI, BLAST and Uniprot databases). PCR primers for molecular experiment designs, expression database (i.e. Oncomine, GeneSapiens).

TRAINING COURSES

- Training seminar: “Centro di Biomedicina Sperimentale: aggiornamento su normativa italiana ed europea in materia di animali da laboratorio” Septemeber 11, 2018. CNR, Pisa, Italy.
- Training seminar: “Corso di Formazione/Aggiornamento: introduzione alla norma ISO9001:2015 e procedure gestionali del Centro di Biomedicina Sperimentale” September 07, 2018. CNR, Pisa, Italy.
- Vth Workshop on in-vitro alternatives. Practical demonstration and theoretical demonstration of the advantages of IVTech products as platforms to implement advanced in-vitro models. 10-11 January 2018, Toscana Life Sciences, Siena, Italy.
- Training seminar: “Corso di Formazione/Aggiornamento: Centro di Biomedicina Sperimentale, Aspetti normativi e procedure operative” October 10, 2017. CNR, Pisa, Italy.
- Attendance at internal course in “Informazione e Comunicazione Scientifica” (10 lessons). February - May 2017. Scuola Superiore Sant’Anna, Pisa, Italy
- Training Week for ESA’s hands-on programs 2016 within the Spin Your Thesis! 2016 campaign. 14-17 March 2016, ESA’s Redu centre, Belgium
- Theoretical Training course on “Prevenzione e Sicurezza sul lavoro”. 2015. Scuola Superiore Sant’Anna, Pisa, Italy.

SYMPOSIA

- “3rd Italian Zebrafish Meeting”. Università degli Sudi di Napoli Federico II, 9-11 February 2022. Napoli, Italy.
- “ZF-MED & Pisa Zebrafish Day 2.0”, University of Pisa, 27-28 January 2020. Pisa, Italy.
- “EMBO EMBL Symposium: Organoids: Modelling Organ Development and Disease in 3D Culture”, 10-13 September 2018. EMBL Heidelberg, Germany.
- "Lo spazio: una storia umana di sogni, scienza e tecnologia", Scuola Superiore Sant'Anna, February, 7 2018. Pisa, Italy.
- “Hypergravity Workshop”. 24-25 January 2018. ESA-ESTEC, Noordwijk (NL) .
- “Biology in Space: Challenges and Opportunities”, Scuola Superiore Sant’Anna, November 7, 2014. Pisa, Italy.

CONGRESS PRESENTATIONS

- **Poster presentation**: “3rd Italian Zebrafish Meeting”. 9-11 February 2022. Napoli, (IT) . Title: “Impact of maternal and zygotic transcripts on mutant setd5-driven social impairment in zebrafish”
- **Oral presentation**: “Hypergravity Workshop”. January 25 2018. ESA-ESTEC, Noordwijk (NL) . Title: “Effect of hyper-gravity on human capillary endothelial cells. Could gravity be exploited as a therapeutic tool?”

TEACHING ACTIVITY

- Subsidiary teaching for the Cytology and Histology Course ”A” for the Bachelor degree in Biological Science (a.y. 2019/2020). Biology department, University of Pisa.
- Undergraduate student tutoring for practical lab rotations of “Molecular Biology” laboratories for the Master’s Degree in Medical Sciences of Sant’Anna School of Advanced Studies (a.y. 2017/2018, a.y. 2018/2019).

SCIENCE DISSEMINATION

- European Researchers’ Night: Mostra interattiva; “Alla Stazione spaziale internazionale e ritorno: avventura di 5 milioni di cellule”. Scuola Superiore Sant'Anna, September, 28 2019. Pisa, Italy.

DESCRIPTION OF INTERNATIONAL RESEARCH ACTIVITIES

- From 2014 to 2016 I actively participated in the ENDO project, co-funded by the European Space Agency and the Italian Space Agency. Aim of this project, whose Principal Investigator is Debora Angeloni (Scuola Superiore Sant’Anna di Pisa), was to understand the response of cultured endothelial cells to spaceflights. Space experiments require complex planning with tasks and responsibilities shared among different participants. This project gave me the opportunity to collaborate with different international partners: the team menbers of the Swiss International Space Station User Support and Operations Center (Hergiswil, CH); the European Space Agency; the Russian Space Agency, the Italian Space Agency; and the Kayser Italia Company personnel.
- In 2016 I participated as Team Leader to the European selection of the ESA Spin Your Thesis! 2016 campaign, with a project connected to the ENDO. Our group was selected to perform experiment in Hypergravity conditions in the European Space Research and Technology Centre (ESTEC) in Noordwijk, The Netherland. Between January 2016 and October 2016 we collaborated with ESA officers, ESA Academy officers and research groups from all over Europe.

SCIENTIFIC PUBLICATION

- **De Cesari C**, Digregorio M, Gabellini C, Pucci C, Martini D, Di Lauro C, Sidoti D, et al. Zebrafish knockout of the autism risk gene Setd5 leads to neurotransmission-associated gene alterations and social impairments. In: 3rd Italian Zebrafish Meeting. 2022. p. 27. **(ABSTRACT)**
- Mosca, R, Digregorio M, **De Cesari C**, Sidoti D, Martini D, Gabellini C, Andrezzoli M. Evaluating a potential role for setd5 inactivation in the aging process. In: 3rd Italian Zebrafish Meeting. 2022. p. 32. **(ABSTRACT)**
- Barravecchia I, **De Cesari C**, Forcato M, Scebba F, Pyankova O V., Bridger JM, et al. Microgravity and space radiation inhibit autophagy in human capillary endothelial cells, through either opposite or synergistic effects on specific molecular pathways. Cell Mol Life Sci. 2021; 10.1007/s00018-021-04025-z
- Barravecchia, I.; Barresi, E.; Russo, C.; Scebba, F.; **De Cesari, C**.; Mignucci, V.; De Luca, D.; Salerno, S.; La Pietra,V.;Giustiniano, M.; et al. Enriching the Arsenal of Pharmacological Tools against MICAL2. *Molecules* 2021, 26, 7519. https://doi.org/10.3390/molecules26247519i
- Andreazzoli,M.; Barravecchia, I.; **De Cesari, C**.; Angeloni, D.; Demontis, G.C. Inducible Pluripotent Stem Cells to Model and Treat Inherited Degenerative Diseases of the Outer Retina: 3D-Organoids Limitations and Bioengineering Solutions. *Cells* 2021,10,2489. https://doi.org/10.3390/cells10092489
- Gabellini C, Pucci C, Martini D, Di Lauro C, Digregorio M, Sidoti D, **De Cesari, C**, et al. Zebrafish knockout of the autism risk gene Setd5 leads to neurotransmission-associated gene alterations and social impairments. In: 11th European Zebrafish Meeting. 2020. p. 169–70. **(ABSTRACT)**
- **De Cesari C**, Barravecchia I, Pyankova OV, et al. (2020) ’Hypergravity Activates a Pro-Angiogenic Homeostatic Response by Human Capillary Endothelial Cells’. *Int J Mol Sci*. doi:10.3390/ijms21072354
- Barravecchia, I., Mariotti, S., Pucci, A., Scebba, F., **De Cesari, C.**, Bicciato, S., Tagliafico, E., Tenedini, E., Vindigni, C., Cecchini, M., Berti, G., Vitiello, M., Poliseno, L., Mazzanti, C. M. and Angeloni, D. (2019) ‘MICAL2 is expressed in cancer associated neo-angiogenic capillary endothelia and it is required for endothelial cell viability, motility and VEGF response’, *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease*. Elsevier B.V. doi: 10.1016/j.bbadis.2019.04.008.
- Barravecchia I, **De Cesari C**, Pyankova OV, Scebba F, Pè ME, Forcato M, Bicciato S, Foster HA, Bridger JM and Angeloni D (2019). A comprehensive molecular and morphological study of the effects of space flight on human capillary endothelial cells: sample quality assessment and preliminary results. *Front. Physiol. Conference Abstract: 39th ISGP Meeting & ESA Life Sciences Meeting*. doi: 10.3389/conf.fphys.2018.26.00050
- Barravecchia, I., **De Cesari, C.**, Pyankova, O. V., Scebba, F., Mascherpa, M. C., Vecchione, A., Tavanti, A., Tedeschi, L. and Angeloni, D. (2018). Pitting Corrosion Within Bioreactors for Space Cell-Culture Contaminated by Paenibacillus glucanolyticus, a Case Report. *Microgravity Science and Technology*. doi: 10.1007/s12217-018-9601-1.
- Balsamo, M., Barravecchia, I., Mariotti, S., Merenda, A., **De Cesari, C**., Vukich, M., & Angeloni, D. (2014). Molecular and Cellular Characterization of Space Flight Effects on Microvascular Endothelial Cell Function – PreparatoryWork for the SFEF Project. *Microgravity Science and Technology*, 26(6), 351–363. doi:10.1007/s12217-014-9399-4

Pisa, 04.06.2022