

# Emiliano Fratini

## PERSONAL INFORMATION

Family name: **FRATINI**  
First name: **EMILIANO**

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## EDUCATION:

2023 Course "**Recognition of pain, suffering and distress and its application in the evaluation of severity of the procedures (species specific: mice and rats) - III Edition**", IZS dell'Abruzzo e del Molise "G. Caporale", Italia.

2022 Course "**Biology and management of laboratory animals, Modules 3.1, 4, 5, 6.1, 7. DM 5 AGOSTO 2021 Rodents and Lagomorphs**", Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia-Romagna, Italia.

2022 Course "**Animal-Welfare Body: Training on specific tasks, Modules 25, 50, 51**", Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia-Romagna, Italia.

2022 Course **Basic elements for the researchers' approach to the use of animals for scientific purposes**, Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna.

2022 **Basic course on the use of aquatic organisms for scientific purposes**, Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna.

2021 Course "**Welfare and care of large animals used in scientific projects**", Università di Pisa, Pisa, Italy.

2020 **Refresher training course for the protection of laboratory animals in scientific research**, Università Cattolica del Sacro Cuore/Centro Ricerche Sperimentali, Rome, Italy.

2019 **Workshop "Technology in scientific research: a contribution to Reduction"**, Centro Europeo di Ricerca sul Cervello CERC, Rome, Italy.

2019 **Workshop "Zebrafish as a tool to investigate rare and genetic diseases: models, emerging techniques and regulation"**, Ospedale Pediatrico Bambino Gesù, Rome, Italy.

2019 Course "**Welfare of laboratory animals and alternative methodologies to animal experimentation**" Istituto Zooprofilattico Sperimentale / Regione Lazio, Rome, Italy.

2011 **PostDoc Training** under the supervision of Prof. Sykes at the Flinders University, Adelaide, South Australia.

2010 **Philosophiæ Doctor** at the Ph.D. school of "Roma Tre" University. Research was carried out in ENEA.

Thesis: “**Identification of Molecular process specific for low doses of high LET radiation in *in vivo* mouse peripheral blood lymphocytes and skin tissue**”.

2007 **Master’s Degree** 110(out of 110) with honors in Molecular and Cell Biology at the SMFN school of “Roma Tre” University.

Thesis: “**Polyamine Metabolism and cell differentiation**”.

2005 **Bachelor’s Degree** in Biology at the SMFN school of “Roma Tre” University.

Thesis: “**Aromatic Compound Metabolism**”.

#### CURRENT POSITION:

06/09/2021-present: **Research Scientist**. Italian National Agency for New Technology, Energy and Sustainable Economic Development (ENEA), SSPT- Division of Health Protection Technologies, Rome, Italy.

#### WORK EXPERIENCES:

01/02/2021-04/09/2021: **External Collaborator**. Università Cattolica del Sacro Cuore (UCSC), Experimental Research Center, Rome, Italy.

Feb 2019-June 2021: **Subject expert (Molecular biology, Advanced molecular biology, Molecular biotechnologies)**. Third University of Rome (Uniroma3), Rome, Italy.

Feb 2019-Jan 2021: **Research fellowship**. Third University of Rome (Uniroma3), Rome, Italy.

Oct 2014-Apr 2017: **Lieutenant Junior Grade**. Italian Navy/Coast Guard, Rome, Italy.

2013-2014: **Research fellowship** “Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi” , Rome, Italy.

2011-2013 **Junior Grant** “Museo Storico della Fisica e Centro Studi e Ricerche Enrico Fermi” , Rome, Italy. This research belong to the In vitro-In vivo MURine coSmiC siLence experiment.

2007-2010 **PhD Fellowship** funded by Italian Space Agency (ASI) for research on the effects of the extreme conditions which the space environment present; clarifying, at cellular and molecular level, the main immune, genetic and metabolic alterations of organisms exposed to the space environment (in particular Radiation). This research belong to the **MOMA project**.

#### Research activity:

Research project manager **Biological control of some tick species by means of hymenopteran parasitoids of the genus Ixodiphagus spp**. Authorization n° 242/2022-PR

Responsible for carrying out the experiments in the project **Maintenance of mouse lines susceptible or resistant to some skin carcinogens**. Authorization n° 194/2022-PR

**Participant in the projects of the University of Rome TRE: CANBBIO and Italy-USA Collaboration** RNAseq transcriptomic analysis on Meloid tissues and characterization of transcripts (CANBBIO Project);

In vivo study on an animal model of muscular dystrophy.

In vivo study on degenerative and neuronal diseases and aging (Alzheimer's, ALS, Epilepsy) on transgenic animal models (Italy-USA project). Authorization n° **815/2020-PR**;

### **MUSCLE and Cosmic Silence Project**

#### **Radiation:**

Gamma-ray from a Cs-137 source,  $\alpha$ -particle from a Americium-241 source.

#### **Experimental Methods:**

Hybridoma and primary cell lines culture, murine primary cell (astrocyte, cardiomyocyte and keratinocyte) lines isolation, cell immortalization, Micronuclei assay, gamma-H2Ax

Immunocytochemistry assay, pKZ1 assay, Enzymatic assay (Superoxide Dismutase SOD, Catalase CAT, Glutathione Peroxidase GSH-px).

### **Identification of Molecular process specific for low doses of high LET radiation in *in vivo* mouse peripheral blood lymphocytes and skin tissue.**

#### **Radiation:**

14 MeV Neutron developed by a deuteron beam speed up to 300 keV against a tritiate target.

#### **Experimental Methods:**

HCT and MEF Cell culture, SDS-PAGE Electrophoresis, agarose gel electrophoresis, Western Blot, DNA, RNA and Protein extraction, semi-quantitative PCR, quantitative Real-Time PCR, Micro-array, Immunohistochemistry, Animal Care, Biopsies.

#### **Data analysis Methods:**

Micro-array Data Normalization and Extrapolation by R software.

Functional analysis of genome data by FatiGo+.

### **Polyamine Metabolism and cell differentiation.**

#### **Experimental Methods:**

C2C12 and Neuroblastoma Cell culture, SDS-PAGE Electrophoresis, agarose gel electrophoresis, Western Blot, DNA, RNA and Protein extraction, semi-quantitative PCR, quantitative Real-Time PCR, Flow cytometry technique, Enzymatic Assay (Ornithine decarboxylase ODC, Spermine/Spermidine Acetyl Transferase SSAT, Spermine Oxidase SMO, Polyamine Oxidase PAO, Catalase), Molecular Cloning, Transfection, Genotypization.

#### Publication:

**2023** Tanori, M.; Pitaro, M.; Fratini, E.; Colantoni, E.; Amoresano, A.; Celentano, S.; Chiamonte, B.; Mancuso, M. *Safety in Rats of a Novel Nasal Spray Formulation for the Prevention of Airborne Viral Infections*. *Pharmaceutics* 2023, 15, 591. <https://doi.org/10.3390/pharmaceutics15020591>

**2022** Fratini E., Rossi M.N., Spagoni L., Ricciari A., Mancini E., Polticelli F., Bologna M.A., Mariottini P. and Cervelli M. *Molecular Characterization of Kunitz-Type Protease Inhibitors from Blister Beetles (Coleoptera, Meloidae)*. *Biomolecules* 2022, 12, 988. <https://doi.org/10.3390/biom12070988>

**2022** Muzzi M., Mancini E., Fratini E., Cervelli M., Gasperi T., Mariottini P., Persichini T., Bologna M.A., Di Giulio A. *Male Accessory Glands of Blister Beetles and Cantharidin Release: A Comparative Ultrastructural Analysis*. *Insects* 2022, 13, 132. <https://doi.org/10.3390/insects13020132>

**2021** Fratini E, Salvemini M, Lombardo F, Muzzi M, Molfini M, Gisoni S, Roma E, D'Ezio V, Persichini T, Gasperi T, Mariottini P, Di Giulio A, Bologna MA, Cervelli M and Mancini E (2021) *Unraveling the role of male reproductive tract and haemolymph in cantharidin exuding *Lydus trimaculatus* and *Mylabris variabilis* (Coleoptera: Meloidae): a comparative transcriptomics approach*. *BMC Genomics* (2021) 22:808 <https://doi.org/10.1186/s12864-021-08118-8>

**2021** Licursi V, Wang W, Di Nisio E, Cammarata FP, Acquaviva R, Russo G, Manti L, Cestelli Guidi M, Fratini E, Kamel G, Amendola R, Pisciotta P & Negri R *Transcriptional modulations induced by proton irradiation in mice skin in function of adsorbed dose and distance*, Journal of Radiation Research and Applied Sciences, (2021) 14:1, 260-270, DOI: 10.1080/16878507.2021.1949675

**2020** Muzzi M, Di Giulio A, Mancini E, Fratini E, Cervelli M, Gasperi T, Mariottini P, Persichini T, Bologna MA. *The male reproductive accessory glands of the blister beetle Meloe proscarabaeus Linnaeus, 1758 (Coleoptera: Meloidae): Anatomy and ultrastructure of the cantharidin-storing organs*. Arthropod Struct Dev. (2020) 59: 100980.

**2019** Fratini E, Cervelli M, Mariottini P, Kanamori Y, Amendola R and Agostinelli E. *Link between spermine oxidase and apoptosis antagonizing transcription factor: A new pathway in neuroblastoma* International Journal of Oncology (2019) 55: 1149-1156.

**2019** Leonetti A, Baroli G, Fratini E, Pietropaoli S, Marcoli M, Mariottini Paolo, Cervelli M. *Epileptic seizures and oxidative stress in a mouse model over-expressing spermine oxidase*. Amino Acids

**2015** I. Pecchia, V. Dini, L. Ricci-Vitiani, M. Biffoni, M. Balduzzi, E. Fratini, M. Belli, A. Campa, G. Esposito, G. Cirrone, F. Romano, C. Stancampiano, F. Pelacchi, R. Pallini and M. A. Tabocchini. *Glioblastoma stem cells: radiobiological response to ionizing radiation of different qualities*. Radiation Protection Dosimetry (2015), Vol. 166, No. 1–4, pp. 374–378

**2015** E. Fratini, C. Carbone, D. Capece, G. Esposito, G. Simone, M.A. Tabocchini, M. Tomasi, M. Belli and L. Satta. *Low radiation environment affects the development of protection mechanisms in V79 cells*. Radiation and Environmental Biophysics (2015) 54:183-194

**2014** E. Fratini and R. Amendola. *Caves and other subsurface environments in the future exploration of Mars: the absence of natural background radiation as biology concern*. Rend. Fis. Acc. Lincei Dic. DOI: 10.1007/s12210-013-0270-0.

**2014** V. Licursi, E. Fratini, B. Benassi, M. Cestelli-Guidi, C. Consales, A. Marcelli, C. Mirri, R. Negri, R. Amendola. *A proposed integrated systems approach to the radiation biology of cosmic interest: biophysics and molecular characterization of tissues irradiated with 14 MeV neutrons*. Rend. Fis. Acc. Lincei

**2014** M. Cestelli Guidi, C. Mirri, E. Fratini, V. Licursi, A. Marcelli. *FT-IR imaging spectroscopy as a complementary analytical technique to monitor lipids as biomarkers to high-LET (linear energy transfer) radiation*. Rend. Fis. Acc. Lincei

**2013** R. Amendola, M. Cervelli, G. Tempera, E. Fratini, L. Varesio, P. Mariottini, E. Agostinelli. *Spermine metabolism and radiation-derived reactive oxygen species for future therapeutic implications in cancer: an additive or adaptive response*. Amino acids Sept 2013 DOI: <http://dx.doi.org/10.1007/s00726-013-1579-9>

**2013** R. Amendola, M. Cervelli, E. Fratini, D.E. Sallustio, G. Tempera, T. Ueshima, P. Mariottini, E. Agostinelli. *Reactive oxygen species spermine metabolites generated from amine oxidases and radiation represent a therapeutic gain in cancer treatments*. International Journal of Oncology Sept. 2013; 43(3):813-20

**2013** E. Fratini, M. Balduzzi, F. Antonelli, E. Sorrentino, G. Esposito, G. Cuttone, F. Romano, V. Dini, G. Simone, M. Belli, A. Campa, M. A. Tabocchini. *Comparison of the Biological Effectiveness of 45 MeV C-Ions and  $\gamma$ -Rays in Inducing Early and Late Effects in Normal Human Primary Fibroblasts*. AIP Conference Proceedings 1530,197-204 (2013); doi: 10.1063/1.4812923

**2012** E. Fratini and D. Capece. *Dalle basse dosi al «Silenzio Cosmico»: nuove evidenze degli effetti delle radiazioni ionizzanti per la salute*. Il Nuovo Saggiatore Vol. 28, anno 2012, no. 5-6.

**2012** D. Capece and E. Fratini. *The use of pKZ1 mouse chromosomal inversion assay to study biological effects of environmental background radiation*. The European Physical Journal Plus, Volume 127, Number 4, 37, DOI: 10.1140/epjp/i2012-12037-7.

**2012** M. Cestelli Guidi, C. Mirri, E. Fratini, V. Licursi, R. Negri, A. Marcelli, R. Amendola. *In vivo skin leptin modulation after 14 MeV neutron irradiation: a molecular and FT-IR spectroscopic study*. Anal Bioanal Chem. 2012 Sep;404(5):1317-26. doi: 10.1007/s00216-012-6018-3.

**2011** E. Fratini, V. Licursi, M. Artibani, K. Kobos, P. Colautti, R. Negri and R. Amendola. *Dose-dependent Onset of Regenerative Program in Neutron Irradiated Mouse Skin*. Plos One, vol. 6; p. e19242 -1-e19242 -12, ISSN: 1932-6203, doi: 10.1371/journal.pone.0019242

**2010** M. Cervelli, G. Bellavia, E. Fratini, R. Amendola, F. Polticelli, M. Barba, R. Federico, F. Signore, G. Gucciardo, R. Grillo, P. M. Woster, R. A. Casero, Jr., and P. Mariottini. *Spermine oxidase (SMO) activity in breast tumor tissues and biochemical analysis of the anticancer spermine analogues BENSpm and CPENSpm*. BMC Cancer. 14;10:555.

**2009** Cervelli, E. Fratini, R. Amendola, M. Bianchi, E. Signori, E. Ferraro, A. Lisi, R. Federico, L. Marcocci and P. Mariottini. *Increased spermine oxidase (SMO) activity as a novel differentiation marker of myogenic C2C12 cells*. Int. J. Biochem. Cell. Biol. 41:934-944.

**2009** R. Amendola, M. Cervelli, E. Fratini, F. Polticelli, D.E. Sallustio and P. Mariottini. *Spermine Metabolism and Anticancer Therapy*. Current Cancer Drug Target, 9(2), 118-130.

#### Oral Communication:

**2014** E. Fratini, M. Fischietti, G. Simone, E. Alesse, F. Zazzeroni, P. Sykes, L. Satta, M.A. Tabocchini. *Expression of genes involved in the protection from Natural Environmental Ionizing Radiation induced oxidative stress: Recent results on in vitro pKZ1 mouse hybridoma cells*. 41<sup>st</sup> Annual Meeting of the European Radiation Research Society, Rodes, GR 14-19 September 2014

**2012** E. Fratini. *Does biochemistry of living matter depends on environmental radiation? Yeast to human cells at the LNGS*. ASPERA Underground Synergies with Astro-Particle Physics Workshop Durham, UK, 18-19 December 2012.

**2012** E. Fratini, D. Capece, L. Satta, G. Simone, M.A. Tabocchini. *The LNGS underground facility for biological experiments in reduced radiation environment*. 39th Annual Meeting of the European Radiation Research Society Vietri sul Mare, Italy, 15-19 October 2012

**2011** E. Fratini, M. Balduzzi, F. Antonelli, G. Esposito, V. Dini, G. Simone, M. Belli, A. Campa, M. A. Tabocchini. *Micronuclei Induction by Carbon Ions in Directly Irradiated and in Bystander AG01522 Normal Human Primary Fibroblasts*. Third International MELODI Workshop November 2-4, Rome, Italy

**2009** E. Fratini, D. E. Sallustio, M. Angelone, E. Pasquali, M. Pillon, F. Chiani, V. Licursi, M.T. Mancuso, R. Negri, R. Amendola. *Differential keratins activation after in vivo skin 14 MeV neutron irradiation at variable doses*. IV Congresso nazionale ISSBB "Un mondo senza gravità" Santa Margherita Ligure, 31 Marzo - 2 Aprile 2009.