Curriculum Vitae

INFORMAZIONI PERSONALI

Nome ROBERTO

Cognome CHIARELLI

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FORMAZIONE TITOLI

EDUCATION AND QUALIFICATIONS OF ROBERTO CHIARELLI Ph.D

- 24-07-2017. Habilitation for Associate Professor. (ASN II FASCIA). Settore concorsuale 05/B2 Anatomia Comparata e Citologia.
- 30-06-2016. Habilitation MIUR (ADMM). University of Palermo
- 09-05-2015. Habilitation MIUR (A028). University of Roma Tre
- 16-07-2013. Habilitation MIUR (A050). University of Palermo
- 2009-2011. PhD in Cell and Developmental Biology, University of Palermo. Italy. Thesis title: “Strategie di difesa attivate in risposta a stress, in embrioni di Paracentrotus lividus”. The research activity was aimed to study cell survival and cell death mechanisms induced by cadmium, and functional relationship between autophagy and apoptosis during embryo development
- 2006-2008 Master (M.Sc) Biomedicine, University of Palermo, Italy. Thesis title: “Valutazione dell’apoptosi negli spermatozoi umani”

ATTIVITA' DIDATTICA

- 2022-2023 Comparative Anatomy for B.Sc. in Natural and Environmental Sciences

-2022-2023 Developmental Biology for B.Sc. in Biological Sciences

-2021-2022. Comparative Anatomy for B.Sc. in Natural and Environmental Sciences
- 2021-2022. Anatomy and Physiology of the circulatory system. In Hippocrates Course - State International Classical High School, in collaboration with University of Palermo
- 2019-2020. Lecturer of Special Didactic, University of Palermo. Italy
- 2018-2019. Lecturer of Special Didactic, University of Palermo. Italy
- 2018-2019. Tutor of Biology, University of Palermo. Italy
- 2016-2017. Lecturer of Special Didactic, University of Palermo. Italy
- 2016-2017. Tutor of Biology, University of Palermo. Italy
- 2015-2016. Lecturer of Biology, University of Palermo. Italy
- 2015-2016. Tutor of Biology, University of Palermo. Italy
- 2014-2015. Tutor of Biology, University of Palermo. Italy
- 2014-2015. Tutor of Cell Biology and Comparative Anatomy. University of Palermo. Italy
- 2013-2014. Lecturer of Zoology, University of Palermo. Italy
- 2013-2014. Tutor of Biology. University of Palermo. Italy
- 2012-2013. Tutor of Cell Biology and Comparative Anatomy. University of Palermo. Italy
- 2011-2016. SEMINARS on Autophagy: definition, classification and experimental procedures during the Cell Biology Course (BIO / 06). B.Sc. in natural and environmental sciences. University of Palermo. Italy
- 2018- to 2021. Preparation course for the State Exam for qualification to the profession of Biologist. Title: "Cell study and DNA extraction". University of Palermo. Italy

RICERCHE FINANZIATE

PROJECT ACTIVITIES
- 2014. Partecipation to SIR program (Scientific Independence of young Researchers).
- March 2012-2013. Grant for fertility innovation, Merck-Serono. “A new strategy in selecting oocytes with high implantation potentiality for Intracytoplasmic sperm injection procedure”. Financed. Role: Investigator (annual fellowship)
- 2009-2011. Pon Ricerca (Italy), Roberto Chiarelli, “Strategie di difesa attivate in risposta a stress, in embrioni di Parcentrotus lividus”. Financed.
- 2011. Grant applications awarded from Dept STEMBIO (ex Biologia Cellulare e dello Sviluppo), Italy. Project title: “Sea urchin

embryo as a model system for studying autophagy induced by cadmium stress". Financed. Ruolo:
Principal Investigator
- 2019-2020. Research funds D15 PJDRD15INCR1035162706CHIARELLI, matr. CSA: 16270. Project: "Analysis of biological effects induced by pollutants in the Mediterranean Sea: sea urchin embryos as a model system". Financed. Role: Research activity by extraordinary permission granted by the Italian Minister of Education. PhD course:
Technologies and Science for Human Health. Dept of STEBICEF, University of Palermo, Italy

PUBBLICAZIONE

SCIENTIFIC PRODUCTION
- Articles in international peer-reviewed journals: 29
- Abstracts in Journal: 3
- Books: 2
- Book Chapters: 1
- Abstracts in national and international congresses: 45
- Speaker at national and international congresses and conferences: 7 - Participation in national and international congresses: 20

METRICS OVERVIEW (SCOPUS) 2011-2023 - Documents by author: 29
- Citations: 8325
- H Index:14

1. Schiera G, Cancemi P, Di Liegro CM, Naselli F, Volpes S, Cruciata I, Cardinale PS, Vaglica F, Calligaris M, Carreca AP, **Chiarelli R**, Scilabra SD, Leone O, Caradonna F, Di Liegro I. An In Vitro Model of Glioma Development. Genes (Basel). 2023 Apr 27;14(5):990. doi: 10.3390/genes14050990. PMID: 37239349; PMCID: PMC10217752.
2. Abruscato G, **Chiarelli R**, Lazzara V, Punginelli D, Sugár S, Mauro M, Librizzi M, Di Stefano V, Arizza V, Vizzini A, Vazzana M, Luparello C. In Vitro Cytotoxic Effect of Aqueous Extracts from Leaves and Rhizomes of the Seagrass *Posidonia oceanica* (L.) Delile on HepG2 Liver Cancer Cells: Focus on Autophagy and Apoptosis. Biology (Basel). 2023 Apr 18;12(4):616. doi: 10.3390/biology12040616. PMID: 37106816; PMCID: PMC10135731.
3. **Chiarelli R**, Martino C, Scudiero R, Geraci F. Vanadium Modulates Proteolytic Activities and MMP-14-Like Levels during *Paracentrotus lividus* Embryogenesis. Int J Mol Sci. 2022 Nov 17;23(22):14238. doi: 10.3390/ijms232214238. PMID: 36430713; PMCID: PMC9697301.
4. **Chiarelli R**, Scudiero R, Memoli V, Roccheri MC, Martino C. Toxicity of Vanadium during Development of Sea Urchin Embryos: Bioaccumulation, Calcium Depletion, ERK Modulation and Cell-Selective Apoptosis. Int J Mol Sci. 2022 Jun 2;23(11):6239. doi: 10.3390/ijms23116239. PMID: 35682917; PMCID: PMC9181554.
5. Martino C, Chianese T, **Chiarelli R**, Roccheri MC, Scudiero R. Toxicological Impact of Rare Earth Elements (REEs) on the Reproduction and Development of Aquatic Organisms Using Sea Urchins as Biological Models. Int J Mol Sci. 2022 Mar 6;23(5):2876. doi: 10.3390/ijms23052876. PMID: 35270017; PMCID: PMC8911218.
6. **Chiarelli R**, Martino C, Roccheri MC, Geraci F. Vanadium Toxicity Monitored by Fertilization Outcomes and Metal Related Proteolytic Activities in *Paracentrotus lividus* Embryos. Toxics. 2022 Feb 10;10(2):83. doi: 10.3390/toxics10020083. PMID: 35202269; PMCID: PMC8878891.
7. Mannino G, Serio G, Bertea CM, **Chiarelli R**, Lauria A, Gentile C. Phytochemical profile and antioxidant properties of the edible and non-edible portions of black sapote (Diospyros digyna Jacq.). Food Chem. 2022 Jun 30;380:132137. doi: 10.1016/j.foodchem.2022.132137. Epub 2022 Jan 21. PMID: 35093655.
8. Mannino G, Serio G, Bertea CM, **Chiarelli R**, Lauria A, Gentile C. Phytochemical profile and antioxidant properties of the edible and non-edible portions of black sapote (Diospyros digyna Jacq.). Food Chem. 2022 Jun 30;380:132137. doi: 10.1016/j.foodchem.2022.132137. Epub 2022 Jan 21. PMID: 35093655.
9. Martino C, Byrne M, Roccheri MC, **Chiarelli R**. Interactive effects of increased temperature and gadolinium pollution in Paracentrotus lividus sea urchin embryos: a climate change perspective. Aquat Toxicol. 2021 Jan 21;232:105750. doi: 10.1016/j.aquatox.2021.105750. Epub ahead of print. PMID: 33529976.
10. **Chiarelli R**, Martino C, Roccheri MC, Cancemi P. Toxic effects induced by vanadium on sea urchin embryos. Chemosphere. 2021 Jul;274:129843. doi: 0.1016/j.chemosphere.2021.129843. Epub 2021 Feb 3. PMID: 33561719.
11. Klionsky DJ, Abdel-Aziz AK, …**Chiarelli R** et al. Guidelines for the use and interpretation of assays for monitoring autophagy (4th edition)[1]. Autophagy. 2021 Jan;17(1):1-382. doi: 10.1080/15548627.2020.1797280. Epub 2021 Feb 8. PMID: 33634751; PMCID: PMC7996087.
12. **Chiarelli R**, Martino C, Roccheri MC (2019). Cadmium stress effects indicating marine pollution in different species of sea urchin employed as environmental bioindicators. Cell Stress Chaperones. doi: 10.1007/s12192-019-01010-1.
13. Martino C., **Chiarelli R.**, Matranga V., Byrne M. Roccheri MC. (2019). Effects of magnesium deprivation on development and biomineralization in the sea urchin *Arbacia lixula*. Invertebrate Reproduction and Development. 63: 165–176.
14. Caradonna F, Cruciata I, Schifano I, La Rosa C, Naselli F, Chiarelli R, Perrone A, Gentile C. (2018). Methylation of cytokines gene promoters in IL-1 -treated human intestinal epithelial cells. Inflamm Res. (67):327–337.
15. Martino C., **Chiarelli R.**, Bosco L., Roccheri MC. (2017). "Induction of skeletal abnormalities and autophagy in *Paracentrotus lividus* sea urchin embryos exposed to gadolinium". Marine Environmental Research. (130):12-20.
16. Bosco L, **Chiarelli R.**, Roccheri M.C., Matranga D., Ruvolo G. (2017). "Relationship between apoptosis and survival molecules in human cumulus cells as marker of oocyte competence". Zygote. (25): 583-591.
17. Bosco L., Roccheri M.C., Martino C., **Chiarelli R.**, Lispi M., Ruvolo G. (2017). "Apoptosis rate in cumulus cells as possible molecular biomarker for oocyte competence". EuroMediterranean Biomedical Journal.12 (11) 051–056.

18. Agnello M., **Chiarelli R**., Martino C., Bosco L. Roccheri M.C. (2016). “Autophagy is required for sea urchin oogenesis and early development”. Zygote. Dec;24(6):918-926.
19. Martino C**., Chiarelli R.,** Costa C., Koop D., Scudiero R., Byrne M., Matranga V., Roccheri MC. Toxicity induced by Gadolinium ions on sea urchin embryos: Comparison among phylogenetically distant species and focus on stress response and skeletogenesis. J Environ Anal Toxicol 2016, 6:5(Suppl): 50.
20. Klionsky DJ,…**Chiarelli R**. et al. (2016). “Guidelines for the use and interpretation of assays for monitoring autophagy”. Autophagy. 12(1):1-222.
21. Klionsky DJ,…**Chiarelli R.** et al. (2016). “ Erratum to: Guidelines for the use and interpretation of assays for monitoring autophagy (3rd edition)”. 12(1):1-222. 10.1080/15548627.2015.1100356. Autophagy, 12(2). 443.
22. **Chiarelli R**., Martino C., Agnello M., Bosco L. Roccheri M.C. (2015). “Autophagy as a defense strategy against stress: focus on Paracentrotus lividus sea urchin embryos exposed to cadmium”. Cell Stress and Chaperones. 21(1):19-27.
23. Librizzi M., **Chiarelli R**., Bosco L., Sansook S., JM Gascon, Spencer J., Caradonna F., Luparello C (2015). “The histone deacetylase inhibitor JAHA down-regulates pERK and global DNA methylation in MDA-MB231 breast cancer cells”. Materials, 8 (10): 7041–7047.
24. Ruvolo G., Roccheri MC**., Chiarelli R**., Matranga D., Manno M., Bosco L. A new strategy in selecting oocytes using cumulus cells analysis of specific molecules of the apoptotic pathway, according to the ability to reach blastocyst stage. Abstract book 31st Annual Meeting of the European Society of Human Reproduction and Embryology. Eshre 2015– Human reproduction. volume 30, supp 1 2015. Lisbon, Portugal – 14-17 june 2015. P i88.
25. Bosco L., Ruvolo G**., Chiarelli R**., Matranga D., Roccheri MC. An innovative strategy in selecting oocytes with high implantation potentiality for intracytoplasmic sperm injection procedure. Proceedings of the 61st congress of the italian embryological group (gei) and the 36th congress of the italian society of histochemistry. Università degli Studi di Pisa, Scuola Superiore Sant’Anna and Scuola Normale Superiore. Pisa (Pi). European journal of histochemistry a journal of functional cytology. ISSN 1121-760X volume 59/supplement 1 2015. June 7-10, 2015. P 3.
26. Bosco L., Ruvolo G., **Chiarelli R.,** Agnello M., Roccheri M.C (2015). “Selection of the best oocytes for intracytoplasmicsperm injection (ICSI) using apoptotic analysis of cumulus cells”. Journal of Biological Research. 88(1): 31-32.
27. Agnello M, Rinaldi A.M., **Chiarelli R.,** Bosco L., Morici G., Roccheri M.C. (2015) “Mitochondrial mass, distribution and activity during sea urchin oogenesis”. Journal of Biological Research. 88(1): 49:50.
28. Bosco L., Ruvolo G., **Chiarelli R**., Agnello M., Roccheri M.C. (2015). “Apoptotic analysis of cumulus cells for the selection of competent oocytes to be fertilized by intracytoplasmatic sperm injection (ICSI)”. Journal of Cells.
29. **Chiarelli R**., Roccheri M.C. (2014). “Marine Invertebrates as Bioindicators of Heavy Metal Pollution”. Open Journal of Metal, 4, 93-106.
30. **Chiarelli R**., Agnello M., Bosco L. Roccheri M.C. (2014). “Sea urchin embryos exposed to cadmium as an experimental model for studying the relationship between autophagy and apoptosis”. Marine Environmental Research. 93: 47-55.
31. Librizzi M., Longo A., **Chiarelli R**., Amin J., Spencer J., Luparello C. (2012) “Cytotoxic effects of Jay Amin hydroxamic acid (JAHA), a ferrocene-based class I histone deacetylase inhibitor, on triple-negative MDA-MB231 breast cancer cells”. Chem Res Toxicol. 25: 2608–2616. PMID: 23094795.
32. **Chiarelli R**., Roccheri M.C. (2012). “Heavy metals and metalloids as autophagy inducing agents: focus on cadmium and arsenic”. Cells, 1: 597-616.
33. Klionsky DJ, Abdalla FC, Abeliovich H, …**Chiarelli R**. et al. (2012). “Guidelines for the use and interpretation of assays for monitoring autophagy”. Autophagy, 8:4, 445–554.

    PMID: 2966490.

1. **Chiarelli R**., Agnello M., Roccheri M.C. (2011). “Sea urchin embryo as a model system for studying autophagy induced by cadmium stress”. Autophagy, 7:10281034;PMID:21628995;

    With a second research award to Roberto Chiarelli, received from Department of Cell and Developmental Biology for the excellence in research.

    With a “Highlight from issue by Andriy Nemchenko”. (2011) Autophagy, 7: 934.

ATTIVITA' SCIENTIFICHE

MEMBERSHIPS OF SCIENTIFIC SOCIETIES
- 2019 –current Member of Italian Embryological Group
- 2009 –2012 Member of Italian Association of Cell Biology and Differentiation

AMBITI DI RICERCA

Roberto Chiarelli Ph.D.

The main research area concerns embryo-cyto-toxicity studies, using the sea urchin embryo as an experimental model to study biological effects induced by metals. Some of these metals were studied because they represent environmental pollutants of anthropogenic origin, released into the environment by industrial processes (e.g., cadmium). Whereas, other metals have a potential role as metalpharmaceuticals (e.g., vanadium) or are used as contrast media (e.g., gadolinium). Embryo-cyto-toxicity studies were carried out in terms of: metal bioaccumulation, activation of defence strategies, such as Hsp60 and 70 synthesis, activation of autophagy and apoptosis pathways, temporal/functional relationships between these processes and analysis of metal related proteolytic activities.

Several techniques were adapted to sea urchin embryos, such as in vivo and in vitro techniques associated with Confocal Laser Scanning Microscopy in order to obtain a 3D reconstruction of the embryo. An international collaboration was carried out with the University of Sidney to study the toxic effects of metals, in particular Gd, in combination with temperature increase, in accordance with the projections for the next century for the Mediterranean Sea (+ 3 and +6°C), as the toxic effects of metals can be completely modified depending on climate change.
Moreover, studies on physiological autophagy during sea urchin oogenesis were performed. In collaborations with other research groups, autophagy was also studied in tumour cell lines MDAMB232 and CaCo2.
Expertise on autophagy allowed to participate in three editions of the guidelines for the study and interpretation of autophagy. In these papers the paragraph on the model system sea urchin is continuously updated.