

Dr. Giuseppe Caruso



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Research experience

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| Since Aug 2017 (current position) | Senior Researcher Neurodegenerative Diseases and Pharmacology, Oasi Research Institute (I.R.C.C.S), Troina, Italy |
| Since Jun 2017 (current position) | Visiting Researcher Department of Biomedical and Biotechnological Sciences (BIOMETEC), University of Catania, Catania, Italy |
| Apr 2019 – May 2019 | Adjunct Industry Research Associate Affiliate, University of Kansas, USA |
| Jul 2016 – Jul 2017 | American Heart Association Fellow Cardiovascular Diseases and Pharmacology, University of Kansas, USA |
| Jul 2015 – Jun 2016 | Postdoctoral researcher with Prof. Susan M. Lunte Pharmaceutical Chemistry, University of Kansas, USA |
| Nov 2014 – Jun 2015 | Postdoctoral researcher with Prof. Sunil A. David Medicinal Chemistry, University of Kansas, USA |
| Nov 2009 – Feb 2014 | PhD student with Prof. Vincenzo G. Nicoletti Neurobiology, University of Catania, Italy |
| Sep 2013 – Dec 2013 | Visiting Scholar with Prof. Susan M. Lunte Pharmaceutical Chemistry, University of Kansas, USA |
| Apr 2010 – Apr 2011 | International Internship Programme Scholarship Pharmaceutical Chemistry, University of Kansas, USA |

Education

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| Feb 2014 | PhD in Neurobiology with Prof. Vincenzo G. Nicoletti , University of Catania, Italy <ul style="list-style-type: none">- PhD thesis: <i>Molecular basis of PCD (protein conformational disorders) of nervous system: microenvironmental conditions and cellular correlations</i> |
| Dec 2008 | MSc in Biomolecular Chemistry with Prof. Vincenzo G. Nicoletti , University of Catania, Italy <ul style="list-style-type: none">- MSc thesis: <i>Study of effects of copper and ribose on oligomerization of amyloidogenic peptides and toxicity</i>- Earned on December 22nd, 2008 with grade of 110/110 with Honors |

- Apr 2006 **BSc in Biological sciences with Prof. Vito De Pinto**, University of Catania, Italy
- BSc thesis: *Two-dimensional analysis of protein content of the metabolic fraction of extracts of wheat*
 - Earned on April 20th, 2006 with grade of **110/110 with Honors**

Professional service

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| Apr 2016 – Present | Review Editor for <i>Frontiers in Neuroscience and Nutrition</i> (specialty section Neuroenergetics, Nutrition and Brain Health). |
| Jun 2017 – Present | Reviewed articles for journals such as: <i>Plants</i> , <i>International Journal of Molecular Science</i> , <i>Molecules</i> , <i>Immunology Letters</i> , <i>Molecular Basis of Disease</i> , and <i>Cellular Physiology and Biochemistry</i> . Publons profile: publons.com/a/1337409/ |
| Nov 2012 – Dec 2012 | Biology adviser at BIOIMIS of Bassano del Grappa, Italy. |

Teaching experience

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| Nov 2014 – July 2017 | Taught biochemistry to pharmacy students (Miranda Diec, Andoh Khadiiam), supervised PhD students (Fergall O'Donnel, Dhanushka Weerasekara, Kelci Schilly), and proctored Clinical Chemistry exams (Christina Juan, Jennifer Mosely). |
| Jan 2013 – Oct 2014 | Private teacher preparing students for entry-level exams for university. (biology and chemistry), Unistudi Snc, Catania, Italy. |
| Nov 2009 – Oct 2014 | Private teacher preparing students for entry-level exams for university (biology and chemistry), UniD S.r.l. - Formazione, Catania, Italy. |
| Jan 2009 – Oct 2014 | Private teacher preparing students for certification exams on pharmacology, dermatology, chemistry, computer science, physiology and hygiene, Centro di formazione U.A.A.M.I., Catania, Italy. |

Funding track record

American Heart Postdoctoral Fellowship

- Role: Principal Investigator
- Title: Role of carnosine in regulation of production of RNOS by macrophages
- Project summary: The ultimate goal of this project was to investigate the possible protective role of carnosine on RNOS and pro-inflammatory markers production by macrophages as a function of activation/differentiation states.
- Budget: 98950\$ (July 2016 – June 2018)

Honors and awards

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| Jul 2016 | American Heart Postdoctoral Fellowship (2 years) (USA) |
| Mar 2009 | International Internship Program Scholarship (1 year) (Italy) |
| Dec 2008 | Cum laude honors for MSc degree |
| Apr 2006 | Cum laude honors for BSc degree |

Licensed and provisional patents

- Title of Invention: Rationally designed human TLR8-selective agonists. Inventors: David SA, Beesu M, **Caruso G**, Salyer AC — Licensed to a startup biotechnology company (confidential; Nov 2016).
- Title of Invention: Amphotericin B as an adjuvant. Inventors: David SA, Malladi SS, Khetani KK, **Caruso G**, Fox LM, Salyer AC — Provisional patent.

Published Journal Articles

- Yakoub KM, Lazzarino G, Amorini AM, **Caruso G**, Scazzone C, Ciaccio M, Tavazzi B, Lazzarino G, Belli A, Di Pietro V. Fructose-1,6-Bisphosphate Protects Hippocampal Rat Slices from NMDA Excitotoxicity (2019) *Int. J. Mol. Sci.* **20**: pii: E2239. doi: 10.3390/ijms20092239.
- Lazzarino G, Listorti I, Bilotta G, Capozzolo T, Amorini AM, Longo S, **Caruso G**, Lazzarino G, Tavazzi B, Bilotta P. Water- and Fat-Soluble Antioxidants in Human Seminal Plasma and Serum of Fertile Males (2019) *Antioxidants (Basel)* **8**: pii: E96; doi: 10.3390/antiox8040096.
- **Caruso G***, Fresta CG, Musso N, Giambirtone M, Grasso M, Spampinato SF, Merlo S, Drago F, Lazzarino G, Sortino MA, Lunte SM, Caraci F*. Carnosine prevents A β -induced oxidative stress and inflammation in microglial cells: a key role of TGF- β 1 (2019) *Cells* **8**: pii: E64. doi: 10.3390/cells8010064. [***corresponding authors**]
- **Caruso G***, Caraci F*, Jolivet RB*. Pivotal role of carnosine in the modulation of brain cells activity: Multimodal mechanism of action and therapeutic potential in neurodegenerative disorders (2018) *Prog. Neurobiol.* **175**:35-53. [***corresponding authors**]
- Siegel JM, Schilly KM, Wijesinghe MB, **Caruso G**, Fresta CG, Lunte SM. Optimization of a microchip electrophoresis method with electrochemical detection for the determination of nitrite in macrophage cells as an indicator of nitric oxide production (2018) *Anal. Methods* **11**:148-156.
- **Caruso G***, Fresta CG, Lazzarino G, Distefano DA, Parlascino P, Lunte SM, Lazzarino G*, Caraci F. Sub-toxic human amylin fragment concentrations promote the survival and proliferation of SH-SY5Y cells via the release of VEGF and HspB5 from endothelial RBE4 cells (2018) *Int. J. Mol. Sci.* **19**: pii: E3659; doi: 10.3390/ijms19113659 [***corresponding authors**]
- Lazzarino G, Listorti I, Muzii L, Amorini AM, Longo S, Di Stasio E, **Caruso G**, D'Urso S, Puglia I, Pisani G, Lazzarino G, Tavazzi B, Bilotta P. Low-molecular weight compounds in human seminal plasma as potential biomarkers of male infertility (2018) *Hum. Reprod.* **33**:1817-1828.
- Caraci F, Spampinato SF, Morgese MG, Tascadda F, Salluzzo MG, Giambirtone MC, **Caruso G**, Munafò A, Torrisi SA, Leggio GM, Trabace L, Nicoletti F, Drago F, Sortino MA, Copani A. Neurobiological links between depression and AD: The role of TGF- β 1 signaling as a new pharmacological target (2018) *Pharmacol. Res.* **130**:374-384.
- Fresta CG, Chakraborty A, Wijesinghe MB, Amorini AM, Tavazzi B, Lazzarino G*, Lunte SM, Caraci F, Dhar P*, **Caruso G***. Non-toxic engineered carbon nanodiamond concentrations induce oxidative/nitrosative stress, imbalance of energy metabolism and mitochondrial dysfunction in microglial and alveolar basal epithelial cells (2018) *Cell. Death. Dis.*, **9**:245. [***corresponding authors**]

- **Caruso G**, Fresta CG, Siegel JM, Wijesinghe MB, Lunte SM. Microchip electrophoresis with laser-induced fluorescence detection for determining the ratio of nitric oxide to superoxide production during inflammation in macrophages (2017) *Anal. Bioanal. Chem.*, **409**:4529-4538. [Article selected for publication as a Paper in Forefront]
- **Caruso G**, Fresta CG, Martinez-Becerra FA, Lopalco A, Johnson RT, de Campos RP, Siegel JM, Wijesinghe MB, Lazzarino G, Lunte SM. Carnosine modulates nitric oxide in stimulated murine RAW 264.7 macrophages (2017) *Mol. Cell. Biochem.*, **431**:197-210.
- Fresta CG, Hogard ML*, **Caruso G***, Costa EE, Lazzarino G, Lunte SM. Monitoring carnosine uptake by RAW 264.7 macrophage cells using microchip electrophoresis with fluorescence detection (2017) *Anal. Methods*, **9**:402-408. [*equally contributing authors]
- **Caruso G**, Distefano DA, Parlascino P, Fresta CG, Lazzarino G, Lunte SM, Nicoletti VG. Receptor-mediated toxicity of human amylin fragment aggregated by short and long term incubations with copper ions (2017) *Mol. Cell. Biochem.*, **425**:85-93.
- Beesu M*, **Caruso G***, Salyer AC*, Shukla NM, Khetani KK, Smith LJ, Fox LM, Tanji H, Ohto U, Shimizu T and David SA. Identification of a Human Toll-Like Receptor (TLR) 8-Specific Agonist and a Functional Pan-TLR Inhibitor in 2-Aminoimidazoles (2016) *J. Med. Chem.*, **59**:3311-30. [*co-first authors]
- Salyer AC, **Caruso G**, Khetani KK, Fox LM, Malladi SS and David SA. Identification of Adjuvantic Activity of Amphotericin B in a Novel, Multiplexed, Poly-TLR/NLR High-throughput Screen (2016) *PLoS One*, **11**:e0149848.
- Beesu M, **Caruso G**, Salyer AC, Khetani KK, Sil D, Weerasinghe M, Tanji H, Ohto U, Shimizu T and David SA. Structure-Based Design of Human TLR8-Specific Agonists with Augmented Potency and Adjuvanticity (2015) *J. Med. Chem.* **58**:7833-49.
- de Campos RP, Siegel JM, Fresta CG, **Caruso G**, Fracassi da Silva JA and Lunte SM. Indirect detection of superoxide in RAW 264.7 macrophage cells using microchip electrophoresis coupled to laser induced fluorescence detection (2015) *Anal. Bioanal. Chem.* **407**:7003-12.
- Sinopoli A, Magrì A, Milardi D, Pappalardo M, Pucci P, Flagiello A, Titman JJ, Nicoletti VG, **Caruso G**, Pappalardo G and Grasso G. The role of copper(II) in the aggregation of human amylin (2014) *Metallomics* **6**:1841-52.
- Gunasekara DB, Siegel JM, **Caruso G**, Hulvey MK and Lunte SM. Microchip electrophoresis with amperometric detection method for profiling cellular nitrosative stress markers (2014) *Analyst* **139**:3265-73.
- Metto EC, Evans K, Barney P, Culbertson AH, Gunasekara DB, **Caruso G**, Hulvey MK, Fracassi da Silva JA, Lunte SM and Culbertson CT. An Integrated Microfluidic Device for Monitoring Changes in Nitric Oxide Production in Single T-Lymphocyte (Jurkat) Cells (2013) *Anal. Chem.* **85**:10188-95.
- Mainz ER, Gunasekara DB, **Caruso G**, Jensen DT, Hulvey MK, Fracassi da Silva JA, Metto EC, Culbertson AH, Culbertson CT and Lunte SM. Monitoring Intracellular Nitric Oxide Production Using Microchip Electrophoresis and Laser-Induced Fluorescence Detection (2012) *Anal. Methods* **4**:414-420.
- Lunte SM, Gunasekara DB, Metto EC, Hulvey MK, Mainz ER, **Caruso G**, Fracassi da Silva JA, Jensen DT, Culbertson AH, Grigsby RJ and Culbertson CT. Microchip electrophoresis devices for the detection of nitric oxide: Comparison of bulk cell and single cell analysis (2011) *Microtas* **3**:1728-1730.

Forthcoming Journal Articles

- **Caruso G***, Fresta CG, Grasso M, Santangelo R, Lazzarino G, Lunte SM, Caraci F. Inflammation as the common biological link between depression and cardiovascular diseases: can carnosine exerts a protective role? (2019) *Curr. Med. Chem.* - Under review [***corresponding author**]
- **Caruso G**, Spampinato SF, Cardaci V, Caraci F, Sortino MA, Merlo S. β -amyloid and oxidative stress: perspectives in drug development (2019) *Curr. Pharm. Des.* - Under review
- **Caruso G***, Fresta CG, Fidilio A, O'Donnell F, Musso N, Lazzarino G, Grasso M, Amorini AM, Tascetta F, Bucolo C, Drago F, Lazzarino G*, Lunte SM, Caraci F. Carnosine decreases PMA-induced oxidative stress and inflammation in murine macrophages (2019) *Oxid. Med. Cell. Longev.* - Under review [***corresponding author**]
- Torrisi SA, Geraci F, Tropea MR, Grasso M, **Caruso G**, Fidilio A, Musso N, Sanfilippo G, Tascetta F, Palmeri A, Salomone S, Drago F, Puzzo D, Leggio GM, Caraci F. Fluoxetine and Vortioxetine reverse depressive-like phenotype and memory deficits induced by A β 1-42 oligomers in mice: a key role of Transforming Growth Factor- β 1 (2019) *Front. Pharmacol.* - Under review

Talks and posters at international conferences

- **Caruso G, et al.** Sub-toxic human amylin fragment concentrations promote the survival and proliferation of neuron-like cells via the release of VEGF and HspB5 from endothelial cells. Biomedical Sciences Symposium, Lawrence (KS), Apr 18th, 2019. (Poster)
- **Caruso G, et al.** Carnosine prevents amyloid-beta-induced oxidative stress and inflammation in microglial cells. AD/PD Conference, Lisbon (Portugal), March 26th-31st, 2019. (Poster)
- **Caruso G, et al.** Carnosine prevents amyloid- β -induced inflammation in microglial cells. CSRM Congress, Pavia (Italy), Sept 28th-29^h, 2018. (Abstract selected for oral presentation) (Talk)
- **Caruso G, et al.** Carnosine prevents amyloid-beta-induced inflammation in microglial cells. BraYn Conference, Genova (Italy), June 29th-30th, 2018. (Poster)
- **Caruso G, et al.** Carnosine prevents amyloid- β -induced inflammation in microglial cells. CoFaS Congress, Roccalumera (Italy), May 11th-12th, 2018. (Talk)
- **Caruso G, et al.** Carnosine decreases nitric oxide production and modulates activation, M1/M2 polarization, and cytokines secretion of stimulated macrophages. ABCD Congress, Bologna (Italy), Sept 21st-23rd, 2017. (Abstract selected for oral presentation) (Talk)
- **Caruso G, et al.** Carnosine decreases nitric oxide concentrations and modulates activation and differentiation in stimulated macrophages through a complex biochemical mechanism. GPEN Conference, Lawrence (KS), Nov 9th-12th, 2016. (Poster)
- **Caruso G, et al.** Role of carnosine in the modulation of nitric oxide production by RAW 264.7 macrophages. Gordon Research Conference (Oxygen Radicals), Ventura (CA), Feb 7th-12th, 2016. (Poster)
- **Caruso G, et al.** Novel microfluidic and fluorescence detection approaches for the determination of reactive oxygen and nitrogen species: application to the investigation of the anticancer activity of the natural antioxidant carnosine. KUCC Research Symposium, Edwards County (KS), Nov 13th-14th, 2015. (Poster)
- **Caruso G, et al.** Role of carnosine in the modulation of nitric oxide production by RAW 264.7 macrophages. Midwest Regional Meeting of the American Chemical Society, St. Joseph (MO), Oct 21st-24th, 2015. (Talk)

- *Caruso G, et al.* High-throughput screens for the identification of novel innate immune stimulatory compounds. The 53rd Annual MIKI Meeting-in-Miniature, Lawrence (KS), Apr 10th-12th, 2015. (Poster)
- *Caruso G, et al.* Modulation of amyloidogenic peptides by transition metal ions. XVI Congress of the Italian Society for Neuroscience, Catania (Italy), Apr 19th-22nd, 2012. (Poster)
- *Caruso G, et al.* Investigating the metabolism of dynorphin A 1-17, an opioid neuropeptide, in peripheral tissues and the central nervous system. Pittcon Conference, Atlanta (GA), Mar 13th-18th 2011. (Poster)
- *Caruso G, et al.* analytical techniques for investigating the metabolism and blood brain barrier transport of the neuropeptide dynorphin A 1-17. 45th ACS Midwest Regional Meeting (MWRM 2010), Wichita (KS), Oct 27th-30th, 2010. (Talk)
- *Caruso G, et al.* analytical techniques for investigating the metabolism and blood brain barrier transport of the neuropeptide dynorphin A 1-17. 17th International Symposium on Electro- and Liquid Phase-separation Techniques, Baltimore (MD), Aug 29th-Sept 1st, 2010. (Poster)

Invited talks

- Carnosine prevents A β -induced cell death, oxidative stress, and inflammation in microglial cells through a multimodal mechanism of action: a key role of TGF- β 1. University of Kansas, Kansas Intellectual and Developmental Disabilities Research Center, Lawrence, Kansas, Apr 30th, 2019.
- Carnosine and oxidative stress-driven disorders. Karolinska Institutet, Solna, Sweden, July 6th, 2017.
- Carnosine modulates nitric oxide/nitrite ratio and influence activation and differentiation of stimulated murine macrophages through a complex biochemical mechanism. Campus Biotech, Geneva, Switzerland, Mar 30th, 2017.
- Carnosine modulates nitric oxide in stimulated murine RAW 264.7 macrophages. University of Kansas Medical Center, Kansas City, Kansas, Mar 2nd, 2017.
- Novel microfluidic and fluorescence detection approaches for the determination of reactive oxygen and nitrogen species and antioxidants uptake. University of Catania, Catania, Italy, Jan 12th, 2016.
- Use of microchip electrophoresis and fluorescence along with bulk and single cell analysis for detection and quantification of intracellular nitric oxide in different cell types. University of Catania, Catania, Italy, Jan 15th, 2014.
- Analytical techniques to study the metabolism of nitric oxide in macrophages and lymphocytes and neuropeptide dynorphin A 1-17 in central nervous system and blood-brain barrier. University of Catania, Catania, Italy, Jan 11th, 2011.

Campus or departmental talks

- Role of carnosine in regulation of RNOs production in oxidative driven diseases. Simons Labs Auditorium, University of Kansas, Lawrence, Kansas, Mar 22nd, 2016.
- Role of carnosine in the modulation of nitric oxide production by RAW 264.7 macrophages. Malott Hall, University of Kansas, Lawrence, Kansas, Nov 9th, 2015.
- Study of effects of metals and glycation conditions on oligomerization of amyloidogenic peptides. Higuchi Biosciences Center, University of Kansas, Lawrence, Kansas, Nov 30th, 2010.

Experimental techniques

Microfluidic devices; Laser-induced fluorescence; Electrochemistry; UV-Vis spectroscopy; MTT, XTT and LDH assay; Griess assay; Th-T assay; ELISA; Immunofluorescence; Flow cytometry; High throughput assays; Reporter gene assays; Multiplexed cytokine and chemokine assays; Atomic force microscopy; Side-by-SideTM diffusion chambers coupled to the use of radioactive-labeled molecules for drug metabolism and protein permeability studies of the blood-brain barrier; High-throughput Real-time PCR; Western Blot; Dot Blot; High-performance liquid chromatography; Horizontal and vertical electrophoresis; SDS-PAGE; Extraction of DNA, RNA and proteins; Liquid chromatography-tandem mass spectrometry.

Computing skills

MS Office, Windows OS, EndNote, Origin, ImageJ, SigmaStat, SoftMax PRO, ChemiDoc, GraphPad.

Languages

- **Italian:** mother tongue
- **English:** excellent writing, reading, and speaking

Membership of professional societies

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| Jan 2015 – Present | American Heart Association/American Stroke Association |
| Jun 2017 – Present | Association of Cell Biology and Differentiation |
| Feb 2019 – Present | Società Italiana di Farmacologia |

References

- Prof. Filippo Caraci, University of Catania - E-mail: fcaraci@unict.it
- Prof. Giuseppe Lazzarino, University of Catania - E-mail: lazzarig@unict.it
- Prof. Susan M. Lunte, University of Kansas - E-mail: slunte@ku.edu
- Prof. Renaud Jolivet, University of Geneva – E-mail: Renaud.Jolivet@unige.ch
- Prof. Prajnaparamita Dhar, University of Kansas - E-mail: prajnadhar@ku.edu
- Prof. Sunil A. David, University of Minnesota - E-mail: sdavid@umn.edu