

Curriculum vitae

Danilo Donnarumma

Personal Information

Name: **Danilo Donnarumma**

Actual Role: **Researcher RTDa in Analytical Chemistry (CHIM/01)**

Company: **University of Messina.**

Nationality: **Italian**

Date of birth: **May 24th, 1984**

Place of birth: **Castellammare di Stabia (NA)**



Work Experience

Dates: **January 2022 – Today**

- Name and address of employer: Department ChiBioFarAm, University of Messina - 98168 Messina (ITALY)
- Position: Researcher RTDa in Analytical Chemistry (CHIM/01)
- Main activities and responsibilities: Development of an innovative and reliable method for the extraction and concentration of viral RNA from saliva samples, in order to obtain reliable results using a commercial RT-LAMP technology for the identification of SARS-Cov-2.

Dates: **March 2020 – December 2021**

- Name and address of employer: Chromaleont S.r.l.- c/o Dipartimento ChiBioFarAm, Università degli Studi di Messina - 98168 Messina (ITALY)
- Position: Technical Director LC,MS
- Main activities and responsibilities: Supervision and coordination of the research activities of the company regarding the LC,MS and *Shotgun* MS area.

Dates: **February 2019 – March 2020**

- Name and address of employer: Chromaleont S.r.l.- c/o Dipartimento ChiBioFarAm, Università degli Studi di Messina - 98168 Messina (ITALY)
- Position: LC, MS specialist
- Main activities and responsibilities: Development of analytical methods for the extraction, separation and identification of intact lipids from biological matrices

Dates: **March 2015 – February 2019**

- Name and address of employer: GSK (previous Novartis Vaccines), Via Fiorentina 1 – 53100 Siena (ITALY)
- Position: Scientist
- Main activities and responsibilities: Use of structural mass spectrometry techniques, such as native MS and HDx-MS, to characterize novel vaccine candidates.

Dates: **January 2012 – November 2014**

- Name and address of employer: Adecco Italia S.p.a. for Novartis Vaccines and Diagnostics, Via Fiorentina 1 – 53100 Siena (ITALY)
- Position: Scientific Associate

- Main activities and responsibilities: Epitope mapping analysis using the Hydrogen/Deuterium Exchange Technology coupled with Mass Spectrometry (HDX-MS)

Dates: **January 2009 - December 2011**

- Name and address of employer: Novartis Vaccines and Diagnostics, Via Fiorentina 1 – 53100 Siena (ITALY)
- Position: Collaborator Researcher
- Main activities and responsibilities: Mass spectrometry service for the analysis of peptides, proteins, lipids and sugars

Dates: **March 2008 - December 2008**

- Name and address of employer: University of Naples “Federico II”, Organic Chemistry and Biochemistry Department, Via Cinthia 4 - 80126 Napoli (ITALY)
- Position: Collaborator Researcher
- Main activities and responsibilities: Identify potential Quorum Sensing molecules in industrial relevant fungi, like *Pleurotus ostreatus* and *Aspergillum niger*, and study the effect of these molecules on the proteome of different fungi.

Dates: **November 2007 - February 2008**

- Name and address of employer: University of Naples “Federico II”, Organic Chemistry and Biochemistry Department, Via Cinthia 4 - 80126 Napoli (ITALY)
- Position: Volunteer Researcher
- Main activities and responsibilities: Study of functional proteomics and development of chemical-free methodologies for protein-protein cross-linking.

Education and Training

Dates: **January 2009 - December 2011**

- Name and type of organization providing education and training: University of Bologna, Via Zamboni 33 – 40126 Bologna (ITALY) & Novartis Vaccines and Diagnostics, Via Fiorentina 1 – 53100 Siena (ITALY)
- Title of qualification awarded: PhD in Cellular, Molecular and Industrial Biology, Project n.2: Functional and Molecular Biology, cycle XXIV
- Thesis title: “Insights in the maturation of pathogenic bacteria vaccine candidates using Mass Spectrometry based approaches”.
- Level in national classification: ISCED 6

Dates: **October 2005 - October 2007**

- Name and type of organization providing education and training: University of Naples “Federico II”, Organic Chemistry and Biochemistry Department, Via Cinthia 4 - 80126 Napoli (ITALY)
- Title of qualification awarded: Master degree in Biomolecular and Industrial Biotechnologies – Evaluation 110/110 *summa cum laude*
- Thesis title: “Development of methodologies for protein-protein cross-linking”
- Level in national classification: ISCED 5A (Master Degree)

Dates: **September 2002 - September 2005**

- Name and type of organization providing education and training: University of Naples “Federico II”, Organic Chemistry and Biochemistry Department, Via Cinthia 4 - 80126 Napoli (ITALY)

- Title of qualification awarded: Bachelor degree in Molecular and Industrial Biotechnologies – Evaluation 110/110 *summa cum laude*
- Level in national classification: ISCED 5A (Bachelor Degree)

Dates: **September 1997 - June 2002**

- Name and type of organization providing education and training: Liceo Scientifico Statale “F. Severi”, Viale Libero D’Orsi 5 - 80053 Castellammare di Stabia (ITALY). “Experimental *curricula* in mathematics and informatics”.
- Title of qualification awarded: School leaving certificate awarded after five years of 'Liceo'- evaluation: 92/100
- Level in national classification: ISCED 3A

Training on analytical instrumentation

- Waters Synapt G2 at GSK Vaccines
- Waters Synapt G2-Si at GSK Vaccines
- Shimadzu CLAM2030-LCMS8060 at Chromaleont S.r.l.
- Shimadzu UV2700 at Chromaleont S.r.l

Technical skills and competences

Electrophoresis

- Bidimensional polyacrylamide gel electrophoresis (**2D PAGE**) technology.
- SDS polyacrylamide gel electrophoresis (**SDS-PAGE**) technology.
- Native polyacrylamide gel electrophoresis (**Native-PAGE**) technology.
- **Western Blot** technology.
- Image analysis and bidimensional maps comparison (**Image master**)

Mass Spectrometry

- MALDI TOF (**Voyager DE-PRO** and **DE-STR**, Applied Biosystem)
- MALDI TOF-TOF (**Ultraflex**, Bruker Daltonics)
- ESI Triple-Q (**4000 Q-Trap**, Applied Biosystem; **Xevo TQ**, Waters; **LCMS-8060**, Shimadzu)
- ESI Q-TOF, also with Ion Mobility Separation (**Q-TOF Premier**, **Synapt G2**, **Synapt G2Si** and **Xevo G2-XS**, Waters)
- Excellent mass spectrum interpretation for proteins and peptides, also with search on protein databases with appropriate software (**MASCOT**)
- Native Mass spectrometry of protein-protein and protein-ligand complexes
- Hydrogen-Deuterium Exchange coupled with Mass Spectrometry (**HDX-MS**) for epitope mapping studies and protein-protein and protein-ligand complexes analysis
- **ETD** fragmentation
- Use of automatic preparative stations for the extraction and direct injection of the samples (**CLAM2030**)

Chromatography

- Online Liquid Chromatography using a **nanoACQUITY UPLC** System with and without HDX technology (Waters) coupled with ESI Q-TOF/Triple-Q MS

- Online Liquid Chromatography using a **LC-20/30 UHPLC** system controlled by a CBM-20A module (Shimadzu) coupled with ESI Q-TOF and Triple Quad MS
- Offline Liquid Chromatography: **HP1100** (Agilent), **Ettan LC System** (Amersham Biosciences)

Molecular Biology

- Extraction and purification of Nucleic Acids (**DNA**) and amplification (**PCR**)
- Preparation of competent bacterial cells and transformation (***E. coli***)
- Construction of recombinant plasmids
- Cloning and Expression
- Extraction and Purification of recombinant Proteins (**IMAC, SEC**)
- Immunoenzymatic assays

Bioinformatics

- Bioinformatics tools available on the net for sequence analysis: **PSORT** package, sequence databases (**NCBI, TIGR**), **ExPaSy** tools, **ProteinProspector**, **HD-Express**
- Mass spectrometry related software: **Analyst** (Applied Biosystems), **MassLynx**, **ProteinLynx Global Server**, **BiopharmaLynx**, **DynamX** (Waters), **Compass** (Bruker Daltonics), **LabSolutions** and **GCSolutions**(Shimadzu)
- Molecular visualization software: **PyMOL**, **Swiss PDB Viewer**, **Chimera**
- *In silico* docking: **AutoDockTools**, **Vina**

Others Skills

- Working in bio safety level 2 and 3 laboratory.
- Detailed knowledge of **protein biochemistry** techniques.
- Good knowledge of **molecular and cellular biology** technologies.
- Excellent knowledge of OS **Windows 10** and former versions.
- Excellent knowledge of **OFFICE** package (Access, Excel, Outlook, Power Point, Word).
- Driving License B
- English knowledge:
 - Reading: B2
 - Writing: B2
 - Speaking: B1
 - Listening: B1

Reviewer Activities

- Analytical and Bioanalytical Chemistry (Springer)
- Journal of Chromatography A (Elsevier)
- Scientific Reports (Nature)

Teaching Activities

Dates: **October 2020 – September 2023**

Appointed as “Cultore della materia” in analytical Chemistry (S.S.D. CHIM/01) at Dipartimento di Sc.Biomediche, Odontoiatriche e delle Immagini Morfologiche e Funzionali, Università degli Studi di Messina - 98168

Messina (ITALY).

Dates: **Academic Year 2020/21**

Member of the academic board of the PhD in Chemical Sciences, XXXVI cycle

Dates: **10-12 October 2018**

Teaching activities performed at the 4th MS BioPharma School organized by the Italian Division of Mass Spectrometry, part of the Italian Chemical Society.

Dates: **18-20 October 2017**

Teaching activities performed at the 3rd MS BioPharma School organized by the Italian Division of Mass Spectrometry, part of the Italian Chemical Society.

Dates: **11-13 October 2016**

Teaching activities performed at the 2nd MS BioPharma School organized by the Italian Division of Mass Spectrometry, part of the Italian Chemical Society.

Dates: **11-13 May 2015**

Teaching activities performed at the 1st MS BioPharma School organized by the Italian Division of Mass Spectrometry, part of the Italian Chemical Society.

Progetti di ricerca

Dates: **April 2020 – Today**

- Project Title: “Micro/nanoformulati innovativi per la valorizzazione di molecole bioattive, utili per la salute e il benessere della popolazione, ottenute da prodotti di scarto della filiera ittica (FOR.TUNA) (PON I&C 2014–2020 “HORIZON 2020”)”
- Main activities:
 - Supervision and coordination of the Chromaleont activities
 - Development of advanced analytical methods for the determination of lipids, proteins and contaminants in tuna industry by-products

Dates: **April 2020 – Today**

- Project Title: “Lipidomics”
- Main activities:
 - Supervision and coordination of the Chromaleont activities in the frame of the scientific collaboration with Shimadzu Corporation
 - Development of fully automated analytical methods for the extraction, separation and identification of intact lipids in complex matrices

Dates: **September 2017 – February 2019**

- Project Title: “Doctoral Industrial School for Vaccine Design through Structural Mass Spectrometry (VADEMA)”
- Main activities:

- Supervision of the PhD students involved in the VADEMA project during the time spent at the laboratory of Proteomics and Antigen Structure, GSK Vaccines, Siena
- Analysis of the humoral response induced by the vaccination by using advanced structural mass spectrometry techniques

Dates: **January 2012 – February 2019**

- Project Title: “Structural Mass Spectrometry”
- Main activities:
 - Research and development activities conducted at the laboratory of Proteomics and Antigen Structure, GSK Vaccines, previously Novartis Vaccines and Diagnostics, Siena
 - Supervising the activities of PhD and Master degree students working on company related research projects
 - Application of advanced mass spectrometry approaches for the structural characterization of vaccine candidates

National/International collaborations

National

- Prof. Martino Bolognesi, Department of Biomolecular Sciences and Biotechnology, University of Milano
- Prof. Giuseppe Teti and Prof. Concetta Beninati, University of Messina
- Prof. Franco Felici, University of Molise
- Prof. Pietro Speziale, University of Pavia
- Doct. Annarita Taddei, Interdepartmental Centre for Electron Microscopy, University of Tuscia, Viterbo

International

- Doct. Martha M. Tanizaki, Biotechnology Center, Butantan Institute, São Paulo, Brazil
- Doct. Michael A. Cianfrocco, Department of Cellular and Molecular Biology, Harvard University, Cambridge
- Prof. Ruedi Aebersold, Department of Biology, ETH, Zurich
- Doct. Maria Valeri, Immunology institute, University of California-Irvine School of Medicine
- Prof. Carlos O. S. Sorzano, National Center of Biotechnology, Madrid

Bibliometric Indices Information

Scopus

- 21 Documents
- 505 Citations
- *h*-index 11

Web of Science

- 21 Documents
- 458 Citations
- *h*-index 10

Google Scholar

- 22 Documents
- 652 Citations
- *h*-index 12

Scientific Publications

- Cucinotta L, De Grazia G, Salerno TMG, **Donnarumma D**, Donato P, Sciarrone D, Mondello L. **Overcoming the lack of reliability associated to monodimensional gas chromatography coupled to isotopic ratio mass spectrometry data by heart-cut two-dimensional gas chromatography** *J Chromatogr A*, 2021 Oct; 1655: 462473. **IF2020: 4.759**
- **Donnarumma D**, La Tella R, Vento F, Salerno TMG, Rigano F, Mondello L. **Evaluation of the level of toxic contaminants and essential molecules in the context of the re-use of tuna fishery industry by-products.** *Food Anal Methods*, 2021 Oct; 14(10): 2161-2174. **IF2020: 3.366**
- Cacciola F, Arena K, Mandolino F, **Donnarumma D**, Dugo P, Mondello L. **Reversed phase versus hydrophilic interaction liquid chromatography as first dimension of comprehensive two-dimensional liquid chromatography systems for the elucidation of the polyphenolic content of food and natural products.** *J Chromatogr A*, 2021 Mar; 1645: 462129. **IF2020: 4.759**
- Rigano F, Arena P, Mangraviti D, **Donnarumma D**, Dugo P, Mondello L, Micalizzi G. **Identification of high-value generating molecules from the wastes of tuna fishery industry by liquid chromatography and gas chromatography hyphenated techniques with automated sample preparation.** *J Sep Sci*, 2021 Apr; 44(8): 1571-1580. **IF2020: 3.645**
- Micalizzi G, Vento F, Alibrando F, **Donnarumma D**, Dugo P, Mondello L. ***Cannabis Sativa L.*: a comprehensive review on the analytical methodologies for cannabinoids and terpenes characterization.** *J. Chromatogr. A*, 2021 Jan 25; 1637: 461864. **IF2020: 4.759**
- Peschiera I, Giuliani M, Giusti F, Melero R, Paccagnini E, **Donnarumma D**, Pansegrau W, Carazo JM, Sorzano COS, Scarselli M, Masignani V, Liljeroos LJ, Ferlenghi I. **Structural basis for cooperativity of human monoclonal antibodies to meningococcal factor H-binding protein.** *Commun Biol*, 2019 Jun 26; 2: 241. **IF2020: 6.268**

- Giussani S, Pietrocola G, **Donnarumma D**, Norais N, Speziale P, Fabbrini M, Margarit I. **The *Streptococcus agalactiae* complement interfering protein combines multiple complement-inhibitory mechanisms by interacting with both C4 and C3 ligands.** *FASEB J*, 2019 Mar; 33(3): 4448-4457. **IF2020: 5.191**
- **Donnarumma D**, Maestri C, Giammarinaro PI, Capriotti L, Bartolini E, Veggi D, Petracca R, Scarselli M, Norais N. **Native state organization of Outer Membrane Porins unraveled by HDx-MS.** *J Proteome Res*, 2018 May 4; 17(5): 1794-1800. **IF2020: 4.466**
- Giuliani M, Bartolini E, Galli B, Santini L, Lo Surdo P, Buricchi F, Bruttini M, Benucci B, Pacchiani N, Alleri L, **Donnarumma D**, Pansegrau W, Peschiera I, Ferlenghi I, Cozzi R, Norais N, Giuliani MM, Maione D, Pizza M, Rappuoli R, Finco O, Massignani V. **Human protective response induced by meningococcus B vaccine is mediated by the synergy of multiple bactericidal epitopes.** *Sci Rep*, 2018 Feb 27; 8(1): 3700. **IF2020: 4.379**
- Chandramouli S, Malito E, Nguyen TV, Luisi K, **Donnarumma D**, Xing Y, Norais N, Yu D, Carfi A. **Structural basis for potent antibody-mediated neutralization of human cytomegalovirus.** *Sci Immunol*, 2017 Jun 30; 2(12): 1457. **IF2020: 17.727**
- Domina M, Lanza Cariccio V, Benfatto S, Venza M, Venza I, **Donnarumma D**, Bartolini E, Borgogni E, Bruttini M, Santini L, Midiri A, Galbo R, Romeo L, Patanè F, Biondo C, Norais N, Massignani V, Teti G, Felici F, Beninati C. **Epitope mapping of a Monoclonal Antibody directed against Neisserial Heparin Binding Antigen using next generation sequencing of antigen-specific libraries.** *PLoS One*, 2016 Aug 10; 11(8). **IF2020: 3.240**
- **Donnarumma D**, Faleri A, Costantino P, Rappuoli R, Norais N. **The role of structural proteomics in vaccine development: recent advances and future prospects.** *Expert Rev Proteomics*, 2016 Jan; 13(1):55-68. **IF2020: 3.940**
- Ciferri C, Chandramouli S, Leitner A, **Donnarumma D**, Cianfrocco MA, Gerrein R, Friedrich K, Aggarwal Y, Palladino G, Aebersold R, Norais N, Settembre EC, Carfi A. **Antigenic characterization of the HCMV gH/gL/gO and Pentamer cell entry complexes reveals binding sites for potently neutralizing human antibodies.** *PLoS Pathog*. 2015 Oct 20; 11(10). **IF2020: 6.823**
- Amerighi F, Valeri M, **Donnarumma D**, Maccari S, Moschioni M, Taddei A, Lapazio L, Pansegrau W, Buccato S, De Angelis G, Ruggiero P, Massignani V, Soriani M, Pezzicoli A. **Identification of a Monoclonal Antibody against Pneumococcal Pilus 1 Ancillary Protein impairing bacterial adhesion to human epithelial cells.** *J Infect Dis*. 2016 Feb 15; 213(4):516-22. **IF2020: 5.226**
- **Donnarumma D**, Golfieri G, Brier S, Castagnini M, Veggi M, Bottomley MJ, Delany I, Norais N. **The *Neisseria meningitidis* GNA1030 is an ubiquinone-8 binding protein.** *FASEB Journal*, 2015 Jun; 29(6):2260-7. **IF2020: 4.191**
- Ciferri C, Chandramouli S, **Donnarumma D**, Nikitin PA, Cianfrocco MA, Gerrein R, Feire A, Barnett SW, Lilja AE, Rappuoli R, Norais N, Settembre EC, Carfi A. **Structural and biochemical studies of HCMV**

gH/gL/gO and Pentamer reveal mutually exclusive cell entry complexes. *Proc. Natl. Acad. Sci. U. S. A.*, 2015 Feb 10; 112(6):1767-72. **IF2020: 11.205**

- Pecetta S, Lo Surdo P, Tontini M, Proietti D, Zambonelli C, Bottomley MJ, Biagini M, Berti F, Costantino P, Romano MR. Study Group: Buricchi F, **Donnarumma D**, Norais N. **Carrier priming with CRM197 or Diphtheria Toxoid has a different impact on the immunogenicity of the respective glycoconjugates: biophysical and immunochemical interpretation.** *Vaccine*, 2015 Jan 3;33(2):314-20. **IF2020: 3.641**
- Barazzone GC, Pinto V, **Donnarumma D**, Tanizaki MM, Norais N, Berti F. **Identification of glycosylated regions in pneumococcal PspA conjugated to serotype 6B capsular polysaccharide.** *Glycoconj J.*, 2014 Mar 22;31(3):259-69. **IF2020: 2.916**
- Tani C, Stella M, **Donnarumma D**, Biagini M, Parente P, Vadi A, Magagnoli C, Costantino P, Rigat F, Norais N. **Quantification by LC-MS(E) of Outer Membrane Vesicle proteins of the Bexsero® vaccine.** *Vaccine*, 2014 Mar 5;32(11):1273-9. **IF2020: 3.641**
- Brier S, Fagnocchi L, **Donnarumma D**, Scarselli M, Rappuoli R, Nissum M, Delany I, Norais N. **Structural Insight into the Mechanism of DNA-Binding Attenuation of the Neisserial Adhesin Repressor NadR by the Small Natural Ligand 4-Hydroxyphenylacetic Acid.** *Biochemistry*, 2012 Aug 28;51(34):6738-52. **IF2020: 3.162**
- Nuccitelli A, Cozzi R, Gourlay LJ, **Donnarumma D**, Necchi F, Norais N, Telford JL, Rappuoli R, Bolognesi M, Maione D, Grandi G, Rinaudo CD. **Structure-based approach to rationally design a chimeric protein for an effective vaccine against Group B Streptococcus infections.** *Proc. Natl. Acad. Sci. U. S. A.*, 2011 Jun 21;108(25):10278-83. **IF2020: 11.205**

Book chapters

- **Donnarumma D**, Bottomley MJ, Malito E, Settembre E, Ferlenghi I and Cozzi R. **Structural Biology in Vaccine Research.** Chapter 5 for “Vaccine Design” book, 2nd Edition, *Caister Academic Press*, 2015.

Scientific awards

- Best Poster Award sponsored by CASSS (Californian Separation Science Society) at the *10th Symposium on the Practical Applications of Mass Spectrometry in the Biotechnology Industry* (Mass Spec 2013).

Posters and Oral Communications at Conferences

- **Donnarumma D**, La Tella R, Vento F, Rigano F, Mondello L. **Identification and quantification of toxic compounds and essential molecules in the context of tuna fishery industry waste valorization.** *XXVII CONGRESSO NAZIONALE DELLA SOCIETÀ CHIMICA ITALIANA 2021. Oral Communication*
- **Donnarumma D**, Micalizzi G, Rigano F, Mondello L. **Automatization and miniaturization of sample preparation of food and biological samples for lipidomics studies.** *1st European Sample Preparation e-Conference 2021. Oral Communication*

- **Donnarumma D**, Rigano F, La Tella R, Di Marco D, Vento F, Mondello L. **Identification of high added value molecules from the wastes of tuna fishery industry through MS based analytical methods.** *9th International Symposium on Recent Advances in Food Analysis (RAFA2019).* **Oral Communication**
- **Donnarumma D.** **Structural Mass spectrometry reveals novel structure-functional aspects of bacterial antigens.** *13th European Institute of Microbiology and Infectious Diseases (EIMID) Annual Meeting 2016.* **Oral Communication**
- **Donnarumma D**, Golfieri G, Brier S, Castagnini M, Veggi D, Bottomley M, Delany I, Norais N. **The *Neisseria meningitidis* GNA1030 is a ubiquinone 8 binding protein.** *11th Symposium on the Practical Applications of Mass Spectrometry in the Biotechnology Industry (Mass Spec 2014).*
- **Donnarumma D**, Faleri A, Brier S, Santini L, Malito E, Veggi D, Bottomley M, Massignani V, Costantino P, Norais N. **Epitope mapping of Bexsero® vaccine antigens using HDX-MS.** *10th European Institute of Microbiology and Infectious Diseases (EIMID) Annual Meeting 2013.*
- **Donnarumma D**, Faleri A, Brier S, Santini L, Malito E, Veggi D, Bottomley M, Massignani V, Costantino P, Norais N. **Epitope mapping of Bexsero® vaccine antigens using HDX-MS.** *10th Symposium on the Practical Applications of Mass Spectrometry in the Biotechnology Industry (Mass Spec 2013).*
- **Donnarumma D**, Brier S, Veggi D, Bottomley M, Nissum M, Norais N. **Use of native mass spectrometry based approaches as a tool to determine the oligomerization state and the stoichiometry of protein-ligand complexes.** *Analytical Science Network Symposium (ASNS) 2012.*
- Brier S, Fagnocchi L, **Donnarumma D**, Scarselli M, Rappuoli R, Nissum M, Delany I, Norais N. **Structural insight into the mechanism of regulation of *Neisseria meningitidis* NadA expression by the small natural ligand 4-HPA.** *American Society Mass Spectrometry (ASMS) Sanibel Conference 2012.*
- Biagini M, **Donnarumma D**, Rappuoli R, Norais N. **Identification of Intramolecular Isopeptide Bonds in Gram-positive Pilus Subunits by Mass Spectrometry.** *European Institute of Microbiology and Infectious Diseases (EIMID) meeting 2009.*

Messina, March 2022

Signature