

CURRICULUM VITAE

Niccolò Candelise, Ph.D.
Institute of Traslational Pharmacology,
Italian National Research Council

PERSONAL INFORMATION

I was born in on the
Current address:
Contact:

EDUCATION

2015-2019: Ph.D. in Molecular Medicine at Universitätsmedizin Gottingen.
Thesis title: *Seeding and structural variability in alpha-synucleinopathies*
Supervisors: Prof. Dr. Inga Zerr, Dr. Matthias Schmitz
Score: *Magna Cum Laude (written); Summa Cum Laude (oral)*

2012-2014: Master Degree in Neurobiology, Sapienza University of Rome.
Thesis title: *Post-natal developmental alterations in the retina of mdx mice, an animal model of Duchenne Muscular Dystrophy.*
Supervisor: Prof. Dr. Maria Egle De Stefano
Score: 110/110 *Cum Laude.*

2009-2012: Bachelor Degree in Biology, Sapienza University of Rome.
Thesis title: *Role of prion-like proteins in the maintenance of long-term memory.*
Supervisor: Dr. Mattia Toni
Score: 110/110 *Cum Laude.*

2004-2009: High School Diploma at "Liceo Scientifico E. Fermi" in Cosenza.
Score: 100/100 *Cum Laude.*

RESEARCH ACTIVITY

- April 2021-Present: **Post-Doctoral Fellowship "Anno 2021"** granted by **Fondazione Umberto Veronesi** at IRCCS Fondazione Santa Lucia, affiliated with the Institute of Traslational Pharmacology, National Research Council in Rome, Italy under the supervision of Professor Alberto Ferri. Here I am currently working on the effect of the induction of chronic stress on cellular models of Amyotrophic Lateral Sclerosis with the aim of dissecting the different routes of aggregation that TDP-43 may undertake in chronic, stressful conditions.
- March 2019-December 2020: **Post-doc position in neuropathology** at University of Bologna, Dept. of experimental, diagnostic and specialty medicine DIMES" under professor Piero Parchi supervision. Here I applied

the RT-QuIC to the largest cohort of synucleinopathies cases to date and detected seeding activity in prodromic synucleinopathies cases such as Pure Autonomic Failure and REM behaviour sleep disorder.

- May 2015-March 2019: **PhD in molecular medicine at Universitätsmedizin Göttingen** in professor Inga Zerr's laboratory, under the supervision of Dr. Matthias Schmitz. I worked on the development of the Real-Time Quaking Induced Conversion (RT-QuIC) suitable for analysing proteopathic aggregates of Tau, Amyloid Beta and Alpha Synuclein. As side projects, I tested synthetic dense shell oligodendrimers for their ability to inhibit prion protein conversion during RT-QuIC.
- April 2018-July 2018: **EMBO fellowship at "Istituto di Fisica Applicata Nello Carrara (IFAC)"** in Florence, Italy. In the frame of my Ph.D., I won a short-term EMBO fellowship with the aim of detecting by Raman spectroscopy the signal deriving from the RT-QuIC seeded with of alpha-synucleinopathies material. Moreover, I am currently working on the development of a topographic map by Atomic Force Microscope (AFM) of the RT-QuIC products, which would indicate the structure of alpha-synuclein aggregates produced starting from minute amounts of pathological seeds.
- October 2014-May 2015: **Internship at Dept. of experimental medicine at Sapienza University of Rome** in Professor Roberta Misasi's laboratory under the supervision of Doctor Alberto Ferri. Here I worked on prion protein expression in rats after chronic morphine withdrawal. As parallel projects, I have worked on cellular models of Amyotrophic Lateral Sclerosis linked to mutation of Cu,Zn Superoxide Dismutase, on the neuroprotective role of Neuroglobin upon induction of oxidative stress and on the localization and signalling of LRP-1 coupled with prion protein at lipid raft microdomains.
- April 2013- October 2014: Internship in cellular neurophysiology at Professor De Stefano's laboratory on the role of cholinergic network during the development of the retina in the *mdx* mouse, an animal model of Duchenne Muscular Dystrophy focused on the synaptic role of full length Dystrophin within the retinal circuitry.

SKILLS

- Expert in protein aggregation methods (RT-QuIC, PMCA, Security level 2** laboratory)
- Advanced experience in biochemistry (Western blot, dot blot, Proteinase K and deglycosylation assay, silver staining, native gels, ELISA, immunoprecipitation assay, surface plasmon resonance).

- Advanced experience in protein expression and purification through chromatographic systems (affinity, size-exclusion, ion exchange).
- Advanced knowledge in biophysical techniques to detect protein structures (Atomic force microscopy, Raman spectroscopy, Dynamic light scattering).
- Advanced experience in molecular biology (Cloning, DNA and RNA extraction, PCR, mitochondria isolation).
- Basic methods in cellular neurobiology (brain and retina dissection from young and adult mice, primary cell culture, cellular transfection, immunofluorescence assays).
- Expert in applied statistic and familiar with the main softwares on MacOS and Windows platforms (ImageJ, ImageLab, ImageReader, Adobe Photoshop, GraphPad Prism).
- Expert in dedicated softwares (Optima/Omega and Mars BMG softwares for RT-QuIC, LabSpec for Raman spectroscopy).

PRESENTATIONS

ORAL PRESENTATIONS

- Kompetenznetz Degenerative Dementia. Gottingen, 12-13/12/2016. Establishment of Tau RT-QuIC for Alzheimer's Disease Diagnosis.
- Kompetenznetz Degenerative Dementia. Essen, 29-30/06/17. In vitro amplification of misfolded proteins via RT-QuIC.
- Forschungscoordination Meeting. Gottingen, 30/09/2017. Detection of alpha-synuclein seeding activity via RT-QuIC.

POSTER PRESENTATIONS

- 12th Gottingen Meeting of the German Neuroscience Society. Gottingen, 22-25/03/2017. Poly(Propylene Imine) dendrimers inhibit RT-QuIC based in vitro amplification of prion protein.
- PRION 2017, Edinburgh, 23-26/05/2017. Dense shell glycodendrimers inhibit prion protein aggregation during RT-QuIC.
- PRION 2018, Santiago de Compostela, 22-25/05/2018. Detection of alpha-synucleinopathies activity through RT-QuIC.
- FENS 2018, Berlin, 7-11/07/2018. Detection of alpha-synucleinopathies activity through Real Time-Quaking Induced Conversion.
- SIPMeT Young Scientist Meeting 2021, Perugia, 10-11/12/2021. Effect of the induction of chronic stress on cellular models of Amyotrophic Lateral Sclerosis.

PUBLICATIONS

- **Candelise N***, Scaricamazza S*, Salvatori I*, Nesci V, Zenuni H, Ferri A, Valle C (2022). Mechanistic Insights of Mitochondrial Dysfunction in Amyotrophic Lateral Sclerosis: An Update on a Lasting Relationship. *Metabolites* 12(3):233. doi: 10.3390/metabo12030233.
- Scaricamazza S, Salvatori I, Amadio S, Nesci V, Torcinaro A, Giacobuzzo G, Primiano A, Gloriani M, **Candelise N**, Pieroni L, Loeffler JP, Renè F, Quessada C, Tefara TW, Wang H, Steyn FJ, Ngo ST, Dobrowolny G, Lepore E, Urbani A, Musarò A, Volontè C, Ferraro E, Coccorello R, Valle C, Ferri A (2021). Repurposing of Trimetazidine for Amyotrophic Lateral Sclerosis: a study in SOD1G93A mice. *Br J Pharmacol.* doi: 10.1111/bph.15738.
- Quadalti C, Calandra-Buonaura G, Baiardi S, Mastrangelo A, Rossi M, Zenesini C, Giannini G, **Candelise N**, Sambati L, Polischi B, Plazzi G, Capellari S, Cortelli P, Parchi P (2021). Neurofilament light chain and α -synuclein RT-QuIC as differential diagnostic biomarkers in parkinsonisms and related syndromes. *NPJ Parkinsons Dis* 7(1):93. doi: 10.1038/s41531-021-00232-4.
- **Candelise N§**, Scaricamazza S, Salvatori I, Ferri A, Valle C, Manganelli V, Garofalo T, Sorice M, Misasi R (2021). Protein Aggregation Landscape in Neurodegenerative Diseases: Clinical Relevance and Future Applications. *Int J Mol Sci.* 22(11):6016. doi: 10.3390/ijms22116016. 10.1038/s41531-021-00232-4.
- **Candelise N**, Baiardi S, Franceschini A, Rossi M, Parchi P (2020). Towards an improved early diagnosis of neurodegenerative diseases: the emerging role of in vitro conversion assays for protein amyloids. *Acta Neuropathol Commun.* 8(1): 117. doi: 10.1186/s40478-020-00990-x.
- Rossi M*, **Candelise N***, Baiardi S, Capellari S, Giannini G, Orrù CD, Antelmi E, Mammama A, Hughson AG, Calandra-Buonaura G, Ladogana A, Plazzi G, Cortelli P, Caughey B, Parchi P (2020). Ultrasensitive RT-QuIC assay with high sensitivity and specificity for Lewy body-associated synucleinopathies. *Acta Neuropathol.* 140(1): 49-62. doi: 10.1007/s00401-020-02160-8.
- **Candelise N***, Schmitz M*, Thüne K, Cramm M, Rabano A, Zafar S, Stoops E, Vanderstichele H, Villar-Pique A, Llorens F, Zerr I (2020). Effect of the micro-environment on α -synuclein conversion and implication in seeded conversion assays. *Transl. Neurodegener.* Accepted for publication. doi : 10.1186/s40035-019-0181-9
- Schmitz M*, **Candelise N***, Kanata E, Llorens F, Thüne K, Villar-Piqué A, da Silva Correia SM, Dafou D, Sklaviadis T, Appelhans D, Zerr I (2019). Validation of Poly(Propylene Imine) Glycodendrimers Towards

Their Anti-prion Conversion Efficiency. *Mol Neurobiol.* doi: 10.1007/s12035-019-01837-w.

- **Candelise N***, Schmitz M*, Llorens F, Villar-Piqué A, Cramm M, Thom T, Correia SM, da Cunha JE, Möbius W, Outeiro TF, Álvarez VG, Banchelli M, D'Andrea C, de Angelis M, Zafar S, Rabano A, Matteini P, Zerr I (2019). Seeding variability of different alpha synuclein strains in synucleinopathies. *Ann Neurol.* doi: 10.1002/ana.25446.
- Villar-Piqué A, Schmitz M, **Candelise N**, Ventura S, Llorens F, Zerr I. Molecular and Clinical Aspects of Protein Aggregation Assays in Neurodegenerative Diseases (2018). *Mol Neurobiol.* doi: 10.1007/s12035-018-0926-y.
- **Candelise N***, Schmitz M*, Correia SM, Arora AS, Villar Piqué A, Zafar S, Llorens F, Cramm M, Zerr I (2017). Applications of the real-time quaking-induced conversion assay in diagnosis, prion strain-typing, drug pre-screening and other amyloidopathies. *Expert Rev Mol Diagn.* 17(10): 897-904. doi: 10.1080/14737159.2017.1368389.
- Mattei V, Martellucci S, Santilli F, Manganelli V, Garofalo T, **Candelise N**, Caruso A, Sorice M, Scaccianoce S, Misasi R (2017). Morphine Withdrawal Modifies Prion Protein Expression in Rat Hippocampus. *PLoS ONE* 12(1): e0169571. doi: 10.1371/journal.pone.0169571.
- Schmitz M, Cramm M, Llorens F, **Candelise N**, Müller-Cramm D, Vargas D, Schulz-Schaeffer WJ, Zafar S, Zerr I (2016). Application of an in vitro-amplification assay as a novel pre-screening test for compounds inhibiting the aggregation of prion protein scrapie. *Scientific Reports* 6:28711. doi: 10.1038/srep28711.

§ corresponding author

* equal contribution

Book chapters

- Schmitz M, **Candelise N**, Llorens F, Zerr I (2018). Amplification and Detection of Minuscule Amounts of Misfolded Prion Protein by Using the Real-Time Quaking-Induced Conversion. In: Sigurdsson E., Calero M., Gasset M. (eds) *Amyloid Proteins. Methods in Molecular Biology*, vol 1779. Humana Press, New York, NY.
- Llorens F, Villar-Piqué A, **Candelise N**, Ferrer I, Zerr I (2018). Tau Protein as a Biological Fluid Biomarker in Neurodegenerative Dementias. In: Sibat HF (ed). *Cognitive disorders*, IntechOpen, DOI: 10.5772/intechopen.73528.

TEACHING

19/11/2021: Plenary lecture at “Università Campus Biomedico di Roma”, course of “general and nutritional biochemistry”, faculty of “Science of Alimentation and human nutrition”. Lesson title: “Domini a bassa complessità: aggregazione e neurodegenerazione.

2016-2018: Supervised the practical section of the course “Introduction to theoretical fundamentals and diagnostics of neurodegenerative diseases”.

OUTREACH

ACTIVITIES

2021: Presentation “Ricercatori in Classe” at Liceo Scientifico “E.Fermi”, Cosenza (CS). Supported by Fondazione Umberto Veronesi.

2014: Presentation “Io scelgo Biologia” at Sapienza University of Rome. Meeting for high school students aimed to show what biology is about and what it means to be a biologist.

2012: Partnership as librarian at Department Biology and Biotechnology “Charles Darwin”

AWARDS

2020: Post-Doctoral Fellowship -Year 2021, Fondazione Umberto Veronesi

2018: EMBO short-term fellowship (7478)

2015: Excellent graduate award, Faculty of Mathematical, Physical and Natural Sciences, Sapienza University of Rome.

2015: Best student award, Neurobiology Master class 2014.

Signature

