

## BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Elvira De Leonibus	<b>Professor in charge</b> , Pscobiology and Physiological Psychology Course, Faculty of Medicine and Surgery, University of "Tor Vergata" <b>Research Director</b> , Neuropsychopharmacology Laboratory, Institute of Cellular Biology and Biochemistry (IBBC) (previously called Institute of Cellular Biology and Neurobiology), Monterotondo (RM), Italy <b>Principal Investigator</b> , Behavioral Genetics laboratory, Telethon Institute of Genetics and Medicine (TIGEM), Naples, Italy <b>Head, Animal Behavioral Facility</b> , Telethon Institute of Genetics and Medicine (TIGEM), Naples, Italy

### EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE (if applicable)	MM/YY	FIELD OF STUDY
University of Rome "La Sapienza", Rome, Italy	Master degree	1999	Psychology
University of Rome "La Sapienza", Rome, Italy	PhD	1999-2002 (award date: 12/4/2002)	Psychobiology and Psychopharmacology

### A. Personal Statement

**Dr. De Leonibus** is a Neuropsychopharmacologist research director at IBBC, CNR and PI at the Telethon Institute of Genetic and Medicine (TIGEM), Telethon Foundation where she also has an appointment as Head of the behavioral facility. Her research focuses on the brain mechanisms of learning and memory in normal and pathological conditions including neurodevelopmental genetic, aging and neurodegenerative disorders. She has published more than 60 peer-reviewed research papers in high top journals (*Nat Comm, Brain, PNAS, Human Molec Med* etc) contributing to: 1. The targeting early disease mechanisms in animal' models of Parkinson's disease (PMID:30927362; PMID:29281030; PMID:18704096); 2. The identification of disease' mechanisms and novel therapeutic tools for developmental genetic disorders including lysosomal storage disorders (PMID:20021231; PMID:20133588, PMID:20181585; PMID:21119624; PMID:32087148; PMID:31788497; PMID:29118420; PMID:27881461; PMID:26813976). 3. The identification of sex-differences in memory in physiological and pathological conditions (PMID: 35859057; PMID: 32781107). As Head of the Behavioral facility and Principal Investigator at TIGEM (Telethon Foundation) she has contributed to pivotal preclinical studies providing proof of concept evidence of novel therapeutic strategies for lysosomal storage disorders which are now being tested on clinical trials. Her research group is supported by national and international grants (Alzheimer' Association, SanFilippo Children Foundation, Cure the Children etc) and is based on a solid network of collaborators. She has received invitation to give seminars in prestigious international universities (Bordeaux University, Marseille University, etc) and many honors (EMBO short term fellowship, Rotary Club international prize, Premio "Le Scienze" in Psychobiology etc).

### B. Positions and Honors

#### Positions and Employment

#### **CURRENT POSITIONS**

- 2022- Present Professor in charge, Pscobiology and Physiological Psychology Course, Faculty of Medicine and Surgery, University of "Tor Vergata", Rome, Italy
- 2023- Present Research Director, Neuropsychopharmacology Laboratory, Institute of Cellular Biology and Biochemistry (IBBC) (previously called Institute of Cellular Biology and Neurobiology), Monterotondo (RM), Italy
- 1/01/2011 – Present PI** (Faculty), Behavioral Genetics laboratory, Telethon Institute of Genetics and Medicine (TIGEM), Naples, Italy
- 2007 – Present Head, Animal Behavioral Facility, Telethon Institute of Genetics and Medicine (TIGEM), Naples, Italy

#### **PREVIOUS POSITIONS**

- 2018- 2022 Group Leader (Senior scientist), Neuropsychopharmacology Laboratory, Institute of Cellular Biology and Biochemistry (IBBC) (previously called Institute of Cellular Biology and Neurobiology), Monterotondo (RM), Italy
- 2018 – Present Visiting scientist, Biomedical Center, Medical Charles University of Pilsen, Czech Republic. EMBO fellowship
- 2010 - 2017 Staff scientist, Neuropsychopharmacology Laboratory, Institute of Genetics and Biophysics (IGB-CNR) “Adriano Buzzati-Traverso”, Naples, Italy
- 2006 - 2007 Post Doctoral fellow, Psychobiology Laboratory, Dept. of Genetic and Molecular Biology “C. Darwin”, Mathematics and Natural Sciences Department, University of Rome “La Sapienza”, Rome, Italy
- 2004 - 2006 Clinical Training, Skinner Institute, Rome, Italy
- 2005 Visiting scientist (one month), Neurobiologie de la Cognition Lab, CNRS, Marseille, France
- 2003 - 2004 Associate Researcher (Rotary Club Research Grant), Neuropsychopharmacology Laboratory, Catholic University of Nijmegen, Nijmegen, Netherlands

### Other Experience and Professional Memberships

Member of: “Italian Society of Neuroscience”, “European Federation of Neuroscience Society”, “European Brain and Behavioral research Society.

Member of the scientific Committee of the Neapolitan Brain Group

2018 – Visiting scientist, Biomedical Center, Medical Charles University of Pilsen, Czech Republic. EMBO fellowship

2006 - 2007 Post Doctoral fellow, Psychobiology Laboratory, Dept. of Genetic and Molecular Biology “C. Darwin”, Mathematics and Natural Sciences Department, University of Rome “La Sapienza”, Rome, Italy

2004 - 2006 Clinical Training, Skinner Institute, Rome, Italy

2005 Visiting scientist (one month), Neurobiologie de la Cognition Lab, CNRS, Marseille, France

2003 - 2004 Associate Researcher (Rotary Club Research Grant), Neuropsychopharmacology Laboratory, Catholic University of Nijmegen, Nijmegen, Netherlands

### ***SELECTED NATIONAL AND INTERNATIONAL COMMITTEE***

2021-2022 Member of the evaluation panel Marie Skłodowska Curie Postdoctoral Fellowships (HORIZON-MSCA-2021-PF) Contract CT-EX2019D348588-102

2021 Reviewer for scientific proposals submitted to the European Research Council (ERC) Consolidator Grant 2021 Call.

2019-2020 Member of the evaluation panel of the Biomedical Center, Medical Charles University of Prague, Czech Republic.

2019-2020 Member of the evaluation panel ANR Molecular and Cellular Neuroscience committee, France.

2019 Member of the selection committee at the Advanced PhD School, SISSA, Trieste, Italy

2018–2019 Member of the evaluation panel ANR Molecular and Cellular Neuroscience committee, France.

2018 PhD in Neuroscience, External Examiner Defence, University of Naples Federico II, Naples, Italy.

2018 President of the Committee for the Selection of post-doc, Institute of Cellular biology and Neurobiology (IBCN-CNR), Rome, Italy - Call identifier: Prot. AR04.2018.RM.

2001 - External Reviewer of international scientific journals: Nature Communications, Nature Aging, Neuropsychopharmacology, Neuropharmacology, Alzheimer’ & Dementia etc.

### ***SELECTION OF INVITED ORAL COMMUNICATIONS***

2022: “Early development of MPS IIIA dopaminergic neurons: at the nexus of behavior changes and therapy” MPS Society 36th Annual Family Conference, August 4-6, 2022 Nashville, TN, (USA)

2020: “Altered metabolism of heparan sulfate leads to developmental dopaminergic abnormalities responsible for autistic-like behaviours in lysosomal storage disorders”, Symposium “Role of neuromodulators in synaptic plasticity and memory”, ***Dopamine Meeting***, 21<sup>th</sup> May 2020, Montreal, Canada.

2020: "Memory load capacity: from pathophysiology to rescue strategies". 22<sup>nd</sup> January 2020, **University of Heidelberg**, Heidelberg, Germany.

2019: "Memory load capacity: from pathophysiology to rescue strategies". October 16, 2019, **Department of Neuroscience, SCRIPPS**, Jupiter (USA), FL 33458-5284.

### Honors

2021 National Qualification (ASN): Full Professor in Psychobiology (BANDO D.D. 2175/2018-Sector 11/E, VALIDO DAL 31/05/2021 AL 31/05/2030, art. 16, comma 1, Legge 240/10).

2018 EMBO short-term Fellowship as visiting Scientist at the Biomedical Center, Medical Charles University of Pilsen, Czech Republic.

2010 Young investigator grant award, Alzheimer' Association

2008 Annual prize for scientific achievements in psychobiology from the magazine "Mente e Cervello" (part of the Italian version of the American magazine "Scientific American")

2003 Award as a one-year scholar Ambassador of Rotary International, Rotary International, Evanston (USA), at the Catholic University of Nijmegen, Nijmegen, the Netherlands (Dr. A.B. Ellenbroek and A.L. Cools).

### **SYMPOSIUM/NATIONAL MEETING ORGANIZER**

- Founding member of the Dopamine Society, Montreal (Canada), 2022
- Invited moderator for the session: "Update sulle distonie: genetica, fisiopatologia e nuovi approcci terapeutici", 7th National Congress of the Italian Academy of Parkinson' disease and Movement Disorders, LIMPSE-DISMOV, Bologna, September 15-17, 2021.
- Symposium organizer: "Aberrant pre- and post-synaptic mechanisms in Parkinson's: pre-degeneration to late stage disease" accepted for Federation of the European Neuroscience Society (FENS), 2018, July, Berlin, Germany
- Member of the Local Organizing Committee: "Congresso Nazionale della Società Italiana di Neuroscienze (SINS)" - Perugia, September 26-29, 2019.

### **C. Selected Peer-reviewed Publications (15 best peer-reviewed publications)**

1. Iemolo A, De Risi M, Giordano N, Torromino G, Somma C, Cavezza D, Colucci M, Mancini M, De Iure A, Granata R, Picconi B, Calabresi P, **De Leonibus E**. Synaptic mechanisms underlying onset and progression of memory deficits caused by hippocampal and midbrain synucleinopathy. **NPJ Parkinson Dis.** 2023, 16, 9(1) 92.
2. Torromino G, Loffredo V, Cavezza D, Esposito F, Crevenna AH, Giofrè M, De Risi M, Treves A, Griguoli M, **De Leonibus E**. Thalamo-hippocampal pathway regulates incidental memory load: insights from sex differences. *BioRxiv* <https://doi.org/10.1101/2021.08.07.453742>. 2022, 13(1): 4194 **Nature Comm**
3. De Risi M, Tufano M, Alvino FG, Ferraro MG, Torromino G, Gigante Y, Monfregola J, Marrocco E, Pulcrano S, Tunisi L, Lubrano C, Papy-Garcia D, Tuchman Y, Salleo A., Santoro f, Bellenchi GC, Cristino L, Ballabio A., Fraldi A. **D Leonibus E**. Altered metabolism of heparan sulfate leads to developmental dopaminergic abnormalities responsible for autistic-like behaviours in lysosomal storage disorders. 2021 Jun 9;12(1):3495 **Nature Comm. Featured in the Editors' highlights webpage: From brain to behaviour (nature.com)**.
4. Indrieri A, Pizzarelli R, Franco B, **De Leonibus E**. Synaptic and mitochondrial dysfunctions in Parkinsonian eyes, Topic: [Seeing Beyond the Eye: The Brain Connection](#). Oct 19;14:567129, 2020, **Frontiers in Neuroscience**.
5. Torromino G., Maggi A., **De Leonibus E**. Estrogens-dependent hippocampal wiring as a risk factor for ageing-related dementia in women. Feb;197:101895, 2021 **Progress in Neurobiology**.
6. De Risi M, Torromino G, Tufano M, Moriceau S, Rivogorda M, Pignataro A, Ammassari\_Teule M, Gardoni F, Middei S, Mele A, Oury F, **De Leonibus E**. Mechanisms through which autophagy regulates memory capacity in ageing". Sep;19(9):e13189, 2020, **Ageing Cell**.
7. Rinaldi A\*, **De Leonibus E\***, Cifra A, Torromino G, Minicocci E, De Sanctis E, Lopez-Pedrajas R, Oliverio A and Mele A. Flexible use of allocentric and egocentric spatial memories activates differential neural networks in mice. Jul 9;10(1):11338, 2020, **Scientific Reports**. \*Identical Contribution

8. Marrocco E, Indrieri A, Esposito F, Tarallo V, Carboncino A, Alvino FG, De Risi M, , Franco B, Auricchio A, **De Leonibus E**. Alpha-synuclein in the retina leads to degeneration of dopamine amacrine cells impairing vision. 10(1):9619, 2020, **Scientific Reports**
9. Giordano NC\*, Iemolo A\*, Mancini M, Cacace F, De Risi M, Latagliata EC, Ghiglieri V, Bellenchi GC, Puglisi-Allegra S, Calabresi P, Picconi B, **De Leonibus E**. Dopamine active transporter mediates learning-induced shift in striatal plasticity: relevance for Parkinson's disease. Feb 1;141(2):505-520, 2018, **Brain**.
10. Flore G, Di Ruberto G, Sannino S, Russo F, Illingworth E, Studer M, **De Leonibus E**. Gradient COUP-TFI Expression is Required for Proper Functional Organization of the Hippocampal Septo-Temporal Longitudinal Axis. Feb 1;27(2):1629-1643, 2017, **Cerebral Cortex**.
11. Olivito L, Saccone P, Perri V, Bachman J, Fragapane P, Mele A, Haganir RL, **De Leonibus E**. Phosphorylation of the AMPA receptor GluA1 subunit regulates memory load capacity. Nov 8. 2014 [Epub ahead of print] **Brain Structure Function**.
12. Saccone P, Cotugno G, Russo F, Mastrogiacomo R, Tessitore A, Auricchio A, **De Leonibus E**. Behavioural characterization of an animal model of Maroteaux-Lamy syndrome (or Mucopolysaccharidosis VI). Jan 10;4:3644, 2014, **Scientific Reports**.
13. Managò F, Lopez S, Oliverio A, Amalric M, Mele A, **De Leonibus E**. Interaction between the mGlu receptors 5 antagonist, MPEP, and amphetamine on memory and motor functions in mice. Nov Epub ahead of print, 2012, **Psychopharmacology**.
14. Sannino S\*, Russo F\*, Torromino G, Pendolino V, Calabresi P, **De Leonibus E**. Role of the hippocampus in object memory load. 19: 211-18, 2012, **Learning & Memory**.
15. Tomassy GS\*, **De Leonibus E\***, Jabaudon D\*, Lodato S, Alfano C. Mele A, Macklis JD, Studer M. Area-Specific temporal control of corticospinal motor neuron differentiation by COUP-TF1. Feb 2. [Epub ahead of print], 2010, **PNAS**.

#### D. Research Support

- Ongoing Research Support

**Project Title:** The role of heparan sulfate and dopamine as disease' modifiers in Mucopolysaccharidosis type IIIA; **Funding source:** Cure SanFilippo; **Amount:** 199395\$; **Period:** 2021-2023; **Role:** PI

**Project Title:** Role of alpha-synuclein and LRRK2 in Levodopa-Induced Dyskinesia; **Funding source:** PRIN, MIUR (IT); **Amount:** 135.000€; **Period:** 2019-2023; **Role:** PI/Unit

- Completed Research Support

**Project Title:** Targeting early synaptic dysfunctions induced by alpha-synuclein as a novel therapeutic approach in Parkinson's disease; **Funding source:** PRIN (MIUR) (IT); **Amount:** 38.000 €; **Period:** 2016-2020; **Role:** PI/Unit

**Project Title:** Neurobiology of sex differences in memory capacity in ageing and AD; **Funding source:** AMERICAN ALZHEIMER' ASSOCIATION (US); **Amount:** \$ 249.000; **Period:** 2016–2020; **Role:** PI

**Project Title:** Pharmacological stimulation of autophagy to rescue proteinopathy and cognitive decline in Mucopolysaccharidosis-IIIa; **Funding source:** SanFilippo Fighters Foundation; **Amount:** 50000€; **Period:** 2021-2022; **Role:** PI

**Project Title:** New therapeutic strategies for the treatment of behavioural symptoms in MPS-IIIa; **Funding source:** Sanfilippo Children's Foundation (Australia); **Amount:** 90.000 \$AU; **Period:** 2019-2020; **Role:** PI

**Project Title:** Disease' mechanisms leading to dopaminergic dysfunction underlying behavioural symptoms in MPSIIIa; **Funding source:** NATIONAL MPS SOCIETY (US); **Amount:** 50.000\$; **Period:** 2017-2019; **Role:** PI

**Project Title:** Disease mechanisms of working memory load capacity in ageing and Alzheimer' disease; **Funding source:** The Ageing Project, MIUR (IT); **Amount:** 210.000€; **Period:** 2015-2018; **Role:** Coordinator/PI

**Project Title:** New markers for dementia: a multidisciplinary approach; **Funding source:** Fondazione con il Sud (IT); **Amount:** 690.000€; **Period:** 2013-2016; **Role:** Coordinator/PI

**Project Title:** Neurobiology of working memory span in normal and pathological ageing; **Funding source:** AMERICAN ALZHEIMER' ASSOCIATION (US); **Amount:** \$ 80.000; **Period:** 2010–2013; **Role:** PI

**Project Title:** A novel behavioral procedure to test object working memory span; **Funding source:** Fondazione Telethon (Core Grant) (IT); **Amount:** 10.000€; **Period:** 2007-2010; **Role:** PI

**Project Title:** Behavioral phenotyping of animal models of human genetic diseases; **Funding source:** Fondazione Telethon (IT); **Amount:** 90.000 €; **Period:** 2009-2011; **Role:** Co-PI

**Project Title:** Neurobiology of processing novelty related information; **Funding source:** Rotary International (US); **Amount:** 20000€; **Period:** 2003-2004; **Role:** PI