PERSONAL INFORMATION

Fabio Moda

Fondazione IRCCS Istituto Neurologico Carlo Besta
UO Neurology 5 - Neuropathology
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WORK EXPERIENCE

December 2019 – present

Italian NHS Research Scientist

Fondazione IRCCS Istituto Neurologico Carlo Besta – UO Neurologia 5 – Neuropatologia

- Head of a research team dedicated to the study of the molecular mechanisms underlying neurodegenerative diseases and to the development of highly sensitive and innovative techniques for the identification of biomarkers in peripheral tissues (urine, blood, tears, faeces, olfactory mucosa and skin) useful for the early diagnosis of human (e.g. Parkinson's disease, Alzheimer's disease, frontotemporal dementia, dementia with Lewy bodies, amyotrophic lateral sclerosis and prion diseases) and animal diseases (e.g. chronic wasting disease of deer and scrapie of sheep);
- Responsible for carrying out (1) biochemical analyses on brains of patients with prion diseases for diagnostic confirmation; (2) highly sensitive assays (e.g. PMCA and RT-QuIC) on CSF, olfactory mucosa, blood and urine samples of patients with prion diseases to support the clinical diagnosis; (3) ultrastructural analysis (transmission electron microscopy) on skin biopsies for diagnostic purposes or other biological material (e.g. exosomes extracted from plasma and urine) for research purposes;
- Supervisor of undergraduate and PhD students (faculty of medicine, biology, biotechnology, pharmacy);
- In charge of the laboratory with biosafety level 3 (BSL3) for the manipulation of biological samples of human or animal origin potentially infected with prions;
- Responsible for the coordination and/or execution of nationally and internationally funded projects (e.g. Italian Ministry of Health, JPND).

September 2013 – November 2019

Senior Researcher

Fondazione IRCCS Istituto Neurologico Carlo Besta – UO Neurologia 5 – Neuropatologia

- Head of a research team dedicated to the development of highly sensitive diagnostic techniques for the detection of traces of specific biomarkers associated with prion diseases, Alzheimer's disease, Parkinson's disease, atypical parkinsonism and frontotemporal dementia eventually present in cerebrospinal fluid, olfactory mucosa, urine, blood, skin and tears;
- Responsible for the diagnostic activities related to prion diseases (CSF and brains analysis);
- Biochemical and immunohistochemical analyses of nervous tissues obtained either from humans or from animal models of prion disease, Alzheimer's disease and primary tauopathies (e.g. FTDP-17).

September 2011 – August 2013

Postdoctoral Researcher

The University of Texas Health Science Center at Houston (USA) – Neurology department

- In charge of the laboratory with biosafety level 3 (BSL3) for the manipulation and analysis of biological samples of human and animal origin potentially infected with prions;
- Development and optimization of highly sensitive diagnostic tests (PMCA and RT-QuIC) for the analysis of urine and blood of patients with different forms of prion diseases, in particular, the variant and sporadic forms of Creutzfeldt-Jakob disease;
- Biochemical and immunohistochemical analyzes of samples collected from animal models of Alzheimer's disease or traumatic brain injury (TBI).

January 2008 – August 2011

PhD Researcher in Translational and Molecular Medicine

University of Milan-Bicocca / Fondazione IRCCS Istituto Neurologico Carlo Besta

- Evaluation of the effects of experimental therapies based on the use of (1) adeno-associated viral vectors (intracerebrally administered), (2) gold nanoparticles (intravenously administered) or (3) humic and fulvic acids (orally administered) in animal models of prion diseases;
- Biochemical and immunohistochemical analyses of tissues collected from animal models intracerebrally inoculated with brains of patients with prion disease, Alzheimer's disease and frontotemporal dementia due to tau P301L mutation;

- Biochemical and immunohistochemical analyses of brains of patients with a clinical suspicion of prion disease for diagnostic confirmation.

January 2007 – December 2007

Research Assistant

IRCCS Carlo Besta Neurological Institute Foundation - Neurology Unit 5 - Neuropathology

- Biochemical and immunohistochemical analyses of samples of human and animal origins (mice and hamsters) for diagnostic and research purposes

EDUCATION AND TRAINING

December 2018 – December 2022

Specialization in Clinical Pathology and Clinical Biochemistry

University of Pavia - Via Forlanini 8, 27100 Pavia

- I approached the main techniques used in standard laboratory analysis for the evaluation of cerebrospinal fluid, blood and urine samples;
- Analyses of cerebrospinal fluid, skin and olfactory mucosa of patients with sporadic forms of Creutzfeldt-Jakob disease, Parkinson's disease, multiple system atrophy, dementia with Lewy bodies, Alzheimer's disease and amyotrophic lateral sclerosis using classical (Lumipulse, ELISA, Western blot) or highly sensitive (RT-QuIC and PMCA) techniques.

September 2022

Authorized to Collect Human Venous Blood

University of Milan – School of Specialization in Clinical Pathology and Clinical Biochemistry

May 2019 – May 2028

National Scientific Qualification to function as Associate Professor in **General Biochemistry** (05/E1-BIO/10)

October 2018 – October 2027

- National Scientific Qualification to function as Associate Professor in **Clinical Biochemistry and Clinical Molecular Biology** (05/E3 - BIO/12);
- National Scientific Qualification to function as Associate Professor in **Sciences of Health Professions and Applied Medicals Technologie**s (06/N1 - MED/46).

Registered in the **National Council of Biologists**, Section A (ID number AA_075317)

March 2016

PhD in Translational and Molecular Medicine

January 2008 – December 2010

University of Milan-Bicocca / Fondazione IRCCS Istituto Neurologico Carlo Besta

- Evaluation of experimental therapies (adeno-associated viral vectors, gold nanoparticles, humic and fulvic acids) in animal models of prion disease;
- Biochemical and immunohistochemical analyses of samples collected either from patients or animal models of neurodegenerative diseases (prions, Alzheimer's disease and frontotemporal dementia)

MSc in Medical Biotechnologies and Molecular Medicine

October 2004 – October 2006

University of Milan - Via Mangiagalli 37, Milano

- Morphological, genetic and immuno-histochemical evaluation of bone samples collected from corps at different times of inhumation

BSc in Medical Biotechnologies

October 2001 – July 2004

University of Milan- Via Mangiagalli 37, Milano

- Microbiological evaluation of dialysis water

ACHIEVEMENTS AND AWARD

Awards

- July 2022 - **Best paper award** for the paper published in Translational Neurodegeneration - De Luca CMG, Elia AE, Portaleone SM, Cazzaniga FA, Rossi M, Bistaffa E, De Cecco E, Narkiewicz J, Salzano G, Carletta O, Romito L, Devigili G, Soliveri P, Tiraboschi P, Legname G, Tagliavini F, Eleopra R, Giaccone G, Moda F. **Efficient RT-QuIC seeding activity for α-synuclein in olfactory mucosa samples of patients with Parkinson's disease and multiple system atrophy**. Transl Neurodegener. 2019 Aug 8;8:24. doi: 10.1186/s40035-019-0164-x;
- November 2021: **AirAlzh award** for the best scientific communication at SINDem2021 meeting (Florence);

- March 2018: **Rita Levi Montalcini award** for the best scientific work presented at the AAT-AD/PD™ focus meeting 2018 (Turin);
- May 2013: **Best poster award** for the poster presented at the Prion2013 meeting (Canada).

Editorial activity

- Review Editor for Frontiers in Aging Neuroscience;
- Review Editor for Frontiers in Neurology / Movement Disorders;
- Guest Editor for the Special Issue "From protein misfolding to dementia: basic research, innovative diagnosis and early biomarkers" of Frontiers in Bioscience;
- Guest Editor for the Special Issue "Emerging Omic tools in neurodegenerative diseases diagnosis" of Frontiers in Molecular Biosciences.

Grants

- 2015 – 2017 - **FABS201402** - La Foundation pour la recherche medicale (FRM) on behalf of the Foundation Alliance BioSecure (FABSFRM). Prion detection in blood samples of patients suffering from variant Creutzfeldt-Jakob disease. Total funding 60.000 €. Role: Principal Investigator;
- 2015 – 2017- **Fondazione CARIPLO** - Understanding the role of β-amyloid peptide halogenation in Alzheimer's disease. Funding allocated to the UO: 146.500 €. Role: Collaborator of UO Neurologia 5 – Neuropatologia/Besta;
- 2016 – 2018 - **BAND11035** - Biomarkers Across Neurodegenerative Diseases Grant Program 2015 – Alzheimer's Association (ALZ), Alzheimer's Research UK (ARUK), The Michael J. Fox Foundation for Parkinson's Research (MJFF) and Weston Brain Institute. Seed of dementia: misfolded proteins in neurodegenerative disorders. Total funding: 110.168 €. Role: Principal Investigator;
- 2016 – 2019 - **GR-2013-02355724** - Ricerca Finalizzata/Ministero della Salute. Ultrasensitive diagnostic test for degenerative dementias based on amplification of peripheral disease-specific biomarkers from the olfactory mucosa. Total funding 321.474 €. Funding allocated to the UO: 138.918 €. Role: Principal Investigator;
- 2017 – 208 - **The Association for Frontotemporal Degeneration (AFTD)** - Detection of misfolded TDP-43 protein in CSF and plasma of GRN and C9orf72 mutation carriers. Total funding: 57.474 €. Role: Co-Principal Investigator;
- 2019 – 2021 - **SPEEDY** - European Innovative Research & Technological Development Projects in Nanomedicine - EuroNanoMed III. Surface-enhanced Raman scattering with nanophotonic and biomedical amplifying system for an early diagnosis of Alzheimer's disease pathology. Total funding: 798.000 €. Funding allocated to the UO: 250.000 €. Role: Coordinator of UO Neurologia 5 – Neuropatologia/Besta;
- 2019 – 2021 - **Norwegian research funding for agriculture and food industry** - Reindeer CWD prion ecology: Risk of dissemination by sheep. Total funding: 935.498 €. Funding allocated to the UO: 0 €. Role: Coordinator of UO Neurologia 5 – Neuropatologia/Besta;
- 2020 – 2022 - **RF-2018-12366209** - Ricerca Finalizzata/Italian Ministry of Health. Dementia with Lewy Bodies: toward a standardization of the diagnostic tools among the Italian Dementia Centers. Total funding: 631.926,29 €. Funding allocated to the UO: 170.000 €. Ruolo: Coordinator "young researcher" of specific activites performed at UO Neurologia 5 – Neuropatologia/Besta;
- 2020 – 2022 - **PRAMA** - Bando Ricerca Salute 2018, Regione Toscana. Proteomics, RAdiomics & Machine learning-integrated strategy for precision medicine for Alzheimer's (PRAMA). Total funding: 736.000 €. Funding allocated to the UO: 0 €. Role: External collaborator of UO Neurologia 5 – Neuropatologia/Besta;
- 2021 – 2024 - **ProDrOMaL** – Bando competitivo della Fondazione IRCCS Istituto Neurologico Carlo Besta (5x1000 Ministero della Salute). Identification of early and peripheral biomarkers predictive of Parkinson's disease and dementia with Lewy bodies (ProDrOMaL). Total funding: 120.000 €. Role: Principal Investigator;
- 2022 – 2025 - **cod2773572** - Ricerca Corrente/Italian Ministry of Health. Malattie neurodegenerative: modelli in vitro ed in vivo di malattia ed approcci terapeutici sperimentali. Role: responsible for the research area of "Neurologia Sperimentale Preclinica" at Fondazione IRCCS Istituto Neurologico Carlo Besta;
- 2022 – 2025 - **ProFFIle** - The EU Joint Programme – Neurodegenerative Disease Research (JPND). Prodromal biomarkers in fatal familial insomnia: a longitudinal study in humans and mice. Total funding: 874.231 €. Funding allocated to the UO: 133.650€. Role: Coordinator of UO Neurologia 5 – Neuropatologia/Besta.

TEACHING ACTIVITY

16 May 2016 Lesson title: **Misfolded aggregates and human neurodegenerative proteinopathies**. Università degli Studi di Bologna.

10 May 2019 Course of Neuropathology – Module Neurobiology of Neurodegenerative Diseases. Lesson title: **Detection of aggregated protein involved in neurodegeneration.** Scuola Internazionale Superiore di Studi Avanzati/Università degli Studi di Trieste;

4 June 2019 Course of Clinical Biochemistry and Clinical Molecular Biology – Master's degree in Biology Applied to Biomedical Research. Lesson title: **Tecniche di biologia molecolare innovative per la diagnosi delle malattie neurodegenerative**. Università degli Studi di Milano;

12 December 2019 Course of Clinical Biochemistry and Clinical Molecular Biology – Master's degree in Biology Applied to Biomedical Research. Lesson title: **Tecniche di biologia molecolare innovative per la diagnosi delle malattie neurodegenerative**. Università degli Studi di Milano;

28 April 2020 Course of Neuropathology – Module Neurobiology of Neurodegenerative Diseases. Lesson title: **Detection of aggregated protein involved in neurodegeneration.** Scuola Internazionale Superiore di Studi Avanzati/Università degli Studi di Trieste;

5 May 2020 Course of Clinical Biochemistry and Clinical Molecular Biology – Master's degree in Biology Applied to Biomedical Research. Lesson title: **Tecniche di biologia molecolare innovative per la diagnosi delle malattie neurodegenerative**. Università degli Studi di Milano;

16 May 2021 Course of Neuropathology – Module Neurobiology of Neurodegenerative Diseases. Lesson title: **Detection of aggregated protein involved in neurodegeneration.** Scuola Internazionale Superiore di Studi Avanzati/Università degli Studi di Trieste;

17 May 2021 Course of Clinical Biochemistry and Clinical Molecular Biology – Master's degree in Biology Applied to Biomedical Research. Lesson title: **Tecniche di biologia molecolare innovative per la diagnosi delle malattie neurodegenerative**. Università degli Studi di Milano;

28 October 2021 Course of Clinical Biochemistry and Clinical Molecular Biology – Master's degree in Biology Applied to Biomedical Research. Lesson title: **Tecniche di biologia molecolare innovative per la diagnosi delle malattie neurodegenerative**. Università degli Studi di Milano;

20 May 2022 Course of Neuropathology – Module Neurobiology of Neurodegenerative Diseases. Lesson title: **Detection of aggregated protein involved in neurodegeneration.** Scuola Internazionale Superiore di Studi Avanzati/Università degli Studi di Trieste;

TECHNICAL SKILLS

- Preparation, development and optimization of RT-QuIC-based analyses (for research and diagnostic purposes);
- Preparation, development and optimization of PMCA-based analyses (for research and diagnostic purposes;
- Preparation of olfactory mucosa, tears, cerebrospinal fluid, skin, urine and blood samples for analysis with classical (e.g. ELISA, Lumipulse, Western blot) and highly sensitive diagnostic techniques (e.g. RT-QuIC and PMCA);
- Preparation and analyses of samples using optical, fluorescent and transmission electron (TEM) microscopy
- Preparation and morphological (TEM) analysis of skin biopsies for diagnostic purposes;
- Analysis of cerebrospinal fluid samples with chemiluminescent technology for the detection of markers of neurodegeneration;
- Preparation, biochemical (e.g. SDS-PAGE, Western blot, dot blot) and immunohistochemical analyses of tissues of human and animal origin;
- Collection of venous blood from animals and patients/healthy subjects;
- Intracerebral inoculation of compounds in mice and hamsters;
- Handling of mice (behavioral tests, intracardiac perfusion, blood sampling).