BIOGRAPHICAL SKETCH

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NAME	POSITION TITLE
Maria Vincenza Catania	Senior Scientist (Primo Ricercatore) Istitute of Neurological Sciences (ISN) National Research Council (CNR) – Catania (CT) ITALY

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Liceo Classico "Tommaso Gargallo" Siracusa, Italy	Baccalaureate	**July 1982**	
Medical School, University of Catania, Catania, Italy	MD	**October 1988**	Medicine and Surgery
Medical School, University of Catania, Catania, Italy	Specialization	**July 1992**	Neurology

A. Personal Statement

I have been always working in the field of excitatory amino acid receptors. My main interests are the pharmacology, the regional and cellular distribution of ionotropic and metabotropic glutamate receptors, the role of glutamate receptors in the mechanisms of plasticity during development and neurodegeneration. During the last ten years my activity has been more focused on pathophysiological aspects, namely on the possible role that neurotransmitter receptors have in the synaptic dysfunctions at the bases of neurological disorders.
Presently there are two major lines of ongoing research in my lab:
Pathophysiology of Fragile X Syndrome
Role of glial mGlu receptors in neurodevelopment and motor neuron degeneration.
My research activities resulted in the publication of 68 papers in International peer reviewed journals, 12 chapters in books and more than 100 abstracts presented at International and National meetings.
My actual bibliometric indexes are: H-index 35 (ISI WEB of Science), 37 (Scopus), 41 (Google Scholar).

Being a CNR Researcher I also combined my research activity with tutorial activity. I have been actively involved in different PhD programs of the University of Catania: Neurobiology, Neuropharmacology, Applied Biomedical Sciences programs, tutoring the work of several PhD students. I am currently member of the PhD program in Biotechnology at the University of Catania. I also supervise the stages of pre-doctoral students at the ISN-CNR for the preparation of experimental thesis, and I have been supervisor of foreign students within the Erasmus plus program. I have given seminars and lessons within several University courses (Pharmacology, Anatomy, Child Education, Psychology, Scuola Superiore UniCT).

Neuroscience is a multidisciplinary science and I strongly believe that the best results can be achieved through collaboration between scientists operating in different fields. I also believe that Science is important for the development of a better Society and that the work and value of scientists should be better understood in Italy. In this sense it is important to open a dialogue with all the actors of a society to transmit not only knowledge, but also the ethical basis of Science: dedication, honesty and methodological rigor. Therefore, I am involved in several activities of public engagement. Since 2013 I enthusiastically participate to the organization of the "Olimpiadi delle Neuroscienze" as coordinator of the regional (Sicily, 2013-date) and national competitions (2017 and 2018, http://www.isn.cnr.it/index.php/olimpiadi-delle-neuroscienze-2017/; http://www.isn.cnr.it/index.php/olimpiadi-delle-neuroscienze-2018/). More recently, I participate to the Science International Festival **"Pint of Science** https://pintofscience.com/ https://pintofscience.it/events/catania.

B. Positions and Honors

- Positions and Employment

October 1988 - December 1990
Clinical Training in Neurology, Neurological Clinic, University of Catania.
Student Instructor and Research Activity at the Institute of Pharmacology, University of Catania.

During this research period she characterized the mechanisms of mGluR homologous desensitization and the involvement of PKC in this process. In addition, she contributed to characterize the role of metabotropic receptors in the LTP formation.

January 1991 – July 1991
Research Scholar-Department of Neurology, University of Michigan, Ann Arbor-USA (Dr. Young Lab)
August 1991 - May 1993
Research Fellow, Neurology Research, Mass. Gen. Hosp. Harvard University-Boston, USA (Dr. Young Lab)
During this research period she was mostly involved in autoradiographical studies of excitatory amino acid receptors. She studied the effect of Phospholipase A2 on the binding of glutamate to its receptors. Subsequently her interests were focused on the study of metabotropic glutamate binding. She disclosed the presence of two types of [3H] glutamate binding sites with the pharmacological properties of mGluRs. She also studied the distribution of mGluR subtypes in different areas of the brain using in situ hybridization techniques.

July 1993 - October 1995: Post-Doctoral Fellow – Zentrum für Molekulare Biologie (ZMBH) University of Heidelberg, Germany (Dr Seeburg lab).
During this research period she focused on the cell-specific expression of AMPA receptor subunits in different brain regions using a double-labelling technique which combines in situ hybridization and immunocytochemistry.

October 1995 - July 1998: Research Scientist (contract) - Institute of Neurological Sciences, National Research Council, Catania, Italy.
July 1998 - September 2006: Research Scientist (Permanent) - Institute of Neurological Sciences of the National Research Council, Catania, Italy.
September 2006 – date: Senior Scientist (Primo Ricercatore) at the Institute of Neurological Sciences of the National Research Council, Catania, Italy.
After setting her own laboratory up, she extended her previous studies to the expression of AMPA receptor subunits in different types of hippocampal interneurons. She has revealed that nNOS and mGlu receptors are up-regulated in spinal cord reactive astrocytes of ALS patients. She has shown that the endogenous activation of mGlu1 and mGlu5 supports the maturation and survival of developing cerebellar Purkinje cells. She has also been collaborating with other investigators for the study of the physiological role of mGlu receptors in several brain regions such as hippocampus, striatum and spinal cord and the possible role of mGlu receptors as targets for pharmacological intervention in neurodegeneration. Her group has demonstrated that a reduced number of mGlu5 receptors are associated with Homer proteins in a mouse model of FRAX syndrome (Giuffrida et al., 2005). In collaboration with Dr. Musumeci (IRCCS Oasi, Troina) she has characterized the phenotype of the FMR1 KO mouse by demonstrating that it exhibits an elevated susceptibility to audiogenic seizures, which are reversed by the introduction of constructs that codify for the human FMRP (Musumeci et al., 2007). Together with Lucia Ciranna she has demonstrated that activation of 5-HT7 receptors can revert mGluR-Long Term Depression in both wild type and Fragile X mice, suggesting activation of 5-HT7 as a possible therapeutic intervention in FXS. More recently, in collaboration with Andreas Frick at Neurocentre Magendie Bordeaux, she has coordinated a collaborative study that demonstrates that mGlu5 receptors are more mobile at synapse as a consequence of disrupted mGlu-Homer interaction and are therefore able to functionally interact more closely with NMDA receptors. This mechanism can affect NMDA functioning in FXS. Her laboratory has also demonstrated that a prolonged pharmacological blockade of astrocytic mGlu5 exerts a protective effect against excitotoxicity in an in vitro model of mixed rat spinal cord cultures enriched of astrocytes. In the same model, her group has demonstrated that endothelin is neurotoxic for cultured motor neurons through a mechanism involving astrocytes.

- Other Experience and Professional Memberships

2005-2015: Project Manager of the CNR project ME P02.011" Molecular Markers of hereditary diseases and tumors of the Nervous System".

2002 to date: Head of the laboratory of Neurobiology at the IRCCS – Oasi Institute for Mental Retardation Troina-EN

Reviewer for several peer reviewed journals: Brain Structure and Function, Brain Research, Epilepsia, AfCS Nature Signaling Gateway, Nature Publishing group (http://www.signaling-gateway.org/molecule), Internet database for signalling molecules, FEBS, Frontiers in Behavioral Neuroscience, International Journal of Developmental Neuroscience, J Comparative Neurology, J Neurochemistry, Journal of Neuroinflammation, Journal of Neuroscience, Journal of Neuroscience Research, Journal of Neuroscience Method, Molecular Autism, Molecular and Cellular , Neurobiology of Disease, Neuroscience, Official journal of the International Brain Research Organization (IBRO), Neuroscience Letters, Neuroscience and BioBehavioral reviews, PLOS Biology.,PLOS One. Since 2014 Review Editor of Frontiers in Molecular Neuroscience.

Referee for the approval of projects (Università Italo-Francese –2014, 2015; ANR- France 2012, Polish Academy of Science 2017, Fondation Recherche Medicale, France 2019).

Member of the American Society of Neuroscience (since 1991) and Società Italiana di Neuroscienze (since 2000).

Coordinator of the regional (Sicily, 2013-date) and national phases of the "Olimpiadi delle Neuroscienze" (2017 and 2018), a chapter of the International Brain Bee, an international competition for high school students

- Honors

President of the CNRS- Jacques Monod Conference "Intellectual Disability: from genes to treatment" - Roscoff Brittany, France Oct 15-19 2012, vice-president L. Colleaux, Hospital Necker Paris

Vice-President of the CNRS - Jacques Monod Conference "Mental Retardation: from genes to synapses" - Roscoff Brittany, France Oct 7-11, 2010, president B. Bardoni – Univ. Nice, Valbonne France
https://insb.cnrs.fr/fr/les-conferences-jacques-monod

Jacques Monod conferences are prestigious international meetings organized by CNRS and dedicated to new topics in life science. Admission to the financing is based on evaluation by a CNRS committee.

Invited speaker at several national and international meetings including:
the prestigious Bambury Meeting "Fragile X Syndrome, Basic mechanisms and Treatment Implication" Cold Spring Harbor 2006, 9-12 April;
FRAXA association meetings 2008 (Sept 21-24) e 2010 (May 2-5), Duhram – NH USA
International Meetings on metabotropic glutamate receptors, Taormina, Italy (eds 1993, 1999, 2014, 2017)
Satellite Symposium "Synapses as therapeutic targets for Autism Spectrum Disorders", 9th FENS Forum of Neuroscience, July 4th, 2014 Pavia.

Chair of the session "Glial cells" - 4th International Meeting on metabotropic glutamate receptors, Taormina, 15-20 sept 2002.
Chair of session "Autism" - 8th International Meeting on metabotropic glutamate receptors, Taormina, 28 sept-3 oct 2014.

Guest Editor of the special issue "Common Mechanisms in Intellectual Disabilities: a challenge for Translational Outlooks" (Ricceri L, Catania MV, Bardoni B) Neurosci Biobehav Rev. 2014 Oct;46 Pt 2:159-60)

National Scientific Qualification - Full Professor in Physiology (2014-2020)
National Scientific Qualification - Full Professor in Pharmacology (2018-2024)

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

1. **Catania MV**, Landwehrmeyer G.B., Testa C.M., Standaert D.G., Penney J.B.,Young A.B. Metabotropic glutamate receptors are differentially regulated during development. **Neuroscience,** 1994 61: 481-495. Pergamon Press, Great Britain. I.F. 4.626
2. **Catania MV**, Tölle T., Seeburg P.H., Monyer H. (1995) Differential expression of AMPA receptor subunits in NOS positive neurons of cortex, striatum and hippocampus. **J Neurosci,** 1995 15: 7046-7061. Society for Neuroscience copyright, Washington. I.F. 8.205
3. Aronica E*, **Catania MV***, Geurts J, Yankaya B, Troost D. Immunohistochemical localization of group I and II metabotropic glutamate receptors in control and amyotrophic lateral sclerosis human spinal cord: upregulation in reactive astrocytes. **Neuroscience.** 2001;105(2):509-20. I.F. 3.563 co-first author
4. **Catania MV**, Bellomo M., Di Giorgi Gerevini V., Giuffrida R., De Blasi A., and Nicoletti F. Endogenous activation of group-I metabotropic glutamate receptors supports the maturation and survival of developing cerebellar Purkinje cells. **J Neuroscience,** 2001 21 (19), 7664-73. I.F. 8.502
5. Giuffrida R, Musumeci S, D'Antoni S, Bonaccorso CM, Giuffrida-Stella AM, Oostra BA, **Catania MV**. A reduced number of metabotropic glutamate subtype 5 receptors are associated with constitutive homer proteins in a mouse model of fragile X syndrome. **J Neurosci**. 2005 Sep 28;25(39):8908-16. I.F. 7.907
6. Musumeci SA, Calabrese G, Bonaccorso CM, D'Antoni S, Brouwer JR, Bakker CE, Elia M, Ferri R, Nelson .DL, Oostra BA, **Catania MV**. Audiogenic seizure susceptibility is reduced in fragile X knockout mice after introduction of FMR1 transgenes. **Exp Neurol**. 2007 Jan;203(1):233-40. I.F: 4.156
7. D'Antoni S, Berretta A, Seminara G, Longone P, Giuffrida-Stella AM, Battaglia G, Sortino MA, Nicoletti F, **Catania MV**. A prolonged pharmacological blockade of type-5 metabotropic glutamate receptors protects

cultured spinal cord motor neurons against excitotoxic death**. Neurobiol Dis.** 2011 Jan 11. [Epub ahead of print] PubMed PMID: 21232601. IF 5.121.

8. Davidovic L, Navratil V, Bonaccorso CM., **Catania MV**, Bardoni B, Dumas ME. A Metabolomic and Systems Biology Perspective on the Brain of the Fragile X Syndrome Mouse Model. **Genome Research**, 2011 Dec;21(12):2190-202 IF 13.588.
9. Costa L, Spatuzza M, D'Antoni S, Bonaccorso CM, Trovato C, Musumeci SA, Leopoldo M, Lacivita E, **Catania MV**, Ciranna L. Activation of 5-HT7 serotonin receptors reverses metabotropic glutamate receptor-mediated synaptic plasticità in wild-type and Fmr1 knockout mice, a model of Fragile X syndrome. **Biol Psychiatry**. 2012 Dec 1;72(11):924-33. IF 9.247.
10. Dell'albani P, Rodolico M, Pellitteri R, Tricarichi E, Torrisi SA, D'Antoni S, Zappia M, Albanese V, Caltabiano R, Platania N, Aronica E, **Catania MV**. Differential patterns of NOTCH1-4 receptor expression are markers of glioma cell differentiation. **Neuro Oncol. 2014 Jan**;16(2):204-16. IF 6.108.
11. Ranno E, D'Antoni S, Spatuzza M, Berretta A, Laureanti F, Bonaccorso CM, Pellitteri R, Longone P, Spalloni A, Iyer AM, Aronica E, **Catania MV**. Endothelin-1 is over-expressed in amyotrophic lateral sclerosis and induces motor neuron cell death. **Neurobiol Dis. 2014** Jan 11. pii: S0969-9961(14)00009-6. doi:10.1016/j.nbd.2014.01.002. IF 5.624.
12. D'Antoni S, Spatuzza M, Bonaccorso CM, Musumeci SA, Ciranna L, Nicoletti F, Huber KM, **Catania MV**. Dysregulation of group-I metabotropic glutamate (mGlu) receptor mediated signalling in disorders associated with Intellectual Disability and Autism. **Neurosci Biobehav Rev. 2014** Feb 15. IF 9.440.
13. Bonaccorso CM, Spatuzza M, Di Marco B, Gloria A, Barrancotto G, Cupo A, Musumeci SA, D'Antoni S, Bardoni B, **Catania MV.** Fragile X mental retardation protein (FMRP) interacting proteins exhibit different expression patterns during development. Int J Dev Neurosci. 2015 May;42:15-23.
14. D'Antoni S, Ranno E, Spatuzza M, Cavallaro S, **Catania MV**. Endothelin-1 Induces Degeneration of Cultured Motor Neurons Through a Mechanism Mediated by Nitric Oxide and PI3K/Akt Pathway**. Neurotox Res**. 2017 Jul;32(1):58-70. doi: 10.1007/s12640-017-9711-3. Epub 2017 Mar 11.
15. Aloisi E, Le Corf K, Dupuis J, Zhang P, Ginger M, Labrousse V, Spatuzza M, Georg Haberl M, Costa L, Shigemoto R, Tappe-Theodor A, Drago F, Vincenzo Piazza P, Mulle C, Groc L, Ciranna L, **Catania MV**, Frick A. Altered surface mGluR5 dynamics provoke synaptic NMDAR dysfunction and cognitive defects in Fmr1 knockout mice. **Nat Commun**. 2017 Oct 24;8(1):1103. doi: 10.1038/s41467-017-01191-2. Co-last author

D. Research Support

- Ongoing Research Support

2016-2019 “Homer-mGlu5 scaffold as common abnormal mechanism and therapeutic target for Intellectual Disability (ID) and Autism Spectrum Disorders (ASD)” n° WFR PE-2013-02355126, Ricerca Finalizzata e Giovani Ricercatori 2013 – Min. Salute “Estero” € 427.007,00. PRINCIPAL INVESTIGATOR

- Completed Research Support

2013-2016 “Activation of serotonin type 7 (5-HT7) receptors as a novel therapeutic strategy in Fragile X Syndrome”, TELETHON n. GGP13145. RESPONSIBLE OF UNIT, PI L.Ciranna Total amount €330.000, unit €144.500

2013-2014 “Preclinical evaluation of serotonin type 7 (5-HT7) receptor agonists as novel pharmacological tools in Fragile X Syndrome”, FRAXA Research Foundation, U.S.A. RESPONSIBLE OF UNIT, PI L. Ciranna, Tot. U.S. dollars 66.000.2013, Unit 22.000.

2008-2012 “Involvement of group-I metabotropic glutamate receptors in the pathophysiology of fragile X syndrome.”, TELETHON n° GGP07264 € 279.000 PRINCIPAL INVESTIGATOR.

2008-2010: PRIN 2007 L92XSP (MIUR).” Neurotransmitter-mediated regulation of AMPA receptor function: implications in physiological transmission and pathology. RESPONSIBLE OF UNIT Tot € 127.142, unit € 41000.

2007-2010 ”Multidisciplinary approach to pathophysiology of epilepsy in Fragile X Syndrome. Min. Salute, RESPONSIBLE OF UNIT, PI. SA Musumeci, tot 300.000, unit 75.000.

2007-2009 “Activity-dependent remodelling of dendritic spines, glutamate receptor targeting and RhoGTPAse activation in a mouse model of FRAX syndrome” Foundation Jerome Lejeune – Paris € 15.000. PRINCIPAL INVESTIGATOR.

2007 Galileo project ”Molecular Basis of Mental Retardation in Fragile X Syndrome” Università italo-francese (with B. Bardoni Univ. Nice, France) € 4.500 PRINCIPAL INVESTIGATOR.

2003 British Council “Neuro-glia interaction in the pathogenesis of motor neuron degeneration in ALS” (with L.Canevari, Univ.London) € 5.500 PRINCIPAL INVESTIGATOR.

2003-2006 MIUR-FIRB RBAY01BA3A, RESPONSIBLE OF UNIT, total €100.000, unit €30000. PI S. Morara.

1999 -2000 “Cell-specific expression of metabotropic glutamate receptors in rat and human normal and ALS spinal cord: double-labeling and electron microscopic study” TELETHON n° 1244. € 41.316,55 PI.