

Curriculum Vitae

Sonia Aroni

Education:

2013-2016: University of Cagliari, Italy

PhD in Neuroscience

Thesis: *Modificazioni neuronali nella via abenulo-mesencefalica durante l'astinenza da Δ^9 -tetraidrocannabinolo.*

Supervisor: Professor Marco Pistis, MD.

2009-2012: University of Cagliari, Italy

MSc in Neuropsychobiology

Thesis: *L'isolamento sociale riduce marcatamente il piacere indotto dalla presentazione del cibo, sia nella fase anticipatoria che consumatoria.*

Supervisor: Professor Laura Dazzi, PhD.

2003-2009: University of Cagliari, Italy

BSc in Experimental Biology

Thesis: *Risposte elettrofisiologiche dei sensilli labellari nei maschi della mosca mediterranea della frutta *C. capitata* al sale.*

Supervisor: Professor Paolo Solari.

Research Experience:

2024-present: University of Cagliari, Italy

Researcher – Supervisor: Miriam Melis, PhD

- **Research focus:**

- to investigate the effect of prenatal cannabis exposure on the development of mesolimbic dopaminergic systems in pre-adolescent rat offspring through optogenetic manipulation of ventral tegmental area (VTA) inputs.

- to study the impact of perinatal acetaminophen exposure on the mesocorticolimbic dopaminergic system in pre-adolescent rat offspring.

- **Techniques:**

- Ex vivo* whole cell patch-clamp recordings in acute ventral tegmental area (VTA) rat brain slices coupled with optogenetic manipulation.

- Behavioral observations (maternal behavior, locomotor activity, marble burying, in rats).

2021-2024: University of Cagliari, Italy

Postdoctoral Fellow – Supervisor: Miriam Melis, PhD

- **Research focus:**
 - to investigate the effect of prenatal cannabis exposure on the development of mesocorticolimbic dopaminergic systems in pre-adolescent and adolescent rat offspring through a multidisciplinary approach.
 - to study the impact of perinatal acetaminophen exposure on the mesocorticolimbic dopaminergic system in pre-adolescent rat offspring.
- **Techniques:**
 - Ex vivo* whole cell patch-clamp recordings in acute VTA and medial prefrontal cortex (mPFC) rat brain slices.
 - In vivo* microdialysis to quantify dopamine, DOPAC, and norepinephrine concentrations in the mPFC of pre-adolescent rats.
 - Behavioral observations (maternal behavior, locomotor activity, marble burying, in rats).

2018-2020: University of Maryland, Baltimore, MD, US

Postdoctoral Fellow – Supervisor: Joseph F. Cheer, PhD

- **Research focus:**
 - to investigate the effect of prenatal cannabis exposure on the development of mesolimbic dopaminergic system in pre-adolescent and adult rat offspring.
- **Techniques:**
 - Stereotaxic surgery for chemogenetic (DREADDs) manipulation of genetically distinct neuronal types in neonatal rats.
 - Behavioral assays (open field, food self-administration, in rats and mice).
 - In vivo* fiber photometry recordings of dopamine release using a fluorescent dopamine sensor (GRABDA; in rats and mice).
 - Ex vivo* whole-cell patch-clamp recordings in acute rat VTA and mPFC brain slices.

2017-2018: University of Maryland, Baltimore, MD

Postdoctoral Fellow – Supervisor: Dennis R. Sparta, PhD

- **Research focus:**
 - in vivo* electrophysiological characterization of mouse central amygdala (CeA) corticotropin releasing factor (CRF) neurons during repeated binge ethanol drinking.
- **Techniques:**
 - Stereotaxic surgery for optogenetic manipulation of genetically distinct mouse neuronal types.
 - Manipulation of mouse cell-type specific pathways during ethanol drinking using optogenetics.
 - In vivo* single-unit multielectrode recordings of optogenetically-identified mouse neuronal phenotypes during ethanol drinking.
 - Ex vivo* whole-cell patch-clamp recordings in ventral bed nucleus of the stria terminalis (vBNST) and CeA brain mouse slices using Channelrhodopsin-assisted circuit mapping (CRACM) to study neural circuits of drinking related behaviors.

2012-2016: University of Cagliari, Italy

PhD Candidate – Supervisor: Marco Pistis, MD

- **Research focus:**

to investigate the involvement of rostromedial tegmental nucleus (RMTg) GABA projections to VTA in the hypodopaminergic state induced by withdrawal upon chronic cannabinoid administration.

- **Techniques:**

- In vivo* extracellular single unit recordings in anesthetized rats and mice.
- Electrophysiological identification of VTA, RMTg, lateral habenula (LHb), CeA, and BLA neurons.
- Implantation of electrodes in the hippocampus, cortex, thalamus, and cerebellum, for electroencephalographic recordings (EEG), and implantation of electrodes for electromyography (EMG) in mice.
- Nerve lesions for induction of neuropathic pain in rats (Spared Nerve Injury).
- Surgery for insertion of a cannula in the femoral vein (in rats and mice).
- Molecular biology (DNA extraction, PCR, gel electrophoresis).

2012: University of Cagliari, Italy

CNR (National Research Council) trainee – Supervisor: Anna Lisa Muntoni, MD

- **Research focus:**

to assess the anticonvulsant properties of a peroxisome proliferator-activated receptor-alpha (PPAR α) agonist on nicotine-induced seizures in mice.

- **Techniques:**

- In vivo* extracellular single unit recordings in anesthetized rats and mice.
- Implantation of electrodes in the hippocampus, cortex, and cerebellum, for electroencephalographic recordings (EEG) in mice.
- Molecular biology (DNA extraction, PCR, gel electrophoresis).

2010-2012: University of Cagliari, Italy

MSc student – Supervisor: Laura Dazzi, PhD

- **Research focus:**

to analyze the effect of social isolation on food intake and dopamine output in the mPFC of rats.

- **Techniques:**

- High Pressure Liquid Chromatography (HPLC) with electrochemical detection.
- In vivo* microdialysis to quantify dopamine and norepinephrine concentrations in the mPFC (rats).

Mentoring Experience:

2021-present: University of Cagliari

Advised one PhD student for thesis preparation.

Supervision of three undergraduate students and assisted in thesis preparation.

Supervision of three bachelor students for basic laboratory techniques.

2019-2020: University of Maryland

Supervision of one undergraduate volunteer for basic laboratory techniques.

2017-2018: University of Maryland

Advised one PhD student in thesis preparation.

2013-2015: University of Cagliari

Supervision of two undergraduate students for basic laboratory techniques.

Advised one undergraduate student and assisted in thesis preparation.

Foreign Languages:

English (C1)

Computer Knowledge:

OmniPlex, Offline Sorter, NeuroExplorer, Spike 2, Axon pCLAMP, Med-PC, GraphPad Prism, EndNote, Adobe group; Office group, MATLAB, RStudio.

Professional Society Memberships:

2019: International Drug Abuse Research Society (IDARS).

2017-2019: Society for Neuroscience (SfN).

2015-present: SIF, Società Italiana di Farmacologia.

2014: ICRS, International Cannabinoid Research Society.

Honors and Awards:

2015: Travel Grant to join the 7th European Workshop on Cannabinoid Research. Sestri Levante, Italy.

2014: Travel Grant to join the 24th ICRS Symposium on the Cannabinoids. Baveno, Italy.

2013: Travel Grant to join the Dopamine 2013. Alghero, Italy.

Ad hoc reviewer:

Ad hoc reviewer for the International Journal of Molecular Sciences

Publications:

1. Valeria S, Francesco T, **Sonia A**, Laura VP, Luca C, Marcello S, Roberta L, Patrizia P, Arnau BG, Roberto F, Miriam M. *Sex-specific maladaptive responses to acute stress upon in utero THC exposure are mediated by dopamine*. Pharmacol Res. 2024 Dec;210:107536. doi: 10.1016/j.phrs.2024.107536. Epub 2024 Nov 30. PubMed PMID: 39622370.
2. Luján MÁ, Young-Morrison R, **Aroni S**, Katona I, Melis M, Cheer JF. *Dynamic overrepresentation of accumbal cues in food- and opioid-seeking rats after prenatal THC exposure*. Sci Adv. 2024 Nov 8;10(45):eadq5652. doi: 10.1126/sciadv.adq5652. Epub 2024 Nov 8. PubMed PMID: 39514650; PubMed Central PMCID: PMC11546747.
3. **Aroni S**, Sagheddu C, Pistis M, Muntoni AL. *Functional Adaptation in the Brain Habenulo-Mesencephalic Pathway During Cannabinoid Withdrawal*. Cells. 2024 Nov 1;13(21). doi: 10.3390/cells13211809. PubMed PMID: 39513916; PubMed Central PMCID: PMC11545051.
4. Murru E, Carta G, Manca C, Verce M, Everard A, Serra V, **Aroni S**, Melis M, Banni S. *Impact of prenatal THC exposure on lipid metabolism and microbiota composition in rat offspring*. Heliyon. 2024 Aug 15;10(15):e35637. doi: 10.1016/j.heliyon.2024.e35637. eCollection 2024 Aug 15. PubMed PMID: 39170117; PubMed Central PMCID: PMC11336829.
5. Sagheddu C, Devoto P, **Aroni S**, Saba P, Pistis M, Gessa GL. (2023) *Combined $\alpha 2$ - and D2 receptor block activates noradrenergic and dopaminergic neurons but extracellular dopamine in the prefrontal cortex is determined by uptake and release from noradrenergic terminals*. Front. Pharmacol., Sec. Neuropharmacology. Volume 14 – 2023. doi: 10.3389/fphar.2023.1238115.
6. Serra V, **Aroni S**, Bortolato M, Frau R, Melis M. (2023) *Endocannabinoid-dependent decrease of GABAergic transmission on dopaminergic neurons is associated with susceptibility to cocaine stimulant effects in pre-adolescent male MAOA hypomorphic mice exposed to early life stress*. Neuropharmacology. 233:109548. doi: 10.1016/j.neuropharm.2023.109548. Epub 2023 Apr 18. PubMed PMID: 37080337.
7. Murru E, Muntoni AL, Manca C, **Aroni S**, Pistis M, Banni S, Carta G. (2022) *Profound Modification of Fatty Acid Profile and Endocannabinoid-Related Mediators in PPAR α Agonist Fenofibrate-Treated Mice*. Int J Mol Sci. 24(1). doi: 10.3390/ijms24010709. PubMed PMID: 36614161; PubMed Central PMCID: PMC9821630.
8. Frau R, Devoto P, **Aroni S**, Saba P, Sagheddu C, Siddi C, Santoni M, Carli M, Gessa GL. (2022) *The potent $\alpha(2)$ -adrenoceptor antagonist RS 79948 also inhibits dopamine D(2) -receptors: Comparison with atipamezole and raclopride*. Neuropharmacology. 217:109192. doi: 10.1016/j.neuropharm.2022.109192. Epub 2022 Jul 16. PubMed PMID: 35850212.
9. **Aroni S**, Marino RAM, Girven KS, Irving JM, Cheer JF, Sparta DR. (2021) *Repeated binge ethanol drinking enhances electrical activity of central amygdala corticotropin releasing factor neurons in vivo*. Neuropharmacology.189:108527.

- doi: 10.1016/j.neuropharm.2021.108527. Epub 2021 Mar 17. PubMed PMID: 33741403; PubMed Central PMCID: PMC8928451.
10. Girven KS, **Aroni S**, Navarrete J, Marino RAM, McKeon PN, Cheer JF, Sparta DR. (2021) *Glutamatergic input from the insula to the ventral bed nucleus of the stria terminalis controls reward-related behavior*. *Addict Biol.* 26(3):e12961. doi: 10.1111/adb.12961. Epub 2020 Aug 20. PubMed PMID: 32820590; PubMed Central PMCID: PMC8651178.
 11. Frau R, Miczán V, Traccis F, **Aroni S**, Pongor CI, Saba P, Serra V, Sagheddu C, Fanni S, Congiu M, Devoto P, Cheer JF, Katona I, Melis M. (2019) *Prenatal THC exposure produces a hyperdopaminergic phenotype rescued by pregnenolone*. *Nat Neurosci.* 22(12):1975-1985. doi: 10.1038/s41593-019-0512-2. Epub 2019 Oct 14. PubMed PMID: 31611707; PubMed Central PMCID: PMC6884689.
 12. De Felice M, Melis M, **Aroni S**, Muntoni AL, Fanni S, Frau R, Devoto P, Pistis M. (2019) *The PPAR α agonist fenofibrate attenuates disruption of dopamine function in a maternal immune activation rat model of schizophrenia*. *CNS Neurosci Ther.* 25(5):549-561. doi: 10.1111/cns.13087. Epub 2018 Nov 21. PubMed PMID: 30461214; PubMed Central PMCID: PMC6488881.
 13. Puligheddu M, Melis M, Pillolla G, Milioli G, Parrino L, Terzano GM, **Aroni S**, Sagheddu C, Marrosu F, Pistis M, Muntoni AL. (2017) *Rationale for an adjunctive therapy with fenofibrate in pharmacoresistant nocturnal frontal lobe epilepsy*. *Epilepsia.* 58(10):1762-1770. doi: 10.1111/epi.13863. Epub 2017 Aug 2. PubMed PMID: 28766701.
 14. Scheggi S, Melis M, De Felice M, **Aroni S**, Muntoni AL, Pelliccia T, Gambarana C, De Montis MG, Pistis M. (2016) *PPAR α modulation of mesolimbic dopamine transmission rescues depression-related behaviors*. *Neuropharmacology.* 110(Pt A):251-259. doi: 10.1016/j.neuropharm.2016.07.024. Epub 2016 Jul 22. PubMed PMID: 27457507.
 15. Mutti A, **Aroni S**, Fadda P, Padovani L, Mancini L, Collu R, Muntoni AL, Fattore L, Chiamulera C. (2016) *The ketamine-like compound methoxetamine substitutes for ketamine in the self-administration paradigm and enhances mesolimbic dopaminergic transmission*. *Psychopharmacology (Berl).* 233(12):2241-51. doi: 10.1007/s00213-016-4275-0. Epub 2016 Mar 28. PubMed PMID: 27020786.
 16. Sagheddu C, **Aroni S**, De Felice M, Lecca S, Luchicchi A, Melis M, Muntoni AL, Romano R, Palazzo E, Guida F, Maione S, Pistis M. (2015) *Enhanced serotonin and mesolimbic dopamine transmissions in a rat model of neuropathic pain*. *Neuropharmacology.* 97:383-93. doi: 10.1016/j.neuropharm.2015.06.003. Epub 2015 Jun 22. PubMed PMID: 26113399.
 17. Puligheddu M, Pillolla G, Melis M, Lecca S, Marrosu F, De Montis MG, Scheggi S, Carta G, Murru E, **Aroni S**, Muntoni AL, Pistis M. (2013) *PPAR-alpha agonists as novel antiepileptic drugs: preclinical findings*. *PLoS One.* 8(5):e64541. doi: 10.1371/journal.pone.0064541. Print 2013. PubMed PMID: 23724059; PubMed Central PMCID: PMC3664607.

Invited Speaker:

1. **Sonia Aroni**, Claudia Sagheddu, Marco Pistis and Anna Lisa Muntoni
Neuronal adaptation in the habenulo-mesencephalic pathway during cannabinoid withdrawal.
Baltimore Brain Series, NIDA, Baltimore, US, April 27, 2018.
2. **Sonia Aroni**, Claudia Sagheddu, Marco Pistis and Anna Lisa Muntoni
Cannabinoid withdrawal: where does the hypodopaminergic state come from?
ECNP Workshop on Neuropsychopharmacology for Junior Scientists in Europe, Nice, France, March 12-15, 2015.

Poster Presentations:

1. **Aroni S.**, Serra V., Di Bartolomeo M., Traccis F., Devoto P., D'Addario C., Melis M., *Prenatal THC exposure produces sex-specific compulsive-like behavior associated with enhanced prefrontal cortex neuron excitability at pre-adolescence in rats*, SIF Monothematic Congress "Innovation in mental illness: from mechanisms to drug treatment and patient response", Brescia, Italy, October 2023
2. **Aroni S.**, Serra V., Di Bartolomeo M., Traccis F., Devoto P., D'Addario C., Melis M., *In utero THC induces a sex-specific compulsive-like phenotype associated with enhanced prefrontal cortex neuronal excitability in pre-adolescent rats*, Gordon Research Conference on Cannabinoid Function in the CNS, Castelldefels, Barcelona, Spain, July 2023
3. **Aroni S.**, Traccis F., Serra V., Devoto P., Melis M., *Prenatal cannabis exposure produces sex-specific compulsive-like behavior and increases cortical neuron excitability in pre-adolescent rats*, Addiction meeting 2022, Villasimius, September 2022
4. **Aroni S.**, Gildish I., Peters K. Z., Frau R., Melis M., Cheer J. F., *Inhibition of ventral tegmental area dopamine neurons rescues aberrant locomotor activity induced by prenatal cannabis exposure in male offspring*, Society for Neuroscience Meeting 2019, Chicago (US), October 2019
5. **Aroni S.**, Girven K. S., Irving J. M., Sparta D. R., *Binge ethanol drinking enhances activity of central amygdala corticotropin releasing factor neurons*, 7th International Drug Abuse Research Society meeting, Casablanca, Morocco, September 2019
6. **Aroni S.**, Irving J. M., Qadir H., Sparta D. R., *Binge ethanol drinking and the central amygdala: a possible role for a unique population of corticotropin releasing factor neurons*, Society for Neuroscience Meeting 2018, San Diego (US), November 2018
7. **Aroni S.**, De Felice M., De Montis M.G., Melis M., Pistis M., *Fenofibrate, a clinically used PPAR α agonist, enhances dopamine and serotonin neuronal activity*, XVI SINS Congress, Cagliari, Italy, October 2015
8. **Aroni S.**, Sagheddu C., Pistis M., Muntoni A.L., *Adaptive changes in the habenulomesencephalic circuit during cannabinoid withdrawal*, 7th European Workshop on Cannabinoid Research, Sestri Levante (GE), Italy, September 2015

9. **Aroni S.**, Sagheddu C., Pistis M., Muntoni A.L., *Neuronal adaptations in the habenulo-rostromedial tegmental nucleus pathway during cannabinoid withdrawal*, 5th Mediterranean Neuroscience Society Meeting 2015, Santa Margherita di Pula (CA), Italy, June 2015
10. **Aroni S.**, Sagheddu C., Pistis M., Muntoni A.L., *The reward-aversion circuit in cannabinoid withdrawal*, CNR-IN, Institute of Neuroscience Retreat, Pisa, Italy, May 2015
11. **Aroni S.**, Sagheddu C., Pistis M., Muntoni A.L., *Cannabinoid withdrawal-induced hypodopaminergia: a role for rostromedial tegmental nucleus and lateral habenula?*, SIF Monothematic Congress "Addictive disorders: from neurobiology to novel therapeutic strategies", Palermo, Italy, March 2015
12. **Aroni S.**, Sagheddu C., Pistis M., Muntoni A.L., *Cannabinoid withdrawal: where does the hypodopaminergic state come from?*, ECNP Workshop on Neuropsychopharmacology for Junior Scientists in Europe, Nice, France, March 2015
13. **Aroni S.**, Sagheddu C., Pistis M., Muntoni A.L., *Neuronal circuits underlying cannabinoid withdrawal*, 24th Annual Symposium of the International Cannabinoid Research Society, Baveno, Italy, June 2014
14. **Aroni S.**, Sagheddu C., De Felice M., Lecca S., Luchicchi A., Muntoni A.L., Pistis M., *Functional properties of midbrain dopamine and GABA neurons in a rat model of neuropathic pain*, CNR-IN, Institute of Neuroscience Retreat, Santa Margherita di Pula (CA), Italy, September 2013
15. **Aroni S.**, Sagheddu C., De Felice M., Lecca S., Luchicchi A., Muntoni A.L., Pistis M., *Characterization of neural activity of midbrain dopamine and rostromedial tegmental neurons in a rat model of neuropathic pain*, Dopamine 2013, Alghero, Italy, May 2013
16. **Aroni S.**, Pillolla G., Melis M., Lecca S., Muntoni A.L., Pistis M., *PPAR-alpha agonists as novel antiepileptics: preclinical findings*, ENCODS 2013, 1st European Neuroscience Conference, Bordeaux, France, April 2013

Scientific Outreach and Public Communication Activities:

2015: Participation to "La notte dei ricercatori", University of Cagliari (Italy).

Advanced Training:

2022: Participation to CPLUS+, contamination plus, Social Innovation, CREA UniCa (Cagliari).

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