



UBICACIÓN/LOCATION:

Laboratorio 1 del INCYL

NOMBRE DEL LABORATORIO/GRUPO; RESEARCH GROUP NAME/ACRONYMS:

Laboratorio de Neurociencia Auditiva y Cognitiva

Cognitive and Auditory Neuroscience Laboratory

CANELAB

BREVE DESCRIPCIÓN DE LA LÍNEA DE INVESTIGACIÓN/ RESEARCH LINE

"We study the structure and function of the auditory brain. Over the last 15 years, our research has been focused on the neurophysiological and neurochemical mechanisms that govern neuronal adaptation, and the relationship between the MMN (mismatch negativity, a human brain signal altered in neuropsychiatric conditions) and its neuronal correlate, the SSA (stimulus specific adaptation). More recently, we have devoted our attention to the processing of auditory information at a neuronal level from the perspective of the predictive coding theory of perception. We are currently expanding the scope of our research to cover the basic neuronal mechanisms involved in auditory learning. We investigate the behavioral consequences of auditory training in normal brain function and disease, using animal models of neuropsychiatric disorders such as schizophrenia or Alzheimer's disease. Finally, our lab is also concerned with the understanding of activity-dependent plasticity due to hearing loss."

INVESTIGADOR RESPONSABLE O PRINCIPAL DEL GRUPO/GROUP TEAM LEADER

Dr. Manuel Sánchez Malmierca

<https://scholar.google.es/citations?hl=es&user=PU2FthsAAAAJ>

<https://pubmed.ncbi.nlm.nih.gov/?term=MALMIERCA+MS&sort=date&size=50>

PERSONAL ADSCRITO/ GROUP MEMBERS

(indicar nombre completo y cargo o puesto que ocupa):

***David Pérez González**

(Investigador Postdoctoral; proyecto MINECO)

***Camilo José Morado Díaz**

(Investigador Postdoctoral; Programa Juan de la Cierva)

***Flora M Antunes**

(Investigador Postdoctoral; Programa Propio Universidad de Salamanca)

***Guillermo Varela Carbajal**

(Investigador Predoctoral; Contrato FPI)

***Ana Belén Lao Rodríguez**

(Investigador Predoctoral; Unidad de Excelencia USAL)

***Lorena Casado Román**

(Investigador Predoctoral; ITN-MSCA-EU)

***Cristian Aedo Sánchez**

(Investigador Predoctoral; Gobierno de Chile)

***María Torres Valle**

(Técnico de Laboratorio subvencionado por JCYL)

PROYECTOS VIGENTES/ON-GOING RESEARCH PROJECTS (indicar nombre completo, referencia, Investigador principal, financiación y periodo):

EUROPEAN COMMISSION (Grant CoSySpeech) The Functional Role of Cochlear Synaptopathy for Speech Coding in the Brain. 2020 NEURON call on Sensory Disorders. to *Manuel S. Malmierca (PI)*. mayo 2021- April /2024. Amount awarded: € 150.000

EUROPEAN COMMISSION (grant BrainTwin). Development of a World-Level Neuroengineering Research Centre by European Twinning EUROPEAN COMMISSION Development of a World-Level Neuroengineering Research Centre by European Twinning. (Universidad de Salamanca).
Sept 2020- August /2023. Amount awarded: € 147.125

Spanish Ministerio de Ciencia, Innovación y Universidades PID2019-104570RB-I00, to *Manuel S. Malmierca (PI)*. NEUROMODULACION DE LOS ERRORES DE PREDICCIÓN: ADAPTACION NEURO-SENSORIAL Y PREDICCIONES).
June 2020- May /2023. Amount awarded: € 237.600

Spanish MINECO (grant SAF2016-75803-P) to *Manuel S. Malmierca (PI)*. PREDICTIVE CODING IN THE AUDITORY BRAIN: ANATOMICAL, PHYSIOLOGICAL AND BEHAVIOURAL CORRELATES.

Jan 2017-dec 2020. *Amount awarded: € 235.000,00.*

European COMMISSION (GRANT MSCA-ITN-LISTEN) to *Manuel S. Malmierca (PI)*. STIMULUS-SPECIFIC ADAPTATION IN THE MIDBRAIN AND CORTEX: ANATOMICAL AND PHYSIOLOGICAL CORRELATES (WP1) IN LISTEN PROJECT.

March 2017-December 2020. *Amount awarded: € 247.872,96.*

GrowForcw- *MJardin Group Inc.* to Manuel S. Malmierca (PI). PRECLINICAL APPROACH FOR UNDERSTANDING THE IMPLICATIONS OF CANNABINOIDS IN A RAT MODEL OF SCHIZOPHRENIA. to Manuel S. Malmierca (PI).

April 2019-April 2020. *Amount awarded: € 41.000.*

PUBLICACIONES/PUBLICATIONS

(indicar hasta un máximo de las 10 publicaciones más significativas):

CASADO-ROMAN L, CARBAJAL GV, PÉREZ-GONZÁLEZ D, MALMIERCA MS (2020)

Prediction error signaling explains neuronal mismatch responses in the medial prefrontal cortex **PLoS Biol** 18(12): e3001019. <https://doi.org/10.1371/journal.pbio.3001019>

VALDÉS-BAIZABAL C, CARBAJAL GV, PÉREZ-GONZÁLEZ D, MALMIERCA MS.

Dopamine modulates subcortical responses to surprising sounds. **PLoS Biol.** 2020;18(6):e3000744. doi:10.1371/journal.pbio.3000744

MALMIERCA MS, NIÑO-AGUILLÓN BE, NIETO-DIEGO J, PORTEROS Á, PÉREZ-GONZÁLEZ D, ESCERA C. Pattern-sensitive neurons reveal encoding of complex auditory regularities in the rat inferior colliculus.

Neuroimage. 2019;184:889-900. doi:10.1016/j.neuroimage.2018.10.012

CARBAJAL GV, MALMIERCA MS. (2018) The Neuronal Basis of Predictive Coding Along the Auditory Pathway: From the Subcortical Roots to Cortical Deviance Detection.

Trends in Hearing. 2018. doi: 10.1177/2331216518784822.

PARRAS GG, NIETO-DIEGO J, CARBAJAL GV, VALDÉS-BAIZABAL C, ESCERA C & MALMIERCA MS* (2017). Neurons along the auditory pathway exhibit a hierarchical organization of prediction error" [§]*author equal contribution.*

Nature Communications, DOI: 10.1038/s41467-017-02038-6.

NIETO-DIEGO, J; MALMIERCA MS (2016). Topographic Distribution of SSA across the Auditory Cortex Reveals Enhanced Change Detection in Higher-Order Auditory Fields.

PLOS BIOLOGY: PLoS Biol. 2016 Mar 7;14(3):e1002397.
doi: 10.1371/journal.pbio.1002397.

AYALA Y.A.; MALMIERCA M.S: (2015). Cholinergic Modulation of Stimulus-Specific Adaptation in the Inferior Colliculus.
Journal of Neuroscience. 35 - 35, pp. 12261 - 12272.

DUQUE, D., PÉREZ-GONZÁLEZ, D., AYALA, A. Y., PALMER, A. R., AND MALMIERCA, M. S. (2012). Topographic distribution, frequency and intensity dependence of stimulus-specific adaptation in the inferior colliculus of the rat.
Journal of Neuroscience. 32, 17762–17774.

ANTUNES FM, MALMIERCA M.S. (2011). Corticofugal modulation of Stimulus-specific adaptation in the medial geniculate body.
Journal of Neuroscience, 31:17306-17316.

MALMIERCA MS, CRISTAUDO S, PÉREZ-GONZÁLEZ D, COVEY E (2009). Stimulus-specific adaptation in the inferior colliculus of the rat.
Journal of Neuroscience, 29:5483-5493.

MALMIERCA M.S., IZQUIERDO M.A., CRISTAUDO S., HERNÁNDEZ O., PÉREZ-GONZÁLEZ D, COVEY E. AND OLIVER D.L. (2008). A Discontinuous Tonotopic Organization in the Inferior Colliculus of the Rat.
Journal of Neuroscience. 28:4767-4776.

MALMIERCA, M.S., MERCHAN, M.A., HENKEL, C.K., AND OLIVER, D.L. (2002). Direct projections from the dorsal cochlear nucleus to the auditory thalamus in rat.
Journal of Neuroscience, 22: 10891-10897.

MALMIERCA, M.S., LEERGAARD, T.B., BAJO, V.M., BJAALIE, J.G., MERCHÁN, M.A. (1998) Anatomic evidence of a 3-D mosaic pattern of tonotopic organization in the ventral complex of the lateral lemniscus in cat.
Journal of Neuroscience, 18:10603-10618.

Recent Book Chapters

ITO T. & **MALMIERCA, M.S.** (2019) Neurons, Connections, and Microcircuits of the Inferior Colliculus. *Oliver DL and Cant NB. (Ed.) In Mammalian Auditory Pathways: Synaptic Organization and Microcircuits,* Springer Handbook of Auditory Research

MALMIERCA, M.S., CARBAJAL G.V. & ESCERA C. (2020) Deviance detection and Encoding acoustic regularity in the auditory midbrain. In Kandler ed. Oxord Univ. Press. **In press**

CARBAJAL G.V.& **MALMIERCA, M.S.,** (2020) Deviance detection and Encoding acoustic regularity in the auditory midbrain. In Kandler ed. Oxord Univ. Press. **In press**