

Molecular Neuropharmacology

Group leader

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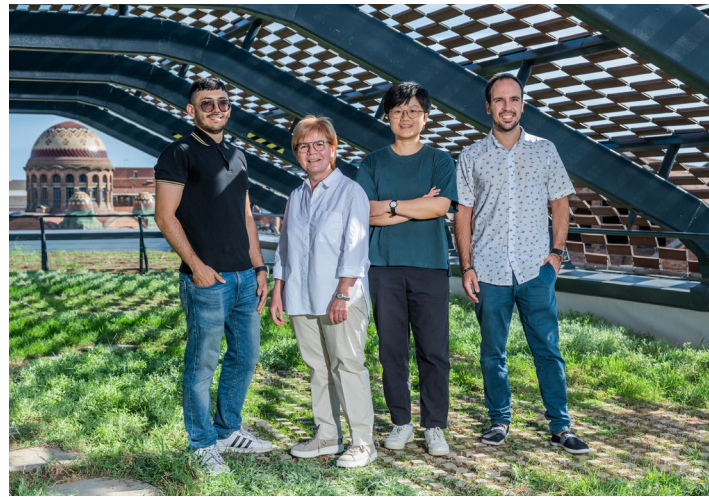
Researchers

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DESCRIPTION

Chronic pain is an important clinical problem due to the low efficacy of conventional treatments and their numerous side effects. Chronic pain is also accompanied by emotional disorders such as depression, anxiety, and memory loss, which negatively influence the perception of pain, creating a vicious circle that contributes to the deterioration of the patients' quality of life. Our main objective is to find new treatments that effectively relieve chronic pain and the associated comorbidities by using pharmacological, molecular, and genetic techniques.

MAIN LINES OF RESEARCH

- New strategies for the treatment of chronic pain.
Identification of new compounds that effectively inhibit inflammatory, osteoarthritic, and/or neuropathic pain induced by nerve injury or chemotherapy and its underlying mechanisms of action.
- New therapies for the emotional disorders associated with chronic pain
Investigation of the role played by different gaseous neurotransmitters in the modulation of the anxiety- and depressive-like behaviors and/or cognitive deficits accompanying persistent pain.
- Neuropharmacology of opioids and cannabinoids
Development of new strategies to potentiate the analgesic effects of opioids and cannabinoids during chronic pain, minimizing the adverse effects of these drugs.
- Sex-related differences in chronic pain and mood disorders



5.1.3 Neurological Diseases, Neuroscience & Mental Health Area

Evaluation of the impact of sex on pain sensitivity and tolerance, and on the effectiveness of treatments used for chronic pain and related mental illnesses.

- New stratagems for the treatment of diabetic neuropathy

Identification of new approaches to inhibit oxidative stress and neuropathy two major complications of diabetes.

SCIENTIFIC CHALLENGES

- Identify new pharmacological compounds that effectively abolish chronic pain with few side effects whose can be transferred to clinical practice and/or be patentable.
- Evaluate the antidepressant, anxiolytic and pain-relieving effects of novel nanoparticles capable of liberating one or more gasses and study their actions on the functional disability and memory loss linked with chronic pain.
- Identify new antioxidant compounds as potential therapeutic targets and study their effects on proinflammatory signals and plasticity changes provoked by nerve injury, chemotherapeutic agents, or metabolic disorders.
- Evaluate the neuroprotective, anti-apoptotic, and antioxidant mechanisms implicated in the modulation of inflammatory pain induced by the Nrf2/heme oxygenase 1 signaling pathway activation and its interaction with the endogenous cannabinoid and opioid systems.
- Analyze differences between sexes in pain sensitivity and in the efficacy of molecular hydrogen in modulating the allodynia and anxiety depressive-like behaviors accompanying chemotherapy-induced neuropathic pain.
- Develop new strategies to enhance the effectiveness of opioids and cannabinoids on relieving chronic pain with few side effects.
- Identify new pharmacological targets for treating nociplastic pain and comorbidities associated and assess their mechanism of action.

ACTIVE GRANTS

- Pol Rigau, Olga. Nuevos enfoques para el tratamiento del dolor crónico y comorbilidades

asociadas. PI18/00645. Instituto de Salud Carlos III (ISCIII). Duration: 2019–2023. 117.370,00 €.

- Pol Rigau, Olga. Nuevas dianas moleculares para el tratamiento del dolor crónico. PI21/00592. Instituto de Salud Carlos III (ISCIII). Duration: 2022–2024. 166.980,00 €.

DOCTORAL THESES DEFENDED

- Bai, Xue. New modalities for treating neuropathic pain and associated emotional disorders. 25/07/2023. Universitat Autònoma de Barcelona. Supervisors: Pol Rigau, Olga; Pol Rigau, Olga.
- Batallé Melgarejo, Gerard. New strategies for the treatment of osteoarthritis pain and associated comorbidities. 12/07/2023. Universitat Autònoma de Barcelona. Supervisors: Pol Rigau, Olga; Pol Rigau, Olga.

SCIENTIFIC PRODUCTION

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- Pérez M, Suárez I, Bai X, Martínez I, Ciaffaglione V, Pittalà V, Salerno L, OLGA R. Novel Heme Oxygenase-1 Inducers Palliate Inflammatory Pain and Emotional Disorders by Regulating NLRP3 Inflammasome and Activating the Antioxidant Pathway. *Antioxidants*. 2023; 12(10):1794. DOI:10.3390/antiox12101794. PMID:37891874. IF:7,000 (Q1/1D). Document type: Article.
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5.1.1.3 Neurological Diseases, Neuroscience & Mental Health Area

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