

BRAIN METASTASIS JUNIOR GROUP

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OVERVIEW

Brain metastasis is the most common neurological complication of cancer. When metastatic cells reach the brain, prognosis is poor given that local therapies (i.e., surgery and radiation) have limited benefits for patients and the disease inevitably progresses. The rise in the number of patients with brain metastasis is partially due to the increasing number of systemic therapies that work extra-cranially but are unable to provide the same therapeutic benefit in the brain. Consequently, cancer cells present at this secondary site have additional time to evolve and to grow into clinically detectable lesions. In the laboratory, we study why and how cells from different cancer types (breast cancer, lung cancer and melanoma) are able to access the brain, survive and colonise this vital organ. We dissect the biology of these processes *in vivo* using experimental models in order to challenge the current status of this unmet clinical need.

“The many branches of our research programme have evolved into a solid strategy that is producing results that could be translated into real benefits for patients with brain metastases.”

Graduate Students
Laura Adriana Álvaro, Ana de Pablos Aragoneses, Pedro García, Carolina Hernández (since July), Pablo Sanz (until September), Lucía Zhu

Visiting Graduate Student
Lauritz Miarka (Boehringer Ingelheim Fonds MD Fellowship) (Christian-Albrechts-University Kiel, Kiel, Germany)

Technicians
María Isabel García (since February),
María Perea (since September),
Diana Patricia Retana

RESEARCH HIGHLIGHTS

A “white book” for brain metastasis research

Together with 19 laboratories worldwide, we have built a public resource for organotropic cancer cell lines that are metastatic to the brain (The Brain Metastasis Cell Lines Panel: <https://apps.cnio.es/app/BrainMetastasis/CellLines>). This is the most valuable research tool available to interrogate brain metastasis. In addition, we jointly describe the main strategies to study brain metastasis, their current problems, and the open key questions.

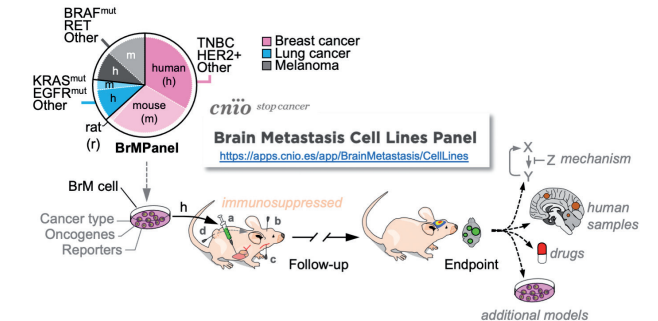


FIGURE The Brain Metastasis Cell Lines Panel is the first effort to collect existing information on existing brain tropic cancer cell lines, their behaviour *in vivo*, and their potential use for research on metastasis. A publicly available webpage describes this open resource.

Modelling the aggressive growth of brain metastasis

During 2020, the Group participated in an international effort to interrogate the growth of aggressive tumours with mathematical models that have helped to obtain key principles that govern cancer cell colonisation in experimental models and in patients. ■

• PUBLICATIONS

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Book Chapters

- García-Gómez P, Valiente M* (2020). Vascular co-option. In: Ribatti D and Pezzella F (eds). Tumor Vascularization. *Elsevier*. ISBN: 978-0-12-819494-2.
- García-Gómez P, Priego N, Álvaro-Espinoza L, Valiente M* (2020). Brain metastases cell partners and tumor microenvironment. In: Ahluwalia M, Metellus P, Soffiatti R (eds), Central Nervous System Metastases. *Springer, Cham*. DOI: 10.1007/978-3-030-23417-1_5.
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- Zhu L, Valiente M* (2020). Organotypic brain cultures for metastasis research. In: Seano G (ed). Brain tumors. *Neuromethods*, vol 158. Springer, New York. DOI: 10.1007/978-1-0716-0856-2.

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• AWARDS AND RECOGNITION

- Manuel Valiente:
 - ERC Consolidator Grant, European Research Council (ERC).
 - La Marató TV3 Grant, *Fundació La Marató TV3*, Spain.
 - ESMO Faculty Member, CNS tumours faculty group (2020-2024), European Society for Medical Oncology (ESMO).
 - Appointed Next Chair of the EANO Scientific Committee, European Association of Neuro-Oncology (EANO; expected mandate 2022-2024).
- Lauritz Miarka was recipient of a Boehringer Ingelheim Fonds MD Fellowship.