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 available 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 extracranially but not in the brain. In this scenario, cancer cells present at this highly demanding secondary site have additional time to evolve and develop 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 Brain Metastasis Group is seeking to identify novel ways to target both cancer cells and the associated microenvironment in order to reduce metastatic burden in the brain."

RESEARCH HIGHLIGHTS

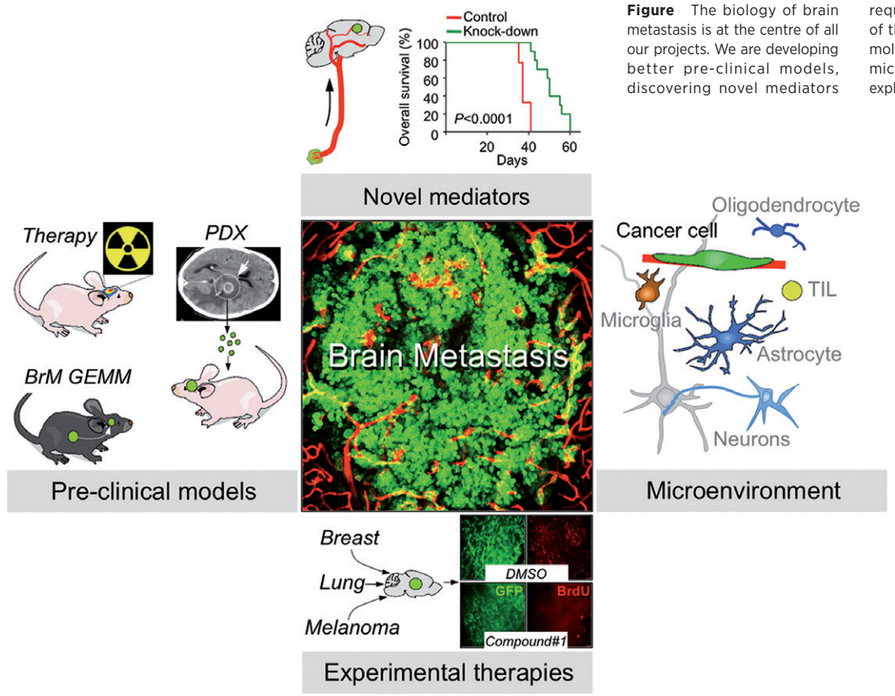

Figure The biology of brain metastasis is at the centre of all our projects. We are developing better pre-clinical models, discovering novel mediators required for the colonisation of the brain and are dissecting molecular interactions with the microenvironment in order to explore new therapies.

The Brain Metastasis Group investigates the progression of cancer to the Central Nervous System (CNS). During 2016, we focused our efforts on various projects:

- → Using a novel medium-throughput drug discovery platform, the laboratory identified **two compounds** with the potential to target established brain metastasis from experimental lung and breast cancer models.
- → We identified **two novel mediators** of brain metastasis that are enabling us to explore the influence of epigenetics on brain colonisation as well as the ability of cancer cells to interact with neurotransmitters.
- → We are evaluating the therapeutic potential of **targeting specific components of the microenvironment** that are only present surrounding metastatic lesions in the brain. Our research suggests that the viability of brain metastasis is highly dependent on altered components of the microenvironment, thus highlighting potential vulnerabilities. ■

PUBLICATIONS AT OTHER INSTITUTIONS

- Chen Q*, Boire A*, Jin X, Valiente M, Er EE, Lopez-Soto A, Patwa R, Sha H, Xu K, Cross JR, Massagué J (2016). Carcinoma-astrocyte gap junctions promote brain metastasis by cGAMP transfer. *Nature* 533, 493-498. *Shared authorship.

AWARDS AND RECOGNITION

- IV "Profesor Durántez"-*Fundación LAIR* Award 2016, Spain.