SEMINAR 2024

CIC biomaGUNE
MEMBER OF BASQUE RESEARCH & TECHNOLOGY ALLIANCE

Dr. Pedro Ramos
Principal Investigator at CIC biomaGUNE and Ikerbasque Professor

Neuroimaging and nanotechnology to better understand the brain and to treat its diseases

Tuesday, 4th June
12.00 p.m.

CIC biomaGUNE - Seminar Room

Nestled within our skull lies a three-pound marvel: the brain. This fascinating organ, delicate in its structure yet complex in its function, is the very seat of our thoughts, emotions, and experiences. It orchestrates a symphony of electrical signals and chemical messengers, allowing us to perceive the world, learn, create, and connect. Yet, despite its central role in who we are, the brain remains shrouded in a certain degree of mystery.

This is where neuroimaging steps in, acting as a powerful tool to unveil the brain's secrets. Techniques like magnetic resonance imaging (MRI) and functional MRI (fMRI) allow scientists and doctors to peer inside the living brain, visualizing its structure and activity in real-time. By observing how different areas of the brain light up during specific tasks, we can gain a deeper understanding of how the brain processes information, controls movement, and regulates emotions.

The journey of exploration doesn't stop there. Nanotechnology, with its ability to manipulate matter on an atomic and molecular scale, is offering exciting new avenues in brain research. Imagine tiny probes, designed on the nanoscale, that can be delivered directly to specific regions of the brain. These probes could be used to image brain activity at an even finer resolution, providing invaluable insights into neurological disorders like Alzheimer's disease or Parkinson's disease.

The future of brain healthcare holds immense promise with the development of theragnostic applications. This emerging field combines diagnostics and therapeutics, aiming to develop tools that can not only diagnose a brain disease but also deliver targeted treatment simultaneously. By utilizing molecular imaging techniques, scientists can identify specific biomarkers associated with disease and design nanoparticles that can bind to these markers. These nanoparticles could then be used to deliver medication directly to the affected area, minimizing side effects and maximizing treatment efficacy.

The more we understand the brain, the better equipped we become to protect it and treat its ailments. Neuroimaging, nanotechnology, and theragnostic applications represent a powerful trifecta in this ongoing exploration. By unraveling the complexities of this fascinating organ, we pave the way for a future where brain disorders are not just managed, but potentially even prevented or cured.