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Deadline: February 27th, 2026

EUR CARe PhD program pre-proposal

(2 pages maximum)

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Research project title: NMDA Receptors in Ageing

Research program abstract (max 500 words): The physiopathological mechanisms associated with neurodegenerative diseases remain largely unknown. However, one process appears to be involved in their development: neurotoxicity induced by a massive calcium influx following excessive activation of NMDA receptors (NMDAr). For example, in Alzheimer's disease this calcium dysregulation affects the metabolism of amyloid precursor proteins, leading to increased formation of amyloid-β. Identifying NMDAr hyperactivation therefore represents a key to preclude this well-known pathological evolution. Molecular imaging using positron emission tomography (PET) is a well-established *in vivo* technique that allows qualitative and quantitative mapping of receptors and biological processes. So far, the development of radiotracers for studying NMDA receptor activation has yet to be validated. While numerous radiotracers targeting these receptors have been tested, few have shown promising in vivo results and enhanced properties are to be achieved. One key issue remains in combining a metabolic stability with a high affinity for NMDAr, especially the intra-canal site, which would allow to highlight the hyperactivation of these receptors. By combining expertise in chemistry, radiochemistry, pharmacology and in vivo imaging the project will give access to a range of molecules to be assessed for their affinities, metabolism and synthesis and radiopharmaceutical production and *in vivo* imaging.