

SELF-ASSEMBLED PRUSSIAN BLUE NANOPARTICLES AS MULTIFUNCTIONAL PLATFORMS FOR BIOMEDICAL APPLICATIONS

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Prussian Blue (PB) is one of the most renowned ancient coordination compounds and a synthetic pigment, discovered in the early 18th century in Berlin. Beyond its historical significance as a celebrated pigment, PB and its analogues have been revisited as promising nanomaterials in several fields.¹ Importantly, PB has emerged as a promising theranostic agent for several diseases, including cancer, inflammatory and cardiovascular diseases, etc. Green synthesis, structural tunability, and capacity for surface functionalization with polymers has made PB-based nanoparticles (PB NPs) particularly attractive for many advanced therapeutic and diagnostic applications.²⁻⁴

Given this context, our team aims to develop self-assemblies based on PB NPs within the size range of 50-200 nm, explore their physical characteristics and evaluate their potential as novel theranostic platforms. We first succeeded in obtaining self-assembled nanochains using ultra-small PB NPs connected by gallic acid/iron clusters that proved to be efficient for cancer therapy. Our current project aims to extend this approach with various biocompatible catechols having antioxidant properties for applications in cardiovascular diseases. Additionally, the incorporation of different metal ions into self-assemblies was explored to add properties such as radiotherapy. This communication will report on the synthesis and full characterisation of this new family of theranostic agents, as well as their antioxidant properties. Ultimately, the most optimised self-assembly will be studied both *in vitro* and *in vivo* for its potential use in the treatment of cardiovascular diseases and cancer.

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