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Nanoparticles for theranostics with PET and MRI

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In nuclear medicine, cancer theranostics refers to the strategy of combining diagnostic imaging with targeted therapy. In this talk, I will discuss how theranostic efficacy may be enhanced by leveraging the unique properties of nanoparticles. Due to their nanoscale size, nanoparticles can penetrate target tissues and tumour cells, and enhance physico-chemical reaction rates. Additionally, nanoscale geometric confinement confers unique physical properties. Superparamagnetic nanoparticles, in particular, offer a unique platform for radiolabelling with PET isotopes, while also enhancing contrast in Magnetic Resonance Imaging (MRI). Additionally, such nanoparticles, when radiolabelled with a therapeutic isotope, can enhance localised damage to tumour cells, thereby improving therapeutic outcomes.

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