Understanding the role of particle rigidity in nanoparticle-cellular interactions

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Engineered nanomaterials have garnered much interest in biomedical research due to their unique and tailorable properties which can facilitate spatially localised diagnostic and therapeutic effects. The interaction of medically relevant nanoparticles with biological systems is strongly influenced by a number of physico-chemical properties such as size, shape and surface chemistry [1]. While the aforementioned properties have been the subject of much study, insufficient effort has been invested in understanding the role of mechanical properties on nanomaterial bio-interactions. There is emerging evidence that particle rigidity can play a substantial role in the *in vivo* biodistribution of nanoparticles as well as their internalisation by cell subtypes [2]. In order to understand how nanomechanical behaviour impacts the biological response, we have synthesised mechanically distinct polymer microgels to explore stiffness-dependent internalisation. We assess the role of particle rigidity in two distinct arenas: internalisation from suspension, and the removal of particles from a substrate. This approach allows us to interrogate the dynamics of particle internalisation in dissimilar, but physiologically relevant models.

References

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