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Next generation C_{60} enabled antibiotics

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The objective of my research is to design, synthesize and tailor a nanoparticle-antibiotic conjugate capable of a multi-targeted approach to multi drug resistant (MDR) pathogenic bacterial infections, such as C_{60}–Ampicillin. Post-synthesis the mechanisms of interaction between the conjugate and the bacteria will be elucidated, to allow for refinement and optimisation of the multi-targeted approach. This work will develop new methodologies and standards for testing the antimicrobial properties of novel nanomaterials. Current antimicrobial agents such as ampicillin and streptomycin which have worked effectively for decades are no longer a viable way of treating bacterial infections due to the resistance they are continuously developing and passing onto the next generation. It is imperative that a new strategy is developed to deal with this treat as a current World Health Organization study in 2014 estimated 10 million deaths per year worldwide with this projection only to increase. Bacteria have developed resistance to ampicillin via efflux pumps, reduced affinity, enzyme degradation and target alteration. It is hoped these resistive traits can be attacked by the C_{60} –AMP complex which offered a reduced affect when tested against clinical strains of *E.coli*. The complex has been characterized extensively with, DLS, Zeta potential, UV/Vis spectra, IR spectra and Raman.

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