THE USE OF SOLID-PHASE SYNTHESISED NANO-SIZED MOLECULARLY IMPRINTED POLYMERS FOR THE SPECIFIC TARGETING AND TREATMENT OF *HELICOBACTER PYLORI*

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Background: Solid-Phase Nano-sized Molecularly Imprinted Polymers (nanoMIPs) are synthesised through the polymerisation of monomers that polymerase around a template in solid-phase, such as a peptide, forming a nanoMIP that is specific to the template, or templates, through electrostatic interactions and space complementarity. The nanoMIPs are double imprinted to the template and to antibiotics to target the conserved surface protein Lpp20 of *Helicobacter pylori.* We are targeting *Helicobacter* as specific delivery of the drug would be expected to improve, specificity of drug delivery, patient benefit, and ultimately treatment outcome.

Methods: Synthesis of the first nanoMIPs was performed by immobilising Lpp20 peptides to glass beads. The polymerisation was catalysed by production of free radicles. Low affinity nanoMIPs were removed through washing with H_2O at 0^oC, whilst the high affinity nanoMIPs were eluted at 60^oC. Imaging of nanoMIP binding to the bacteria was performed by confocal microscopy.

Results: Synthesis allowed to produce with a high yield Lpp20 specific fluorescent tagged nanoMIPs at a size of 93 nm, with or without ampicillin. The binding of Lpp20 imprinted nanoMIPs to *H. pylori* was confirmed by confocal microscopy showing binding of single nanoMIPs to bacteria and nanoMIP dependent aggregation of bacteria.

Conclusion: The use of nanoMIPs for delivery of antibiotics is a novel, cheap and effective way of treating bacterial infections. We envisage that our work will demonstrate that this specific delivery will optimise antimicrobial delivery thus contributing to the maintenance of a normal microbiota.