P037 A scalable, generic technique to generate large branched DNA complexes

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The inherent self-recognition properties of DNA have led its utilisation as a scaffold for various self-assembly applications. Macromolecular complexes, metallic and semiconducting nanoparticles, proteins, inter alia, can be assembled onto designed DNA structures. A number of studies utilised synthetic methods for building DNA structures. However, these methods are limited by the chemical synthesis methods of the DNA molecules at their root in terms of molecule size which is typically around 100 base pairs (bp). Applications that require self-assembling DNA complexes of several tens or more nanometres will therefore need to utilise other techniques. Here, we present a generic scalable technique to generate large DNA macromolecular complexes. Utilising the method outlined here, linear, branched and/or circular DNA complexes can be synthesised and functionalised in a specific manner, allowing assembled complexes to be directly incorporated into their intended application. The effectiveness of this technique is demonstrated here by the use of Lambda Bacteriophage DNA as a template to generate three- and four-way DNA structures approximately 120 nm in size.