

## Synthesis of DNA Triblock Copolymer using a Combination of Restriction and Ligation Enzymes

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Hybrid polymers containing both biological and synthetic segments have attracted much interest in recent years. In particular, DNA containing block copolymers are expected to find utility in a wide range of biomedical applications. We designed a DNA triblock copolymer synthesis scheme where two DNA diblock copolymers containing complementary sticky ends are connected into a triblock with the assistance of ligation enzyme. The triblock copolymer thus produced contains covalent linkage throughout the structure, generating a true triblock chain structure with a DNA center block. We also showed that the DNA center block can be cut again using restriction enzyme to regenerate diblock copolymers. This recycled diblock can then be ligated to a different DNA diblock, generating a new triblock of different DNA center block as well as different synthetic polymer end blocks. This process can be repeated many times allowing the same stock of DNA diblock copolymers to be shuffled to create a variety of triblock copolymers for different applications.