

Synthesising AND Gates with DNA strand displacement reactions

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I. INTRODUCTION

This demo shows how to implement the two-input AND gate with DNA strand displacement reactions. The input signals and output signals are indicated by DNA single strands, respectively. The AND gate refers to some DNA complex which could process DNA single strands. This design is expected to be applied in vitro as shown in Fig. 1. The well-designed DNA complex is stored in vitro at first, as the input signals being injected in the test tube, the output signals generate automatically. We have performed DNA experiments in lab to validate our design. The instrument and the curve representing the output signal are shown in Fig. 2 and Fig. 3. We will use animation to illustrate the detailed DNA reaction mechanism.

II. REQUIREMENTS

A computer that could display animation.

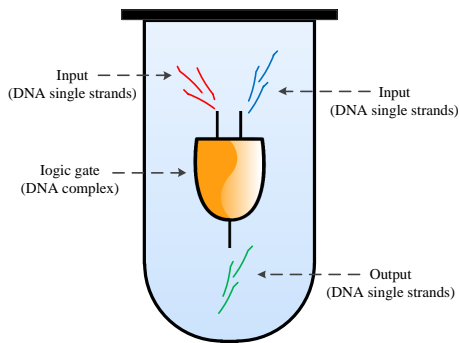


Fig. 1. The DNA AND gate in vitro.



Fig. 2. The instrument used to measure the output signal.

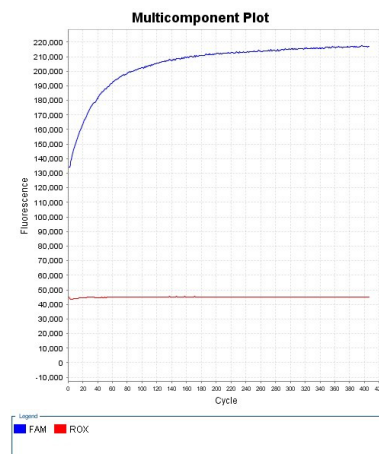


Fig. 3. The curve of the output signal.