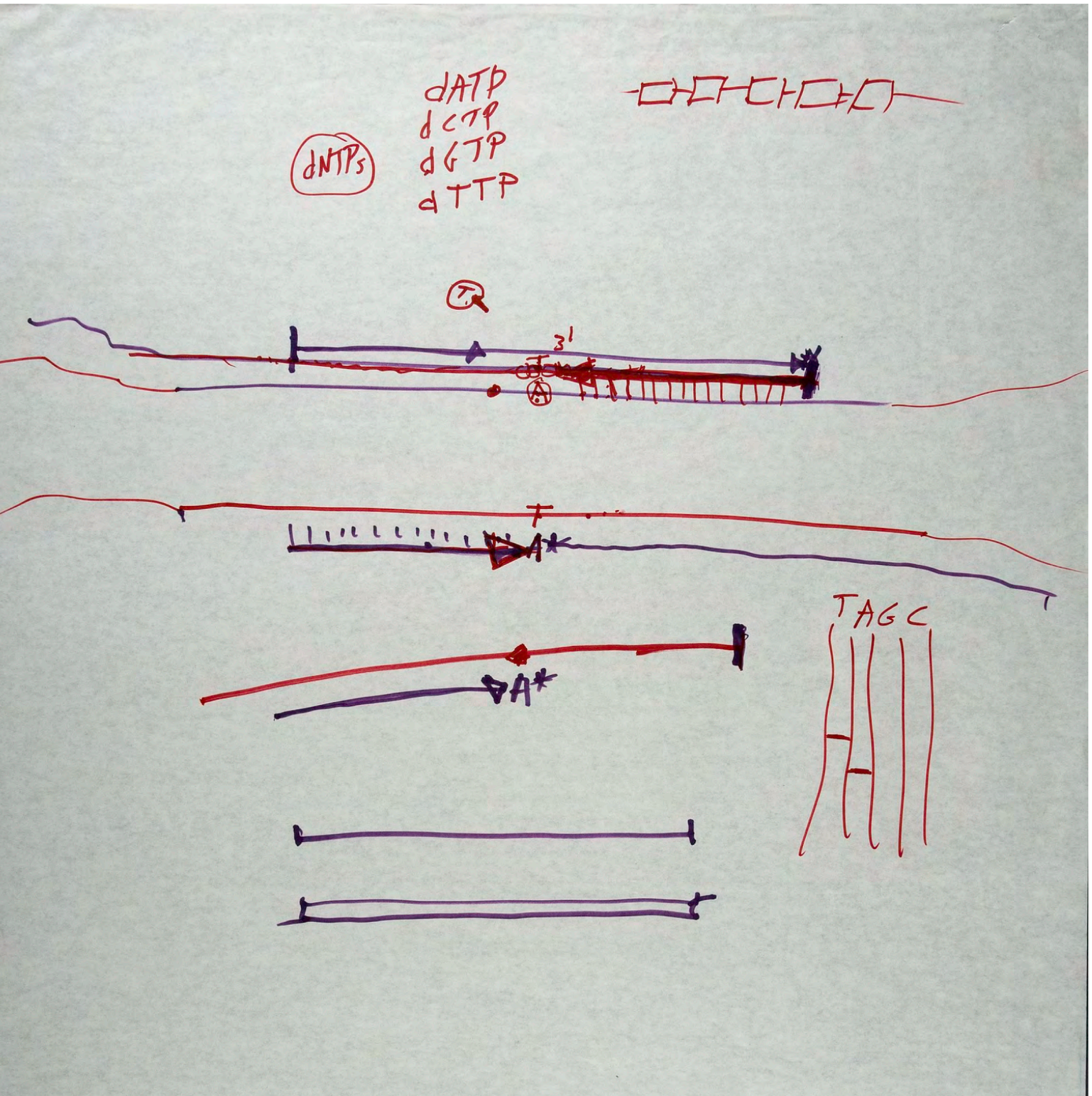
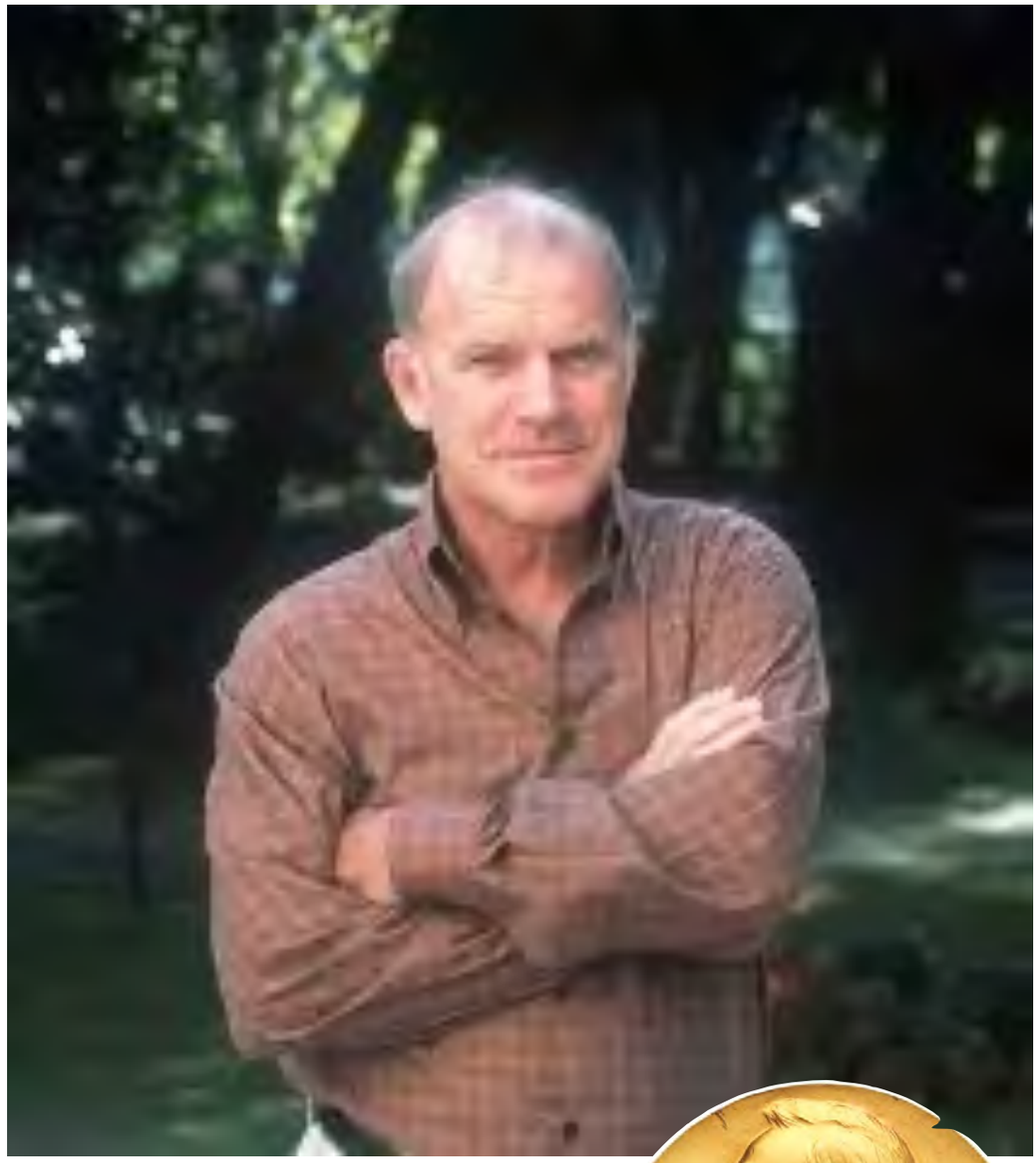
Введение в молекулярную биологию

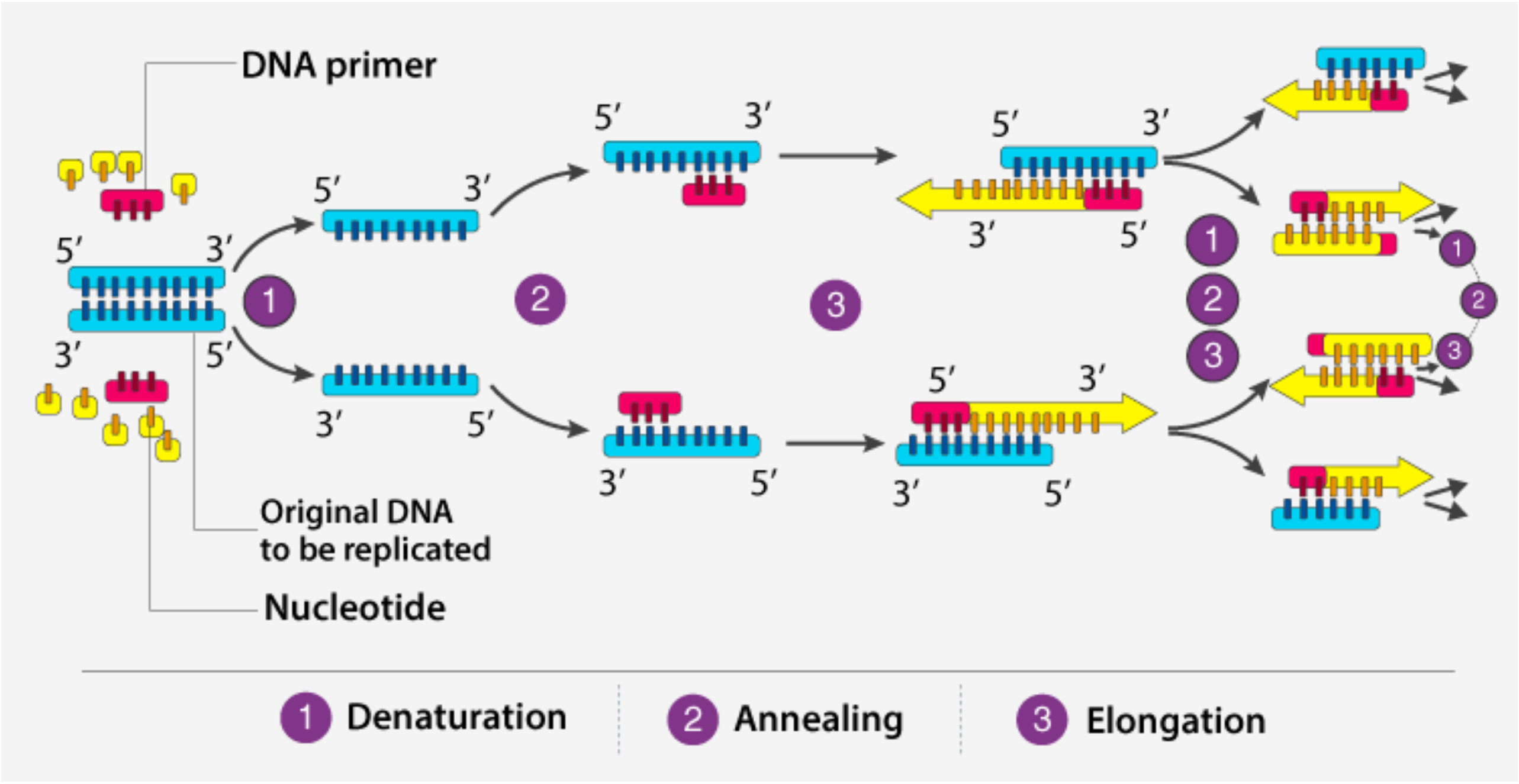
Лекция 4. Методы анализа ДНК, секвенирование

ПЦР: Введение

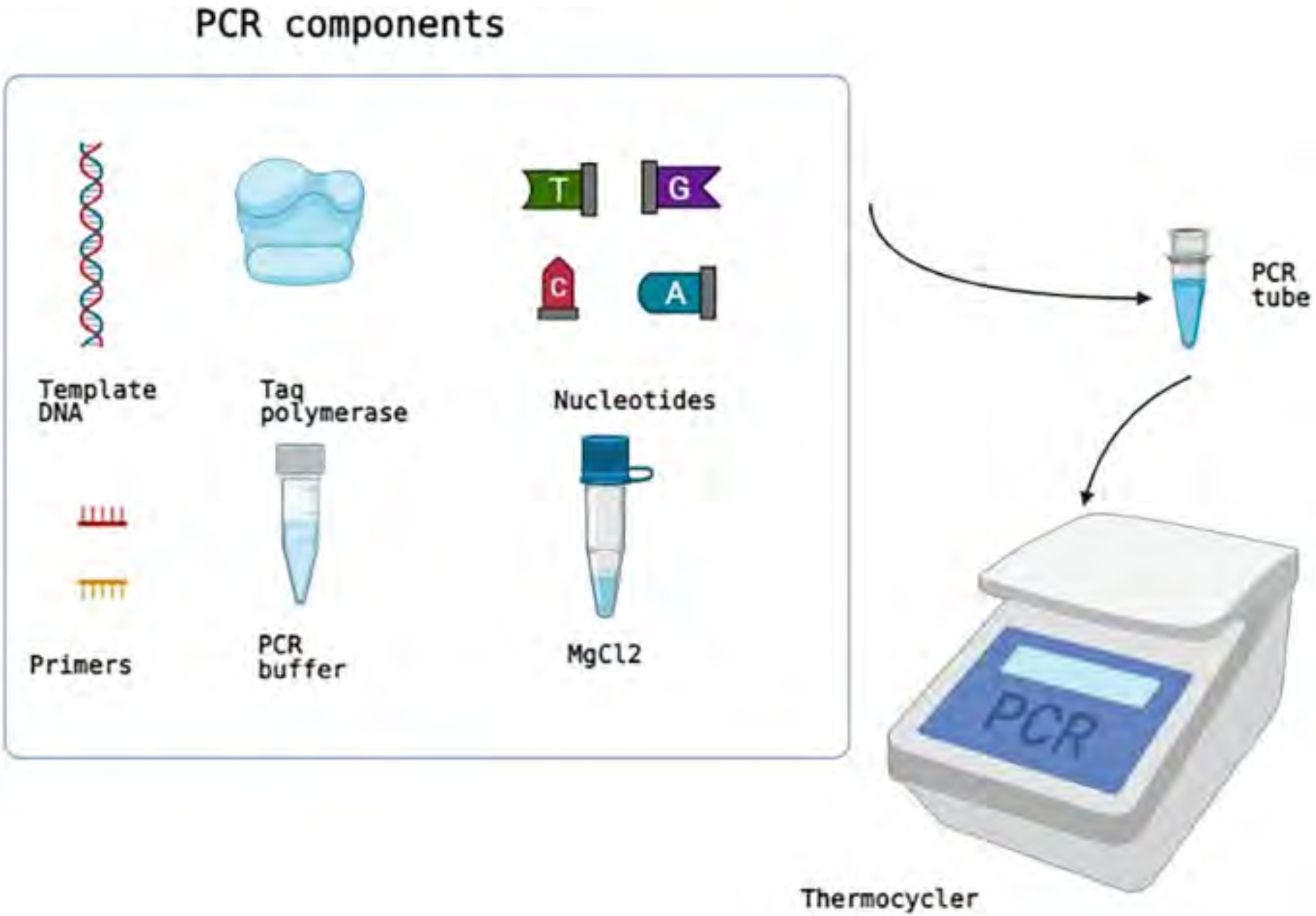




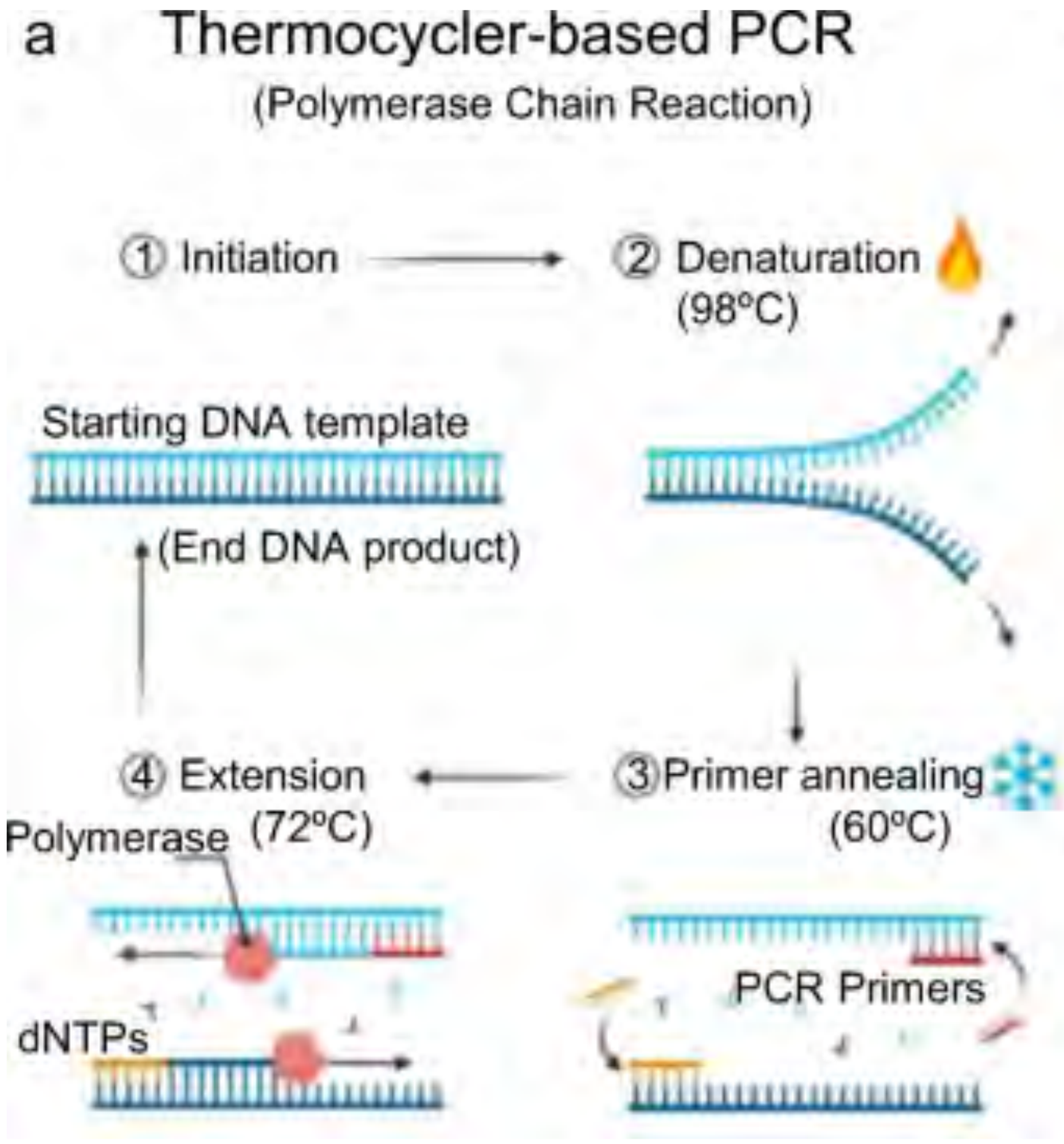
Классическая ПЦР: Принцип метода



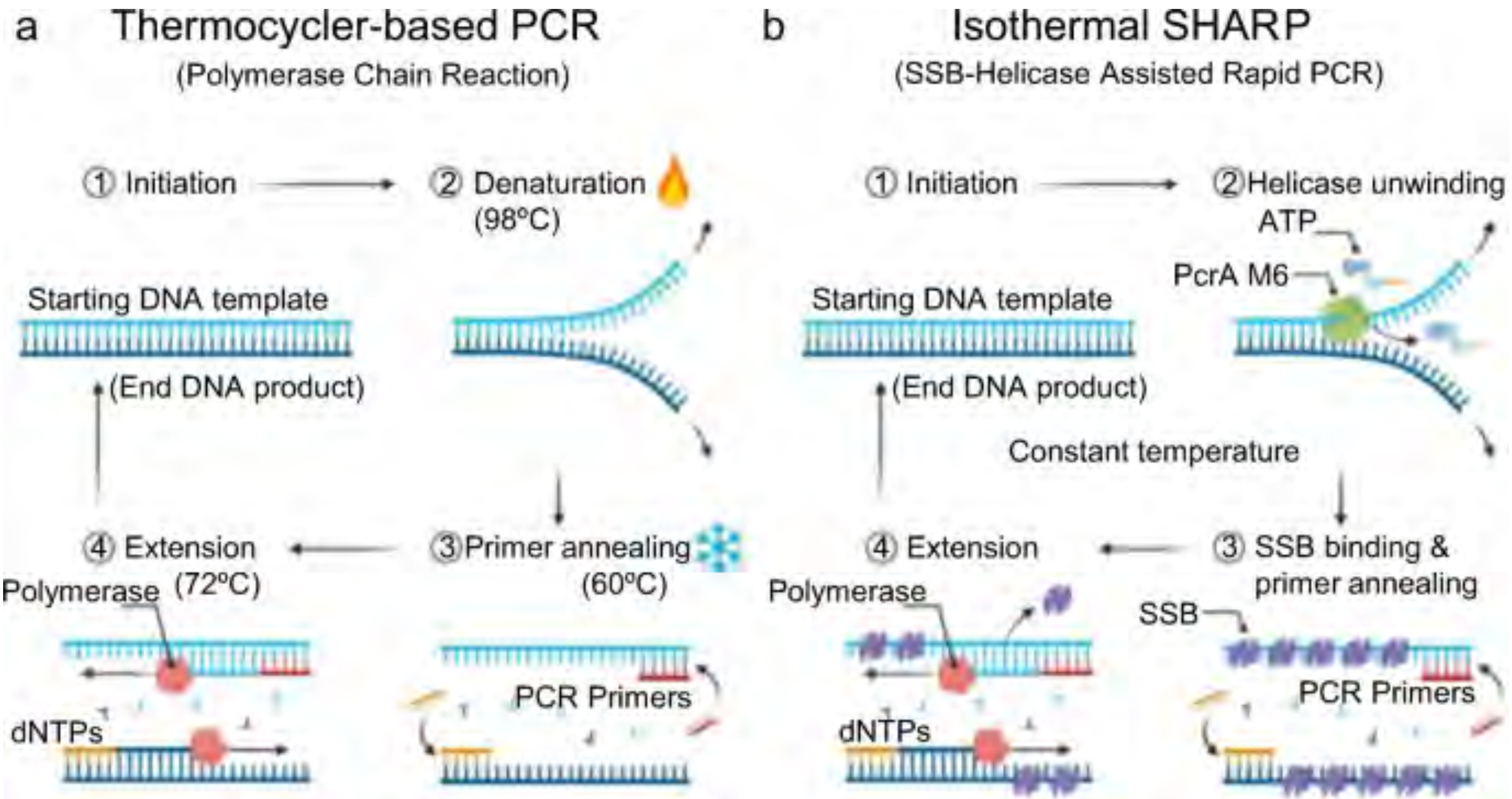
Классическая ПЦР: Компоненты реакции



Классическая ПЦР: Циклы амплификации

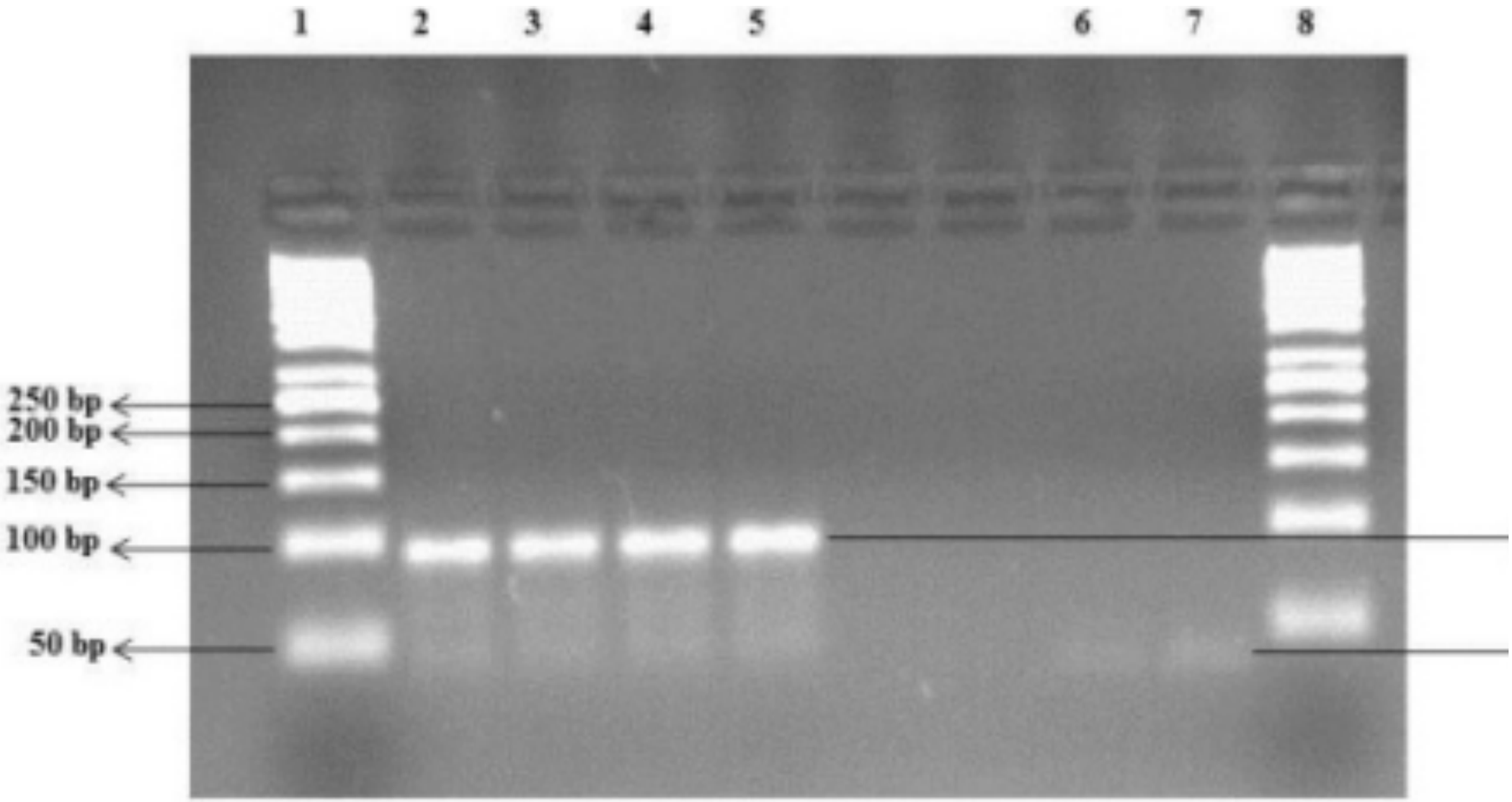


Классическая ПЦР: Циклы амплификации

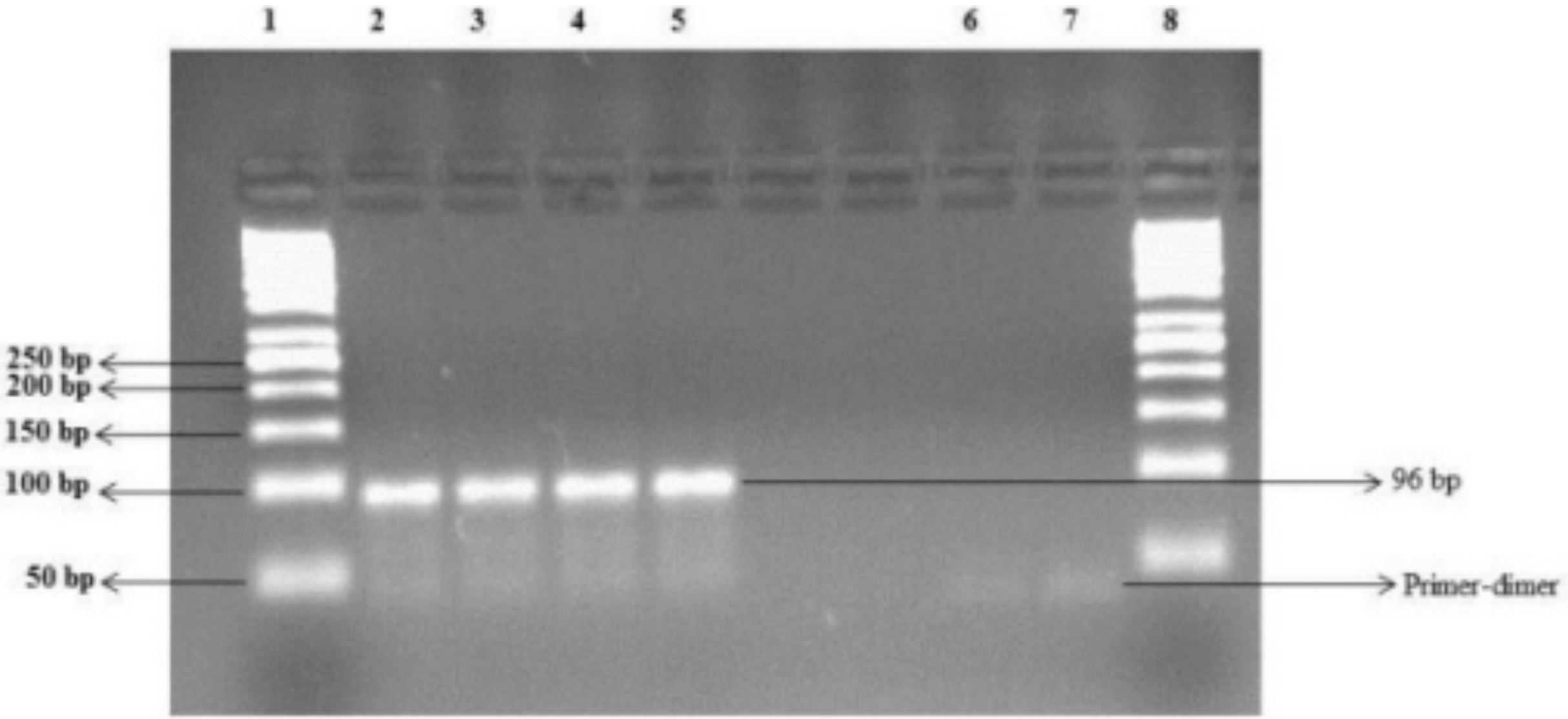


Классическая ПЦР: Применение

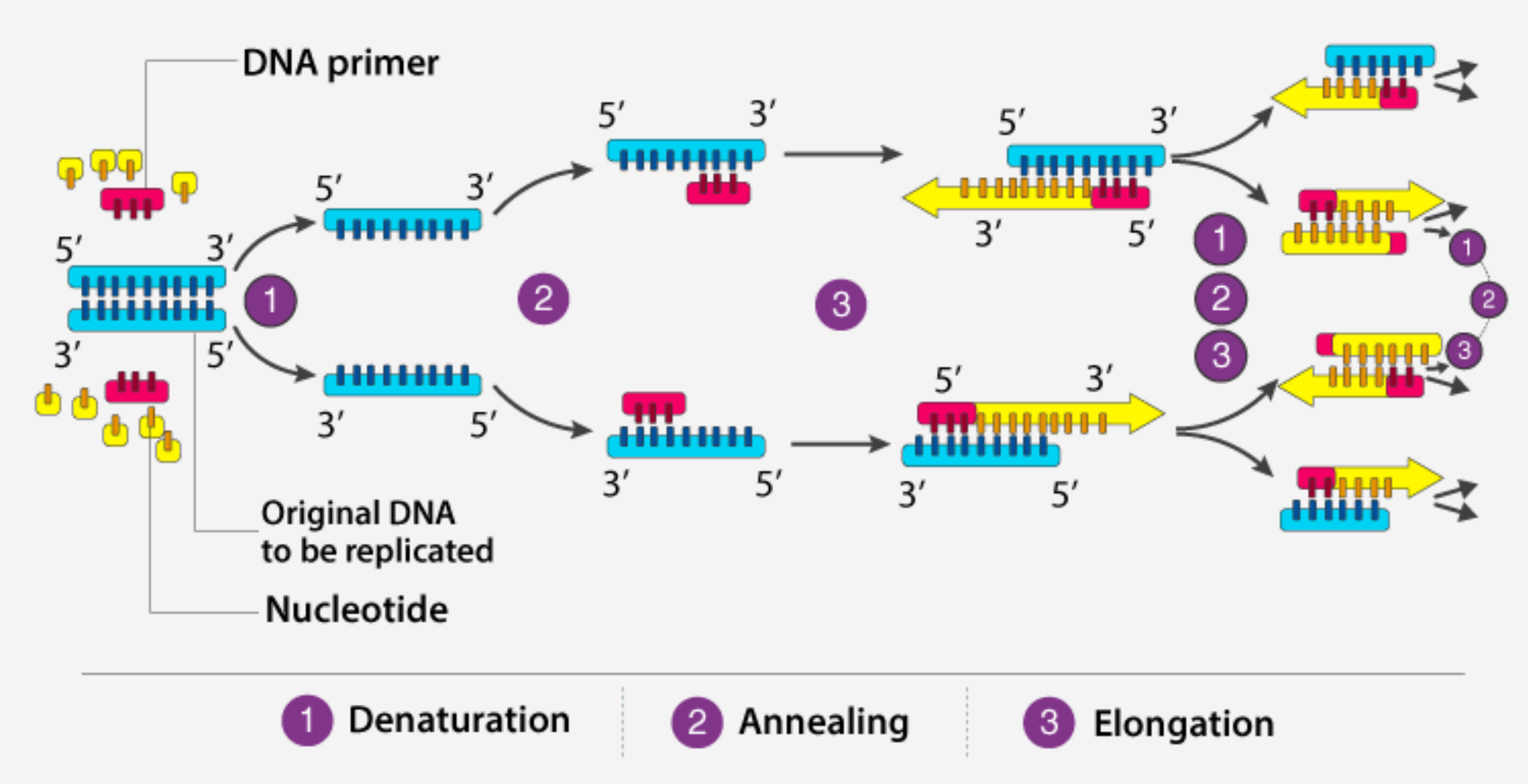
Классическая ПЦР: Выходные данные



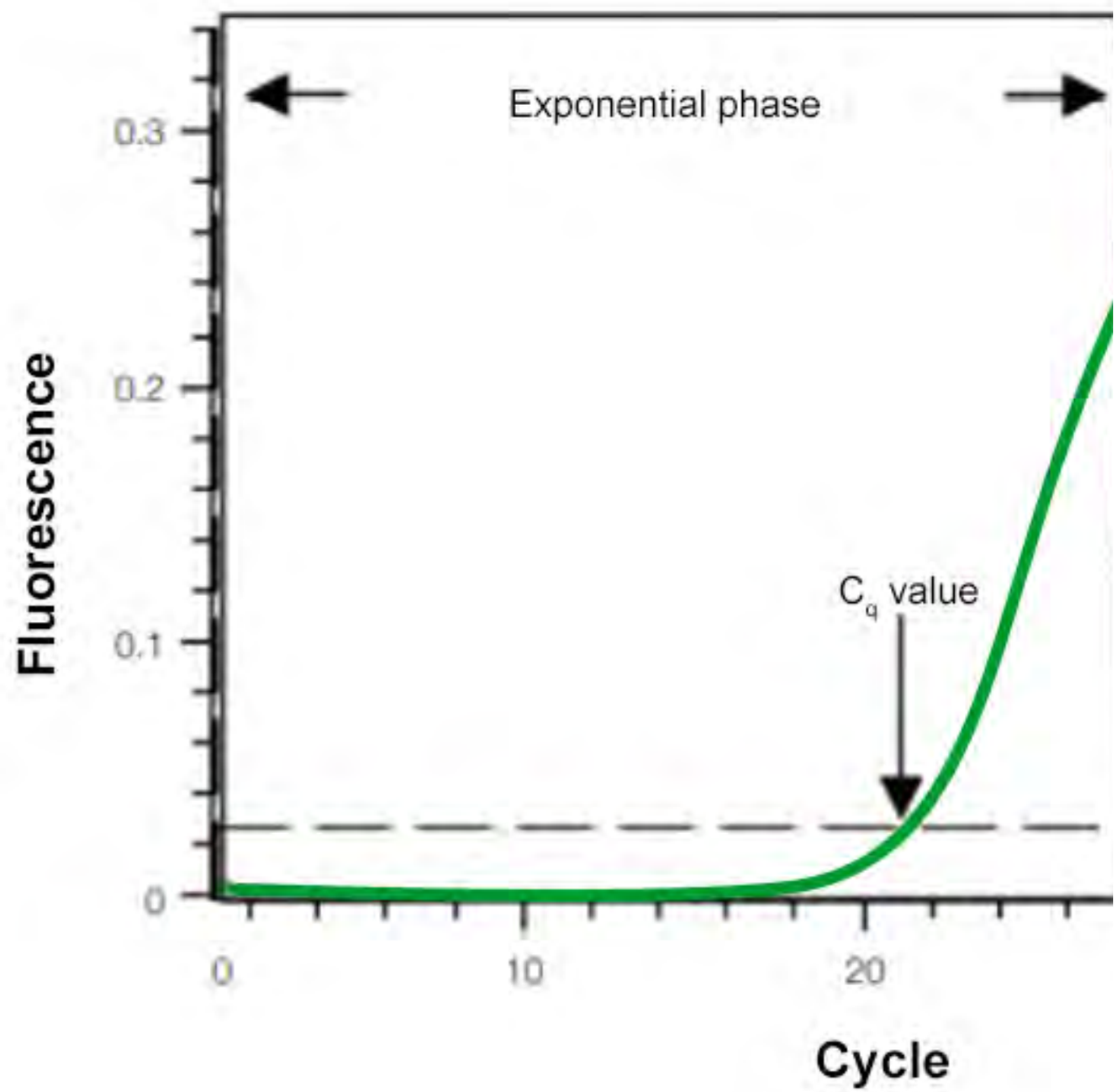
Классическая ПЦР: Выходные данные



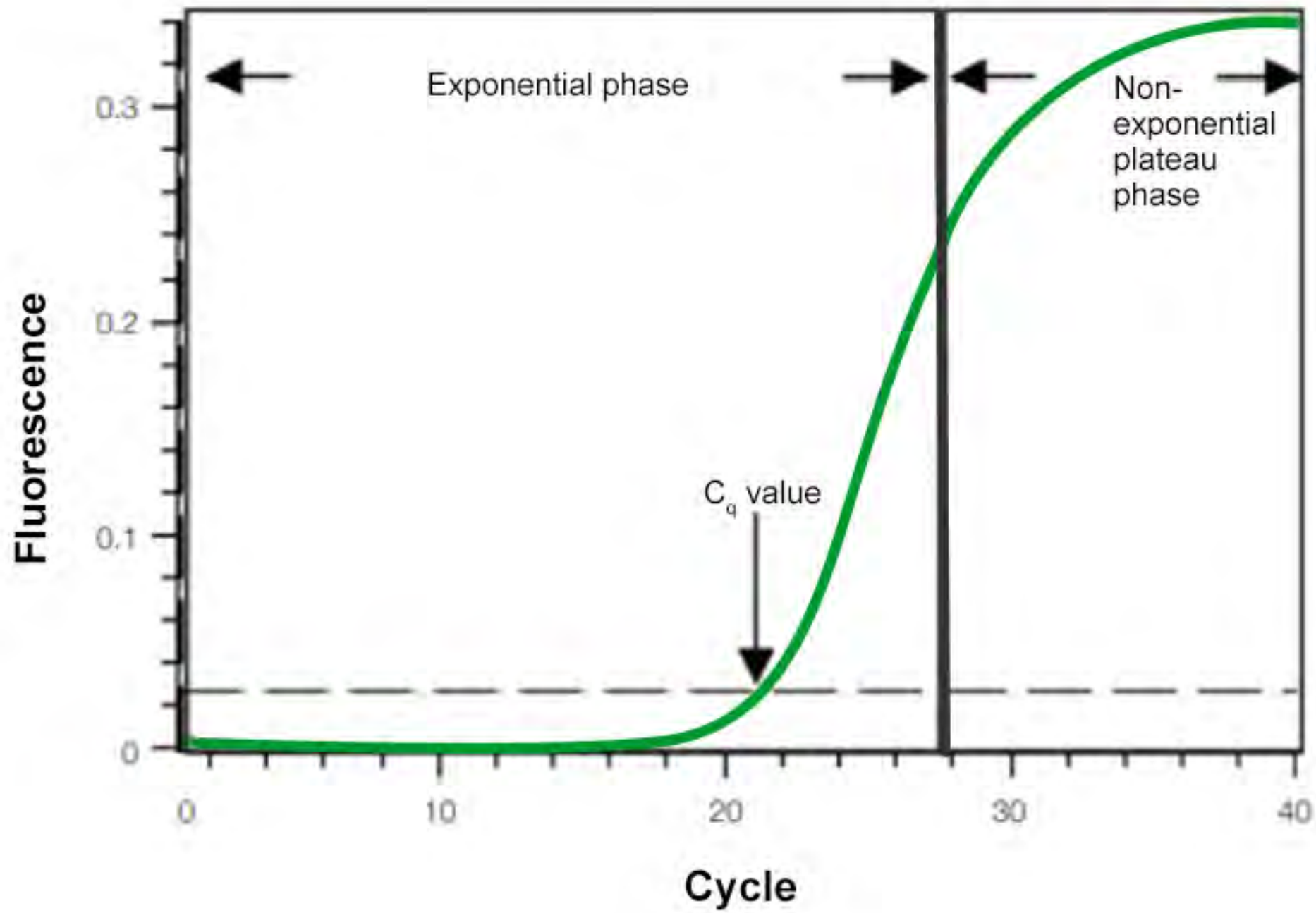
ПЦР в реальном времени (qPCR): Принцип



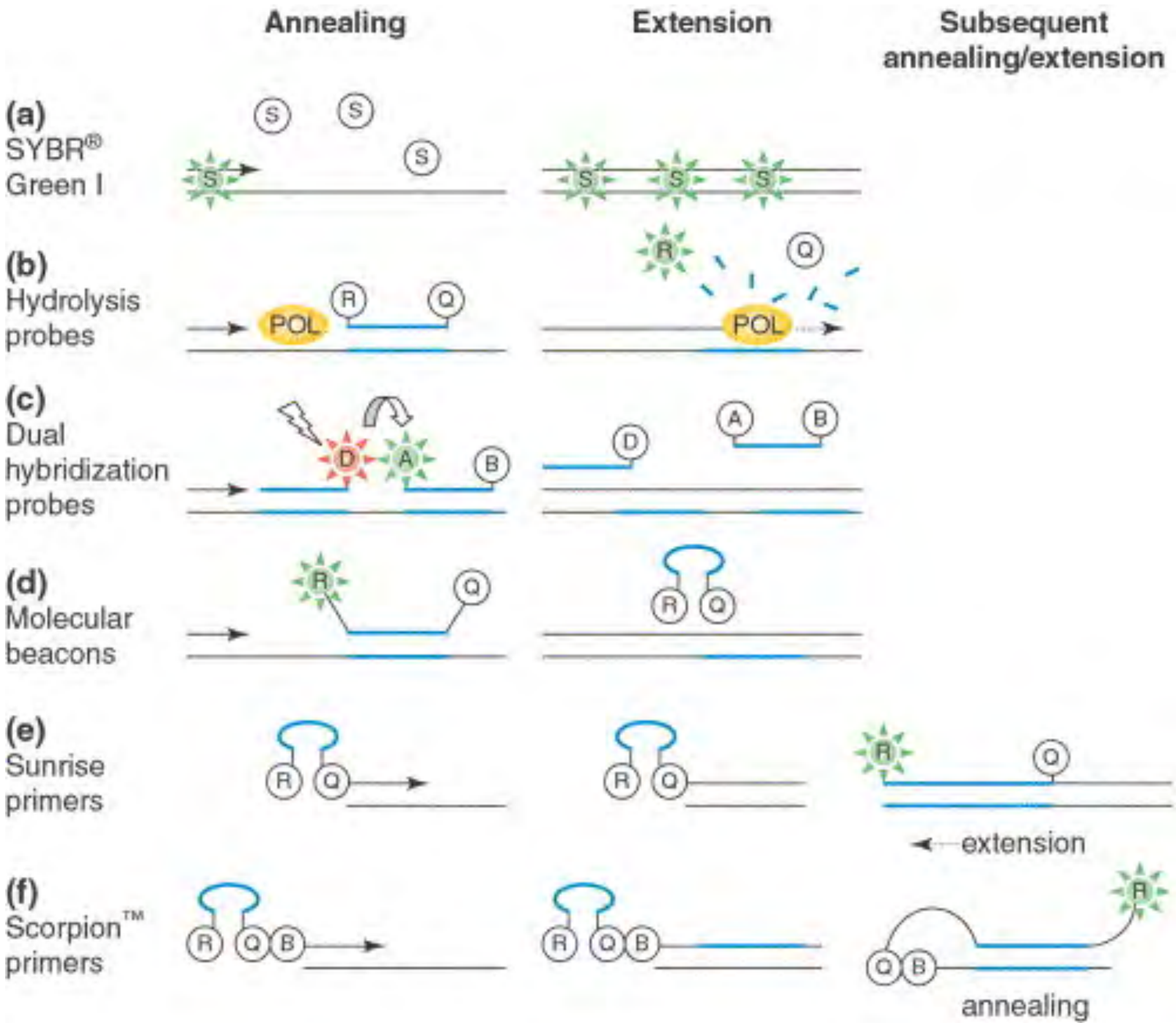
ПЦР в реальном времени (qPCR): Принцип



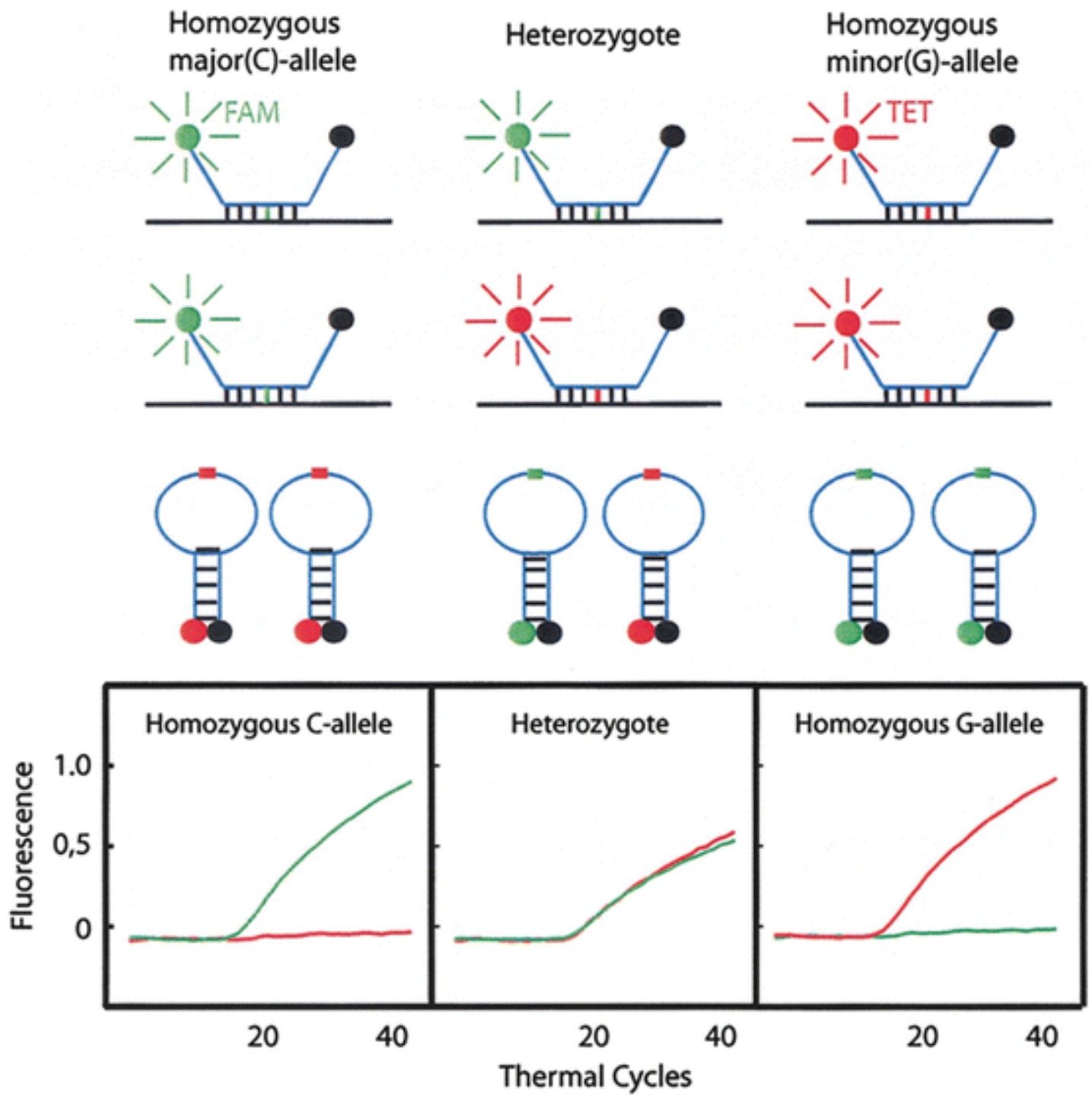
ПЦР в реальном времени (qPCR): Принцип



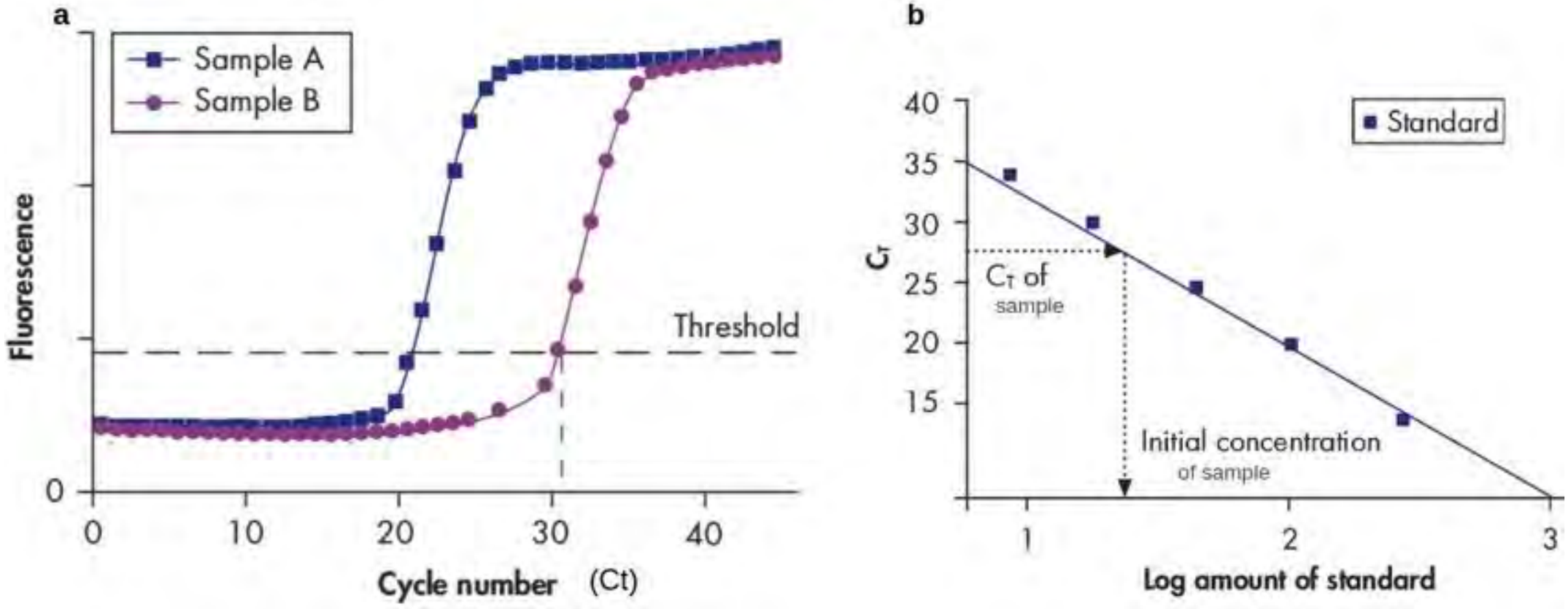
qPCR: Флуоресцентные методы



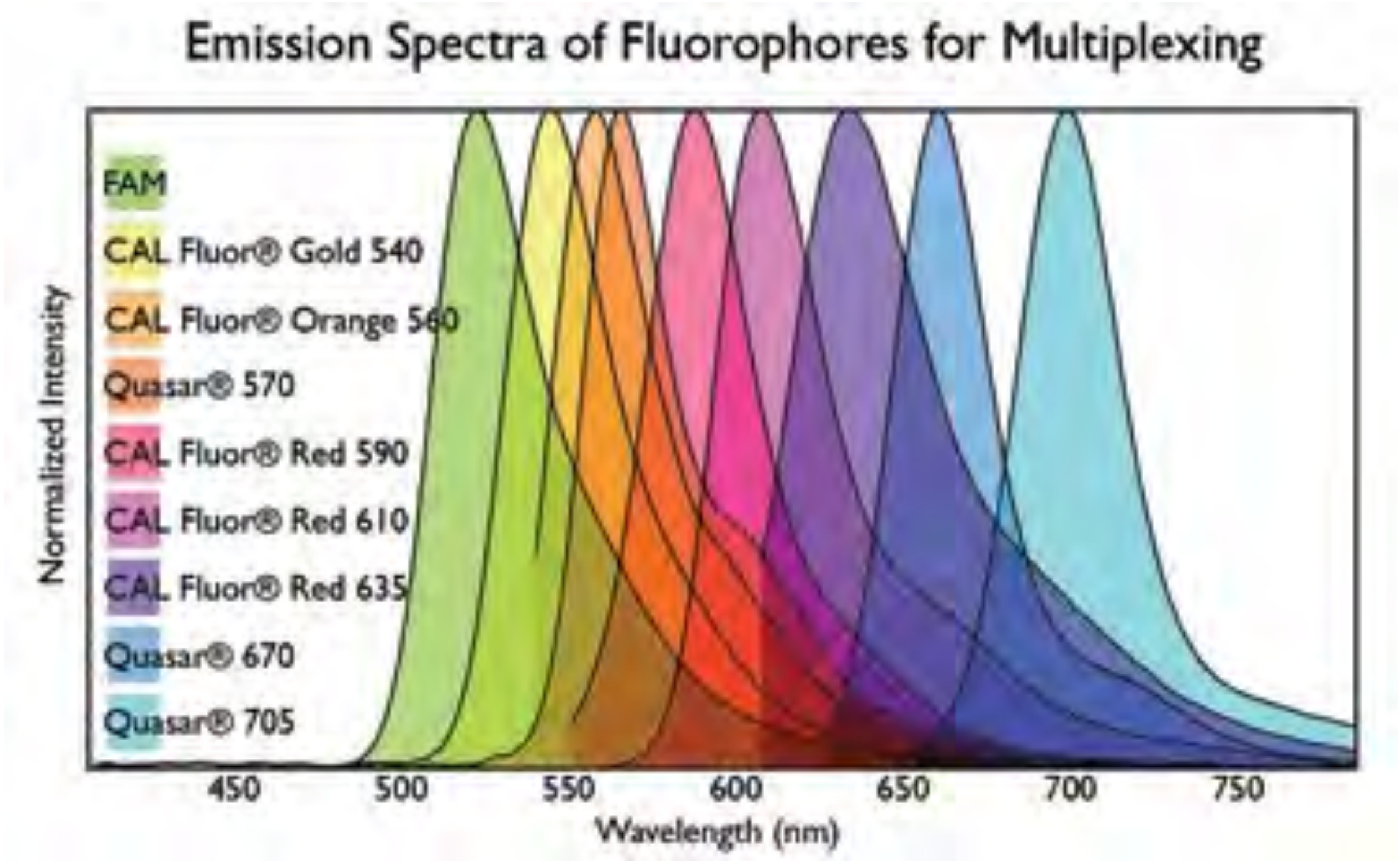
qPCR: применение



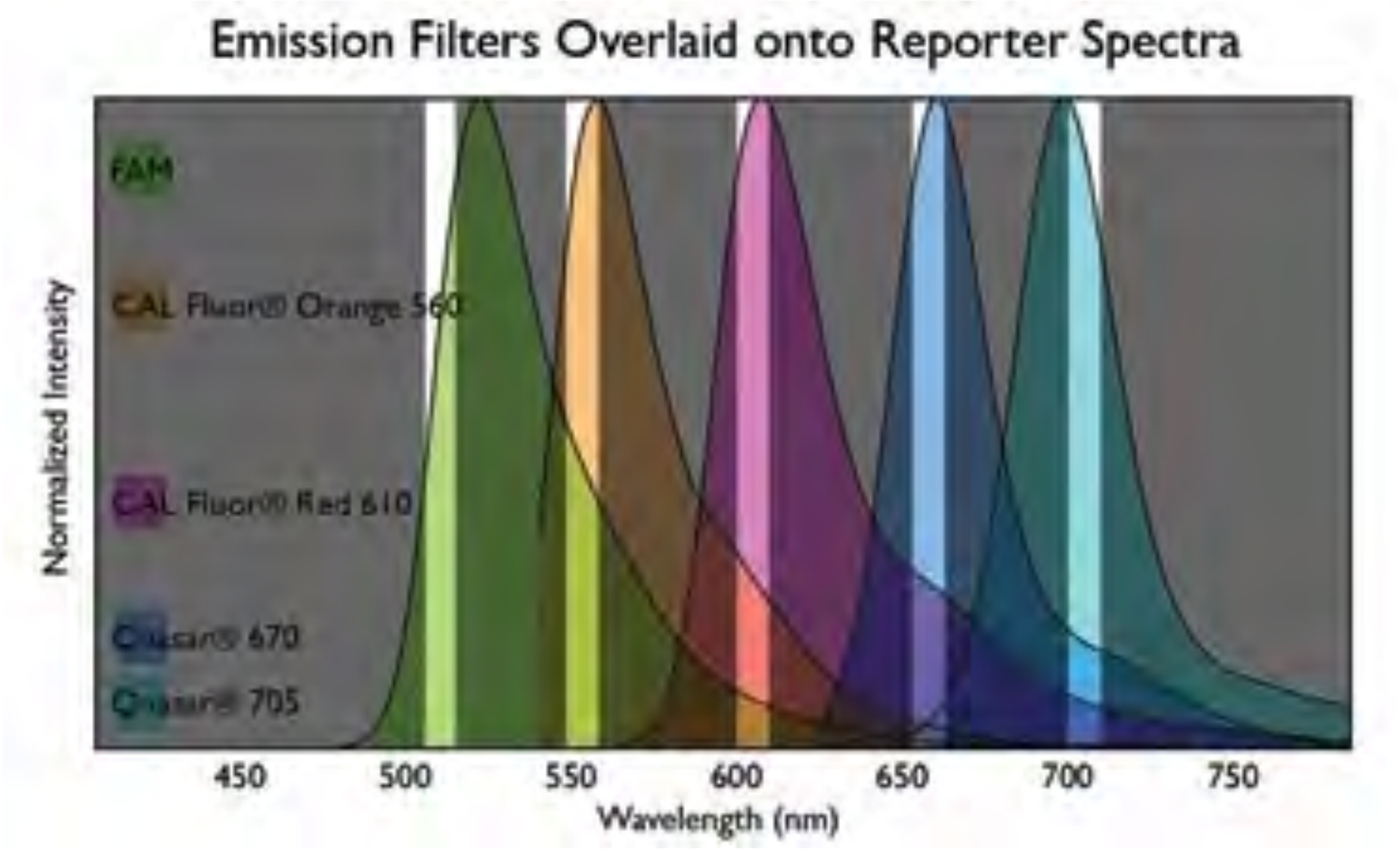
Обработка данных qPCR



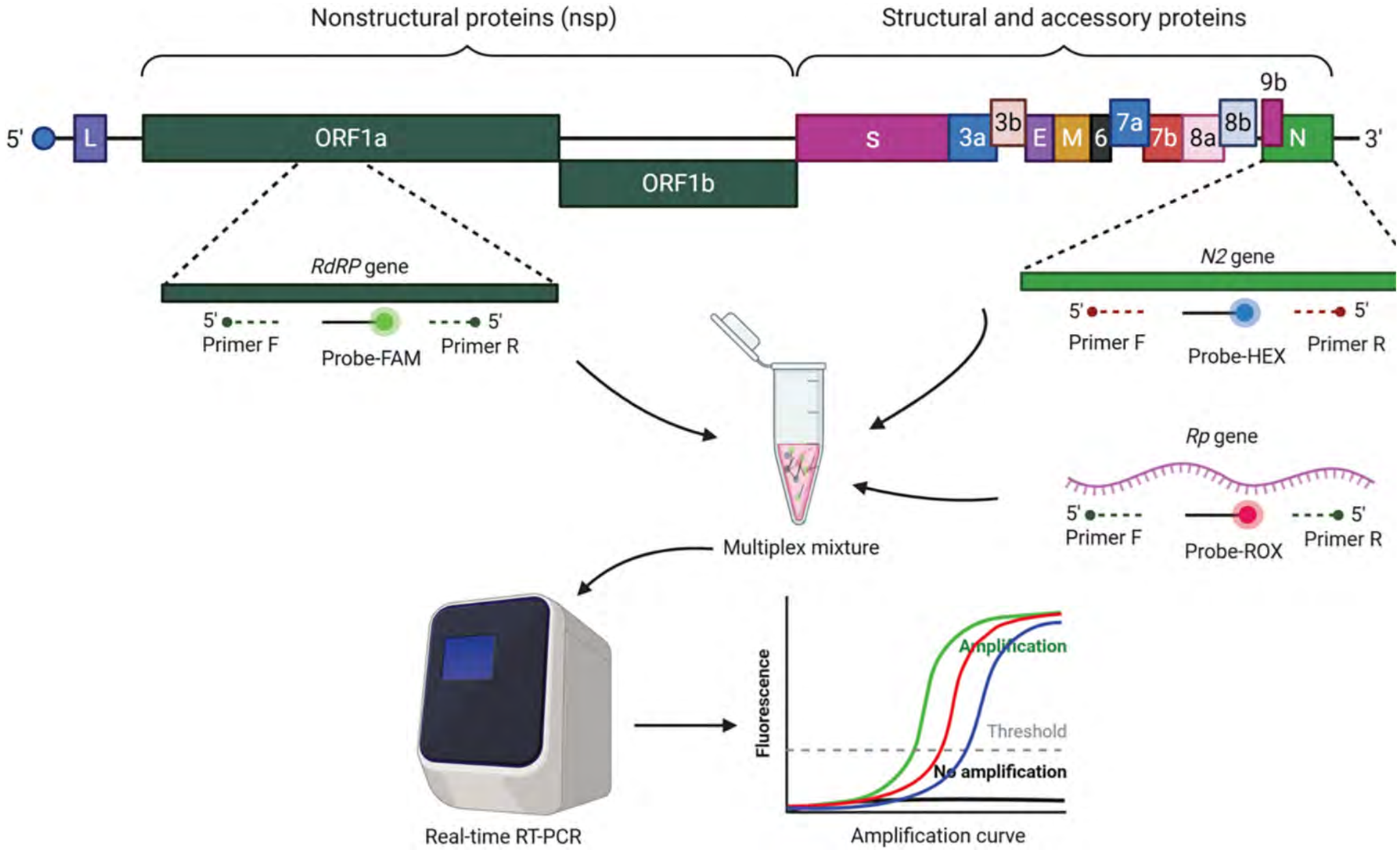
Другие варианты ПЦР: Мультиплексная ПЦР



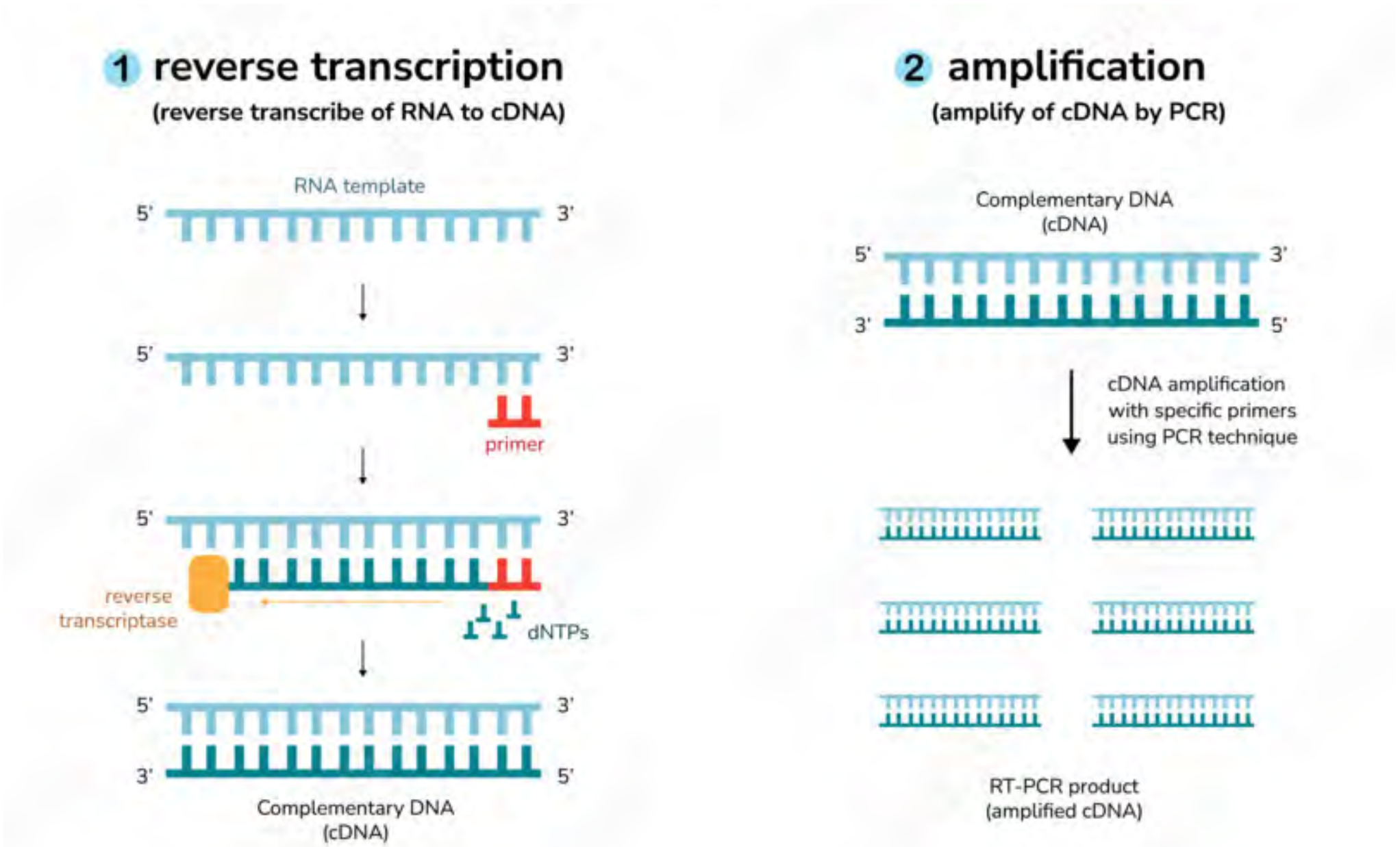
Другие варианты ПЦР: Мультиплексная ПЦР



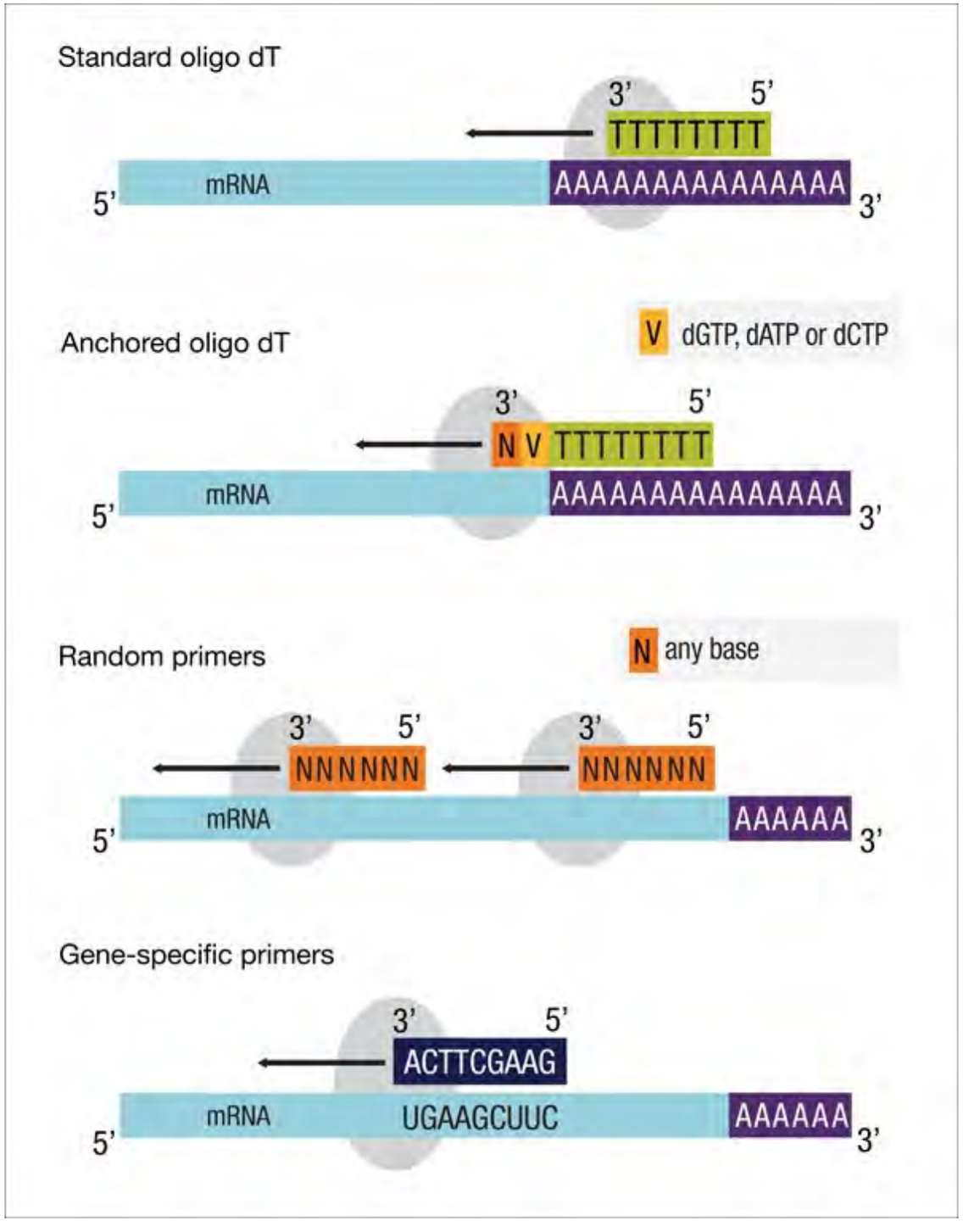
Другие варианты ПЦР: Мультиплексная ПЦР



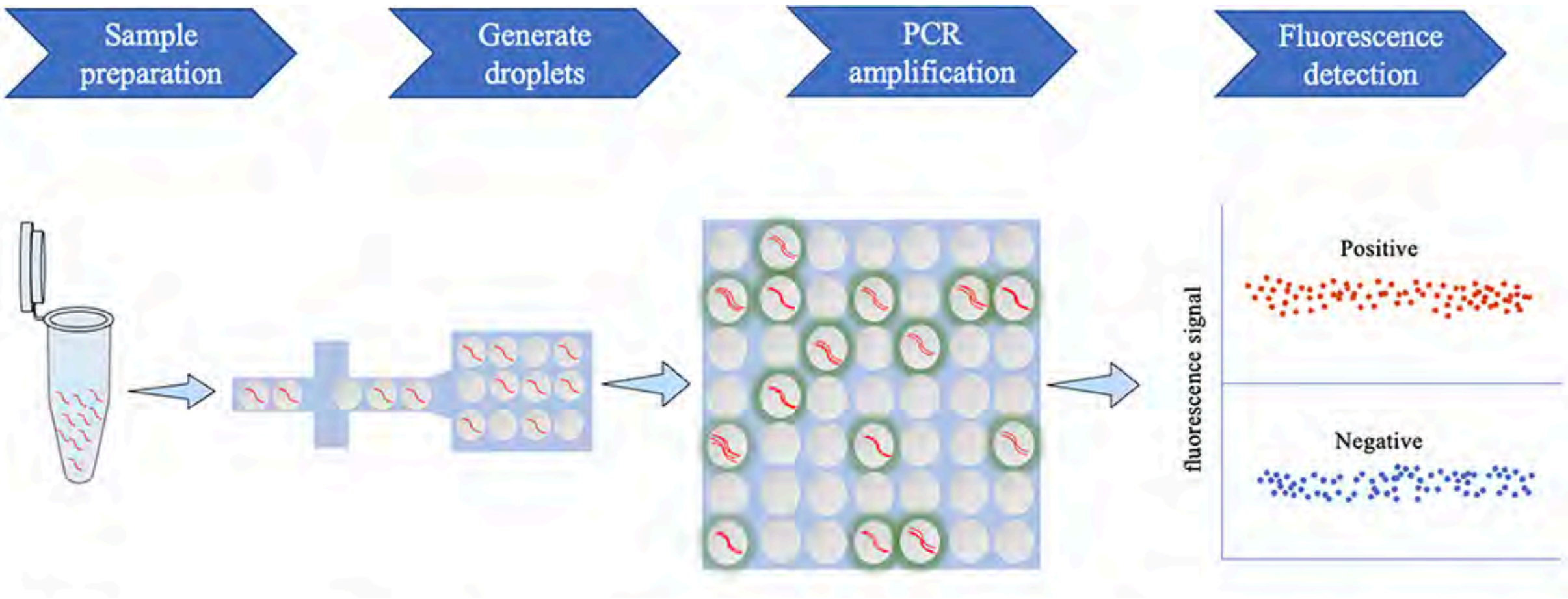
Обратная транскрипционная ПЦР (RT-PCR)



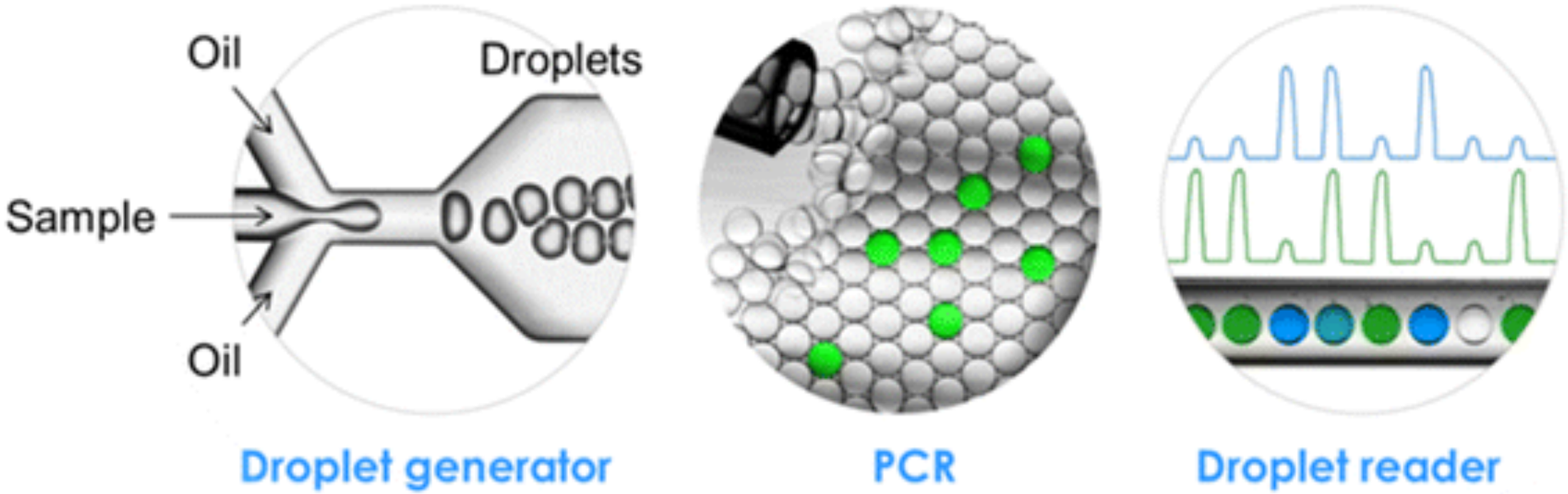
Обратная транскрипционная ПЦР (RT-PCR)



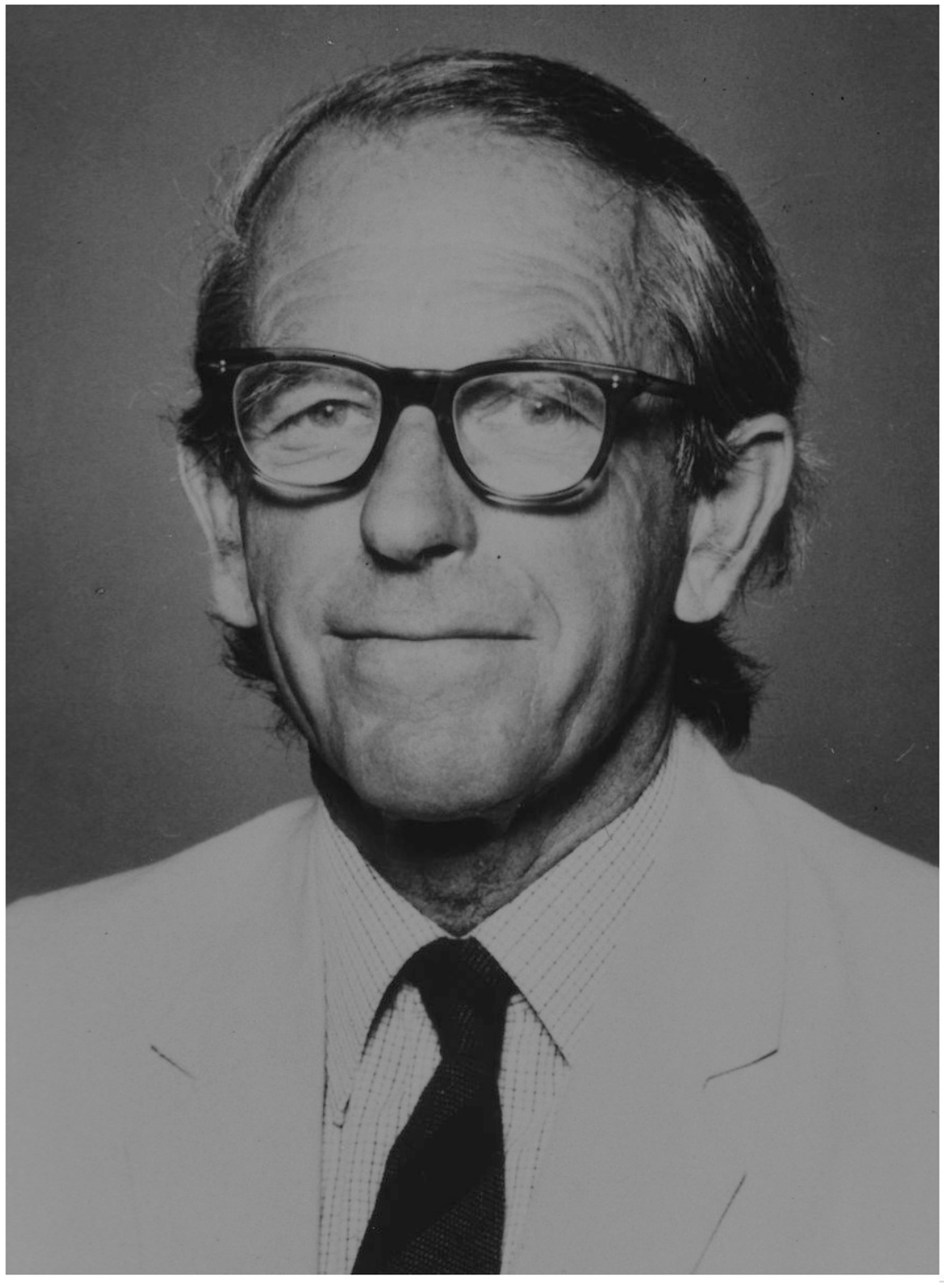
Цифровая ПЦР (dPCR): Принцип

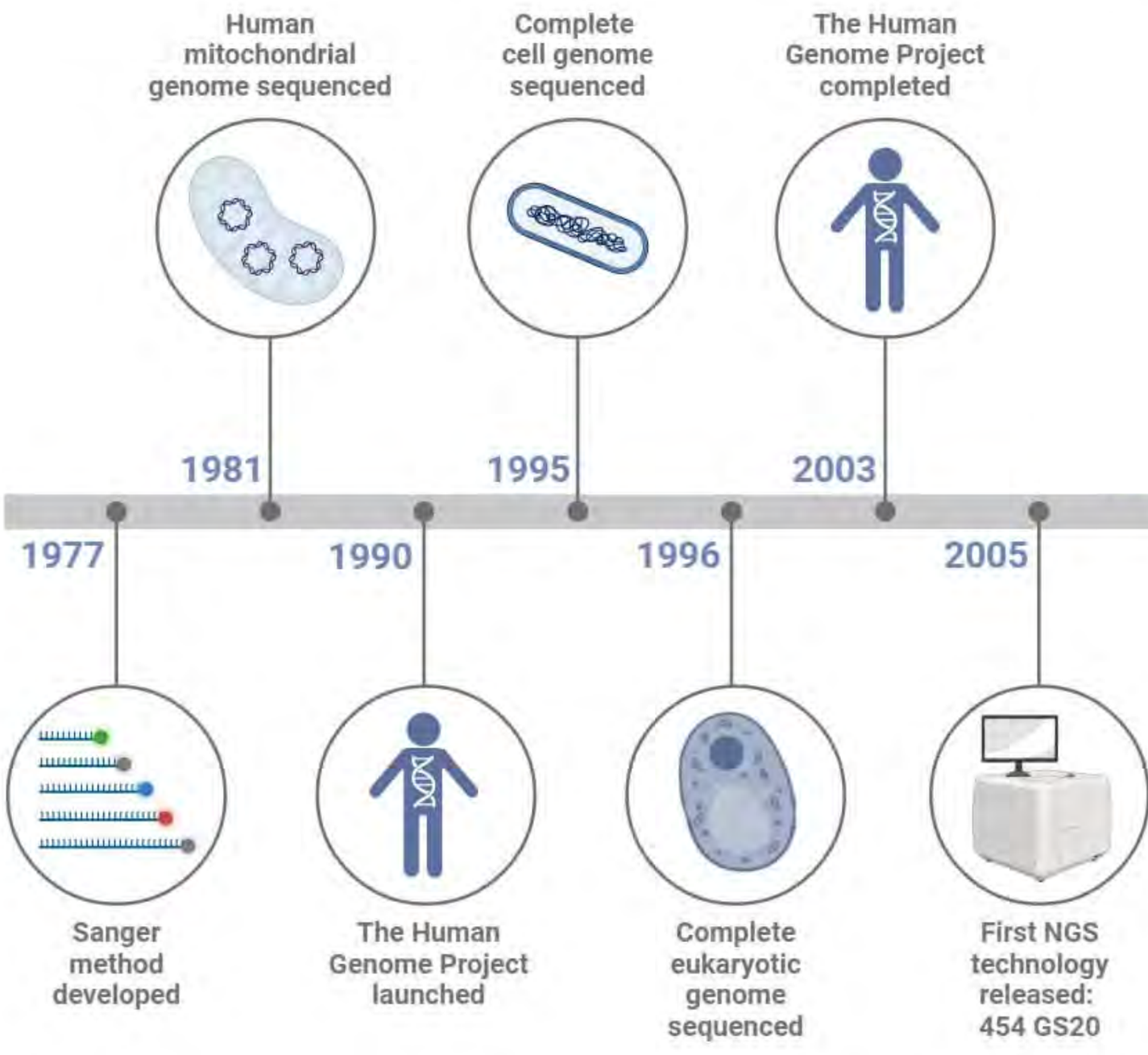


Цифровая ПЦР (dPCR): Принцип

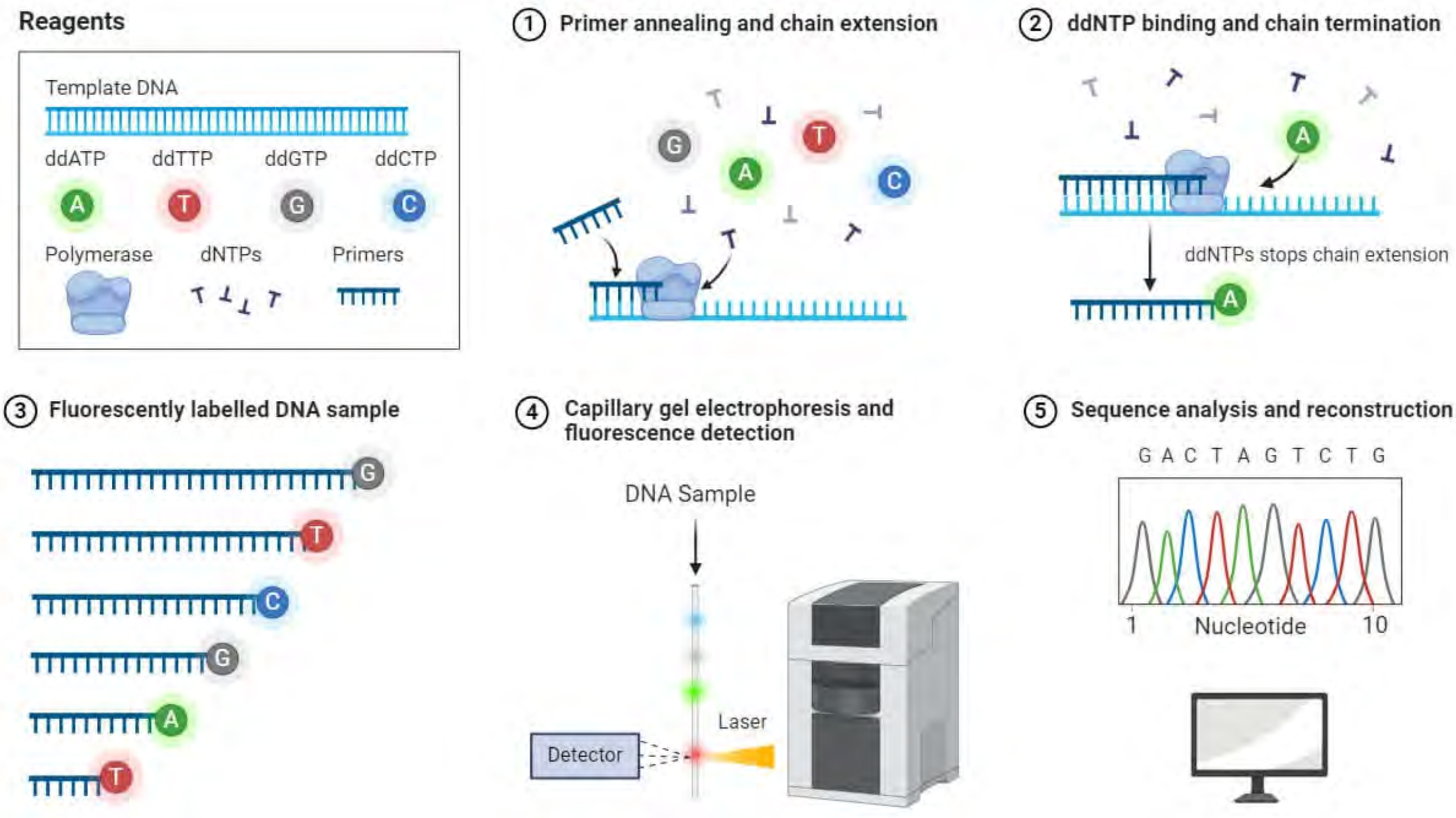


Секвенирование по Сэнгеру: История и значение

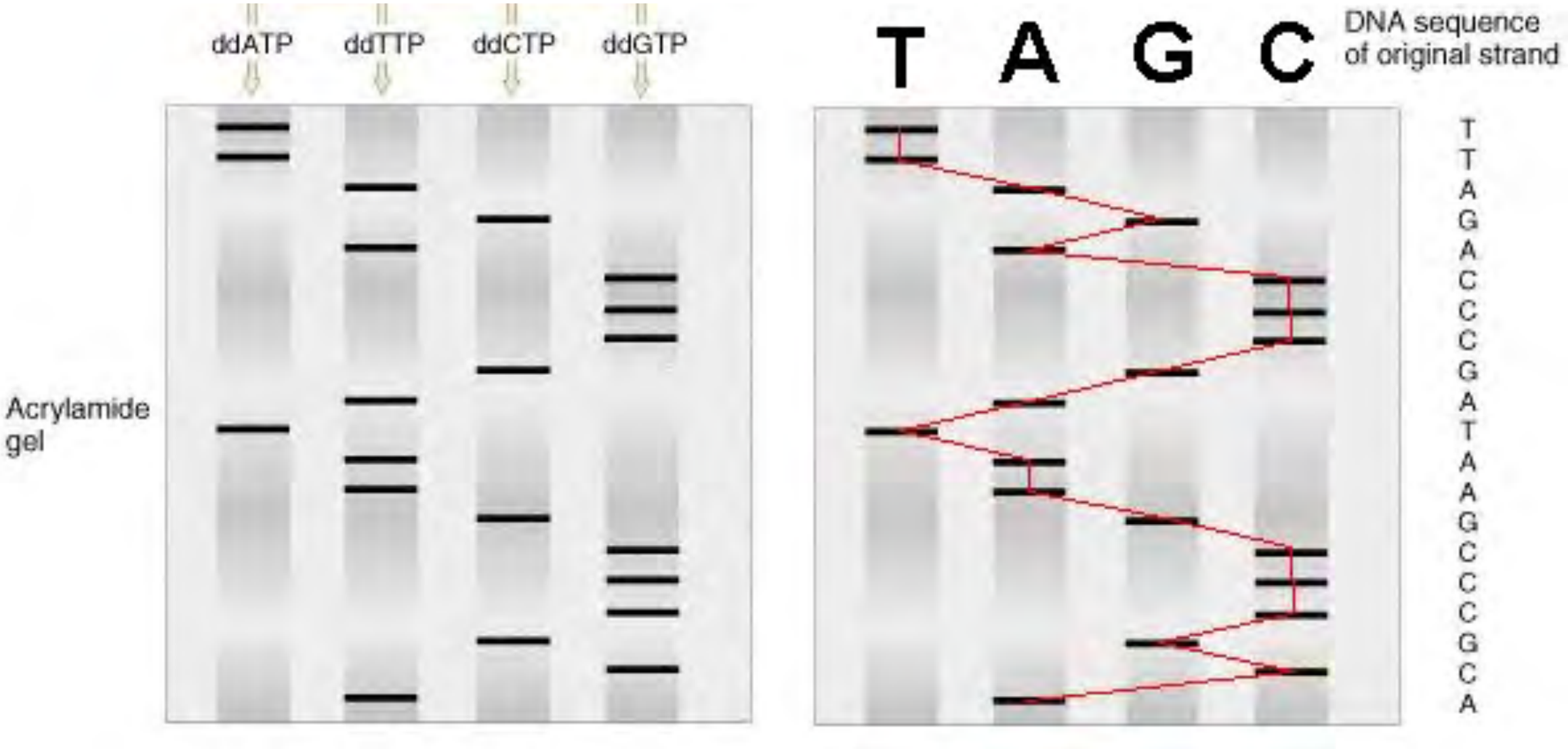




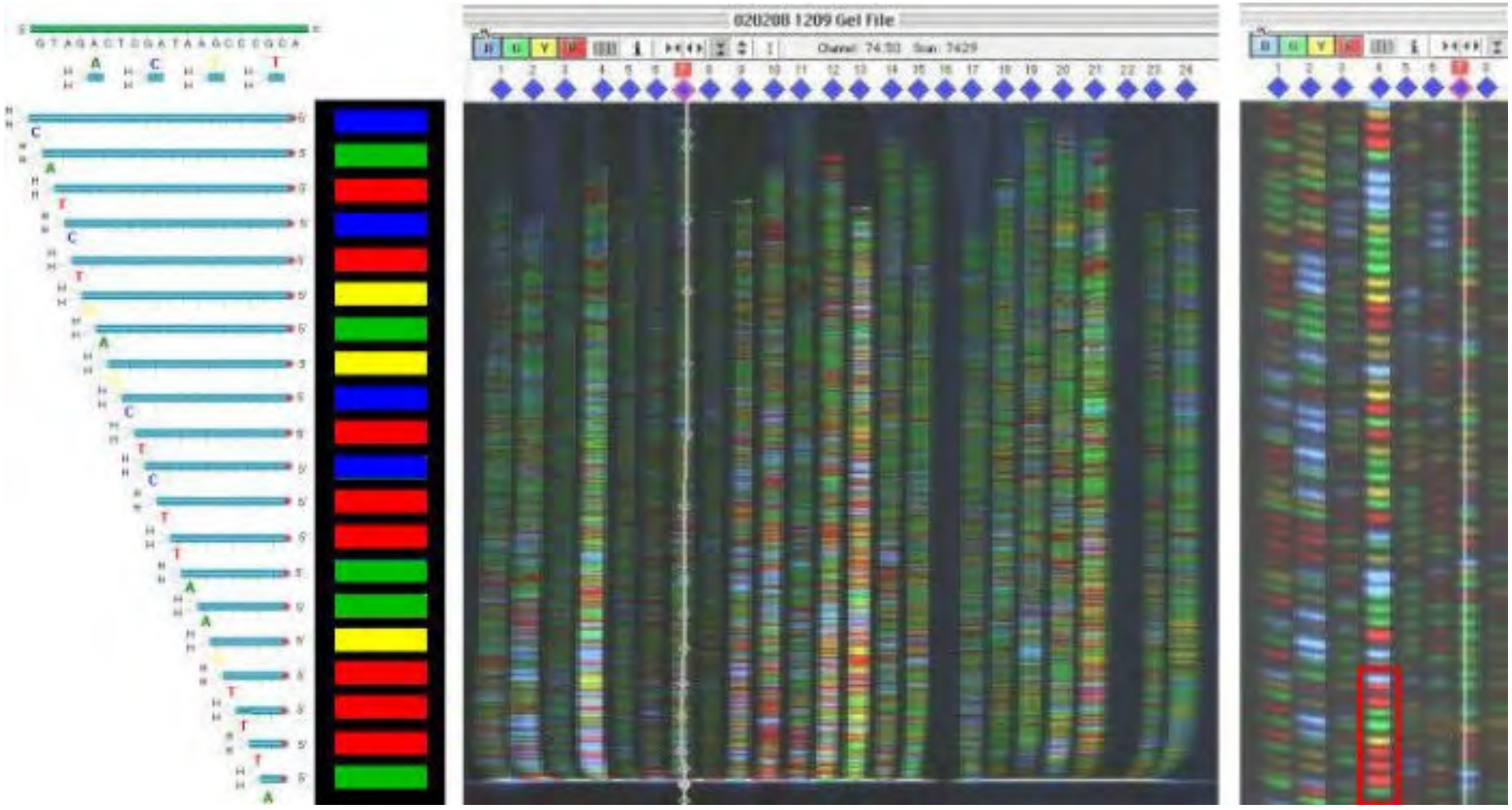
Секвенирование по Сэнгеру: Методика



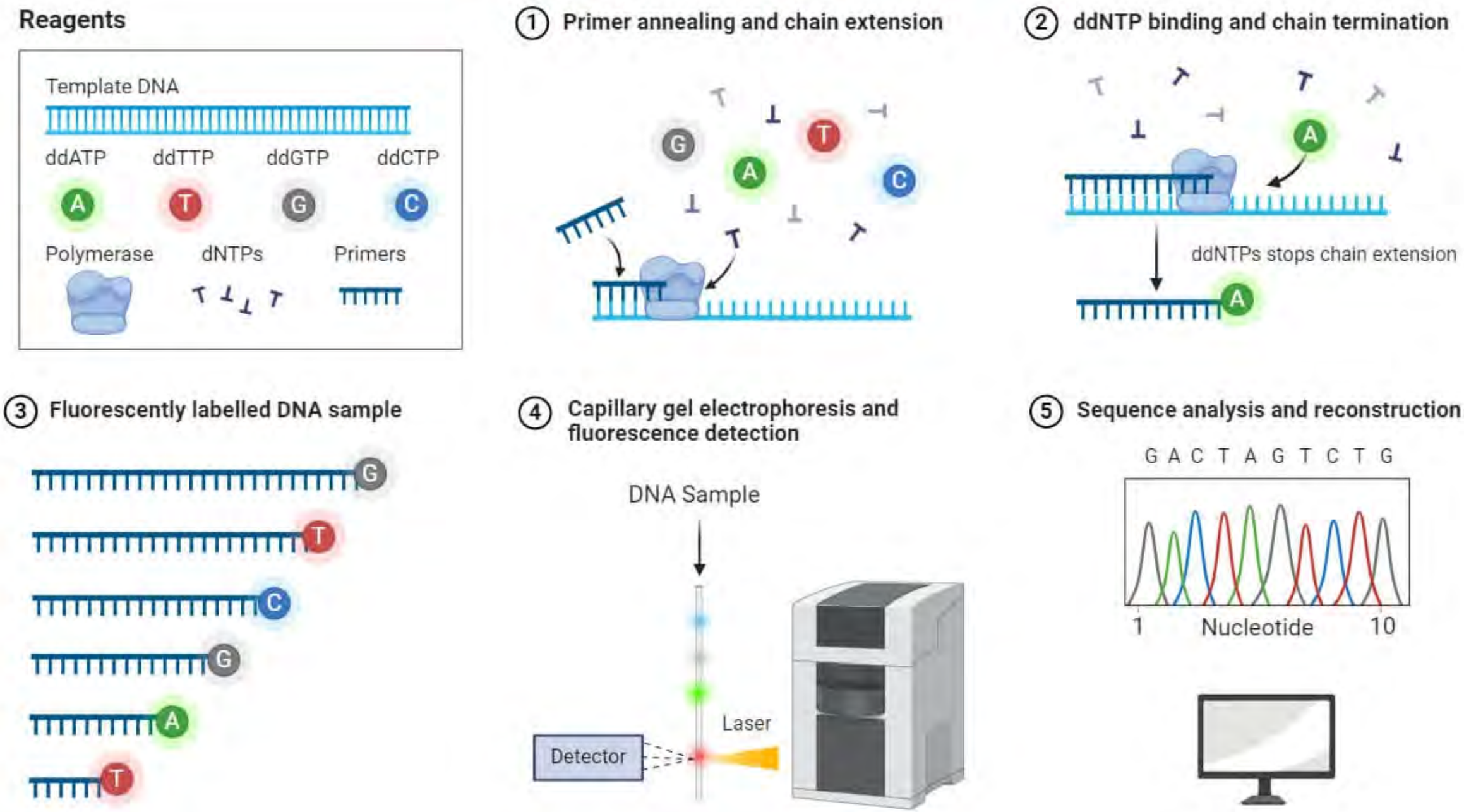
Секвенирование по Сэнгеру: Методика



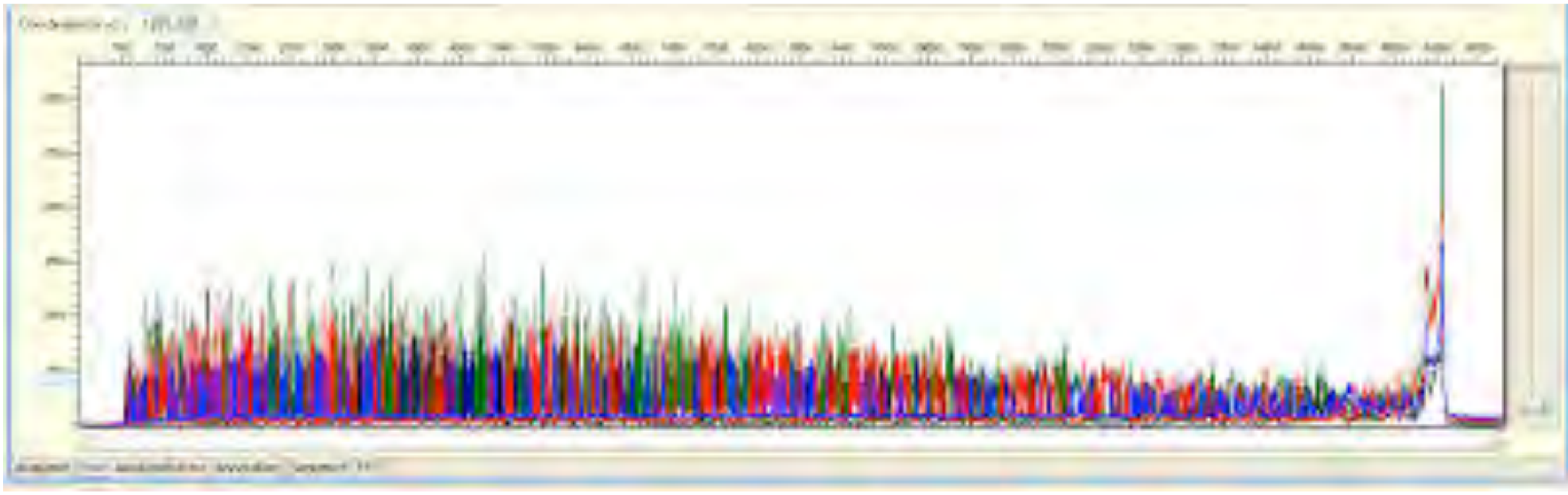
Автоматизация Сэнгер-секвенирования



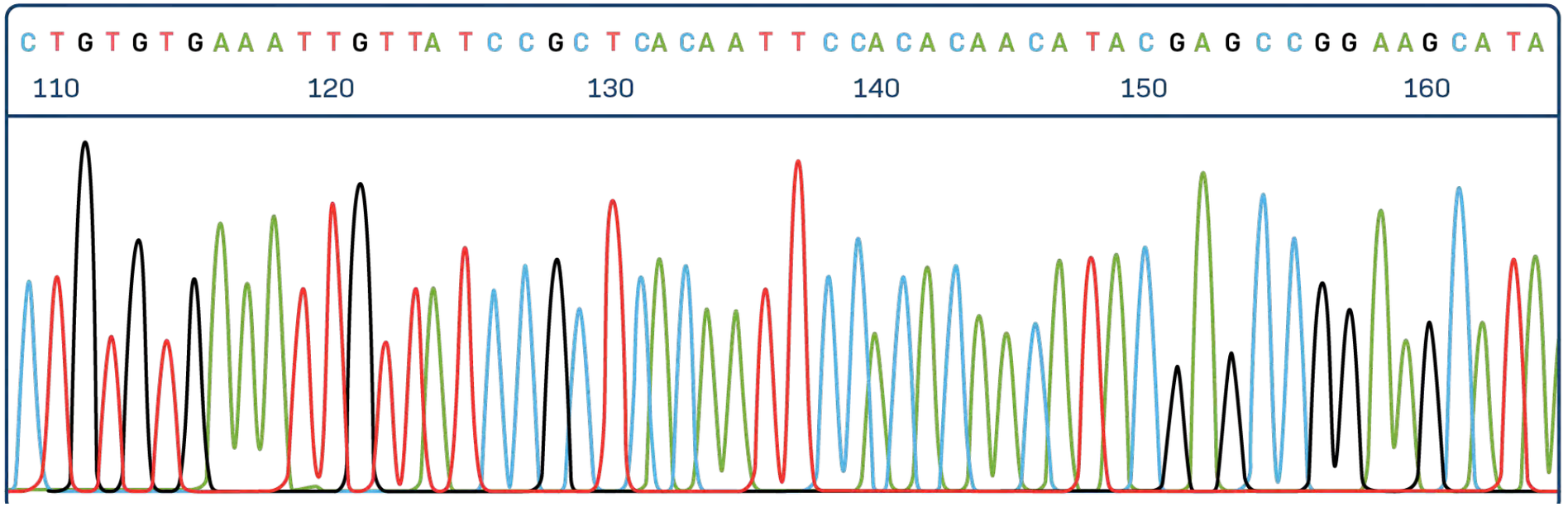
Автоматизация Сэнгер-секвенирования



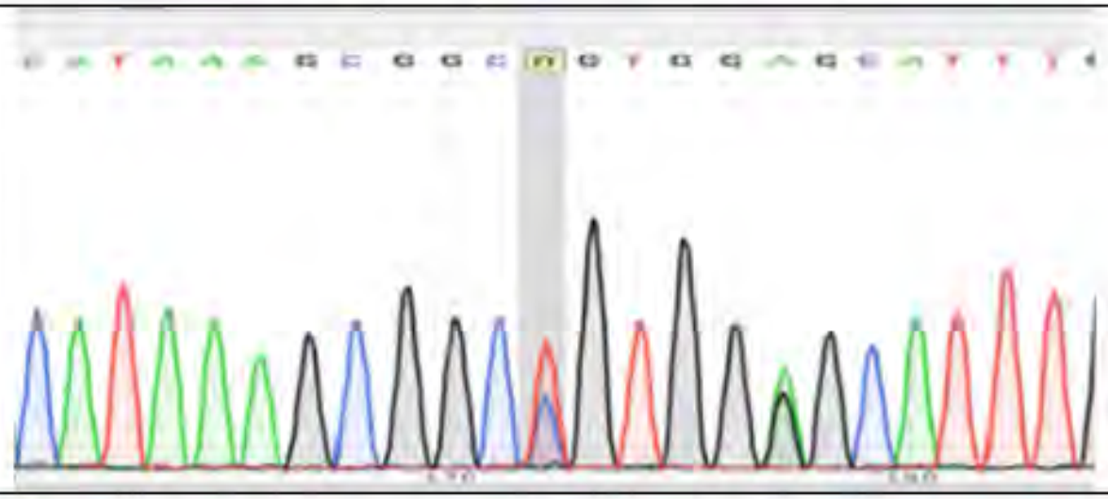
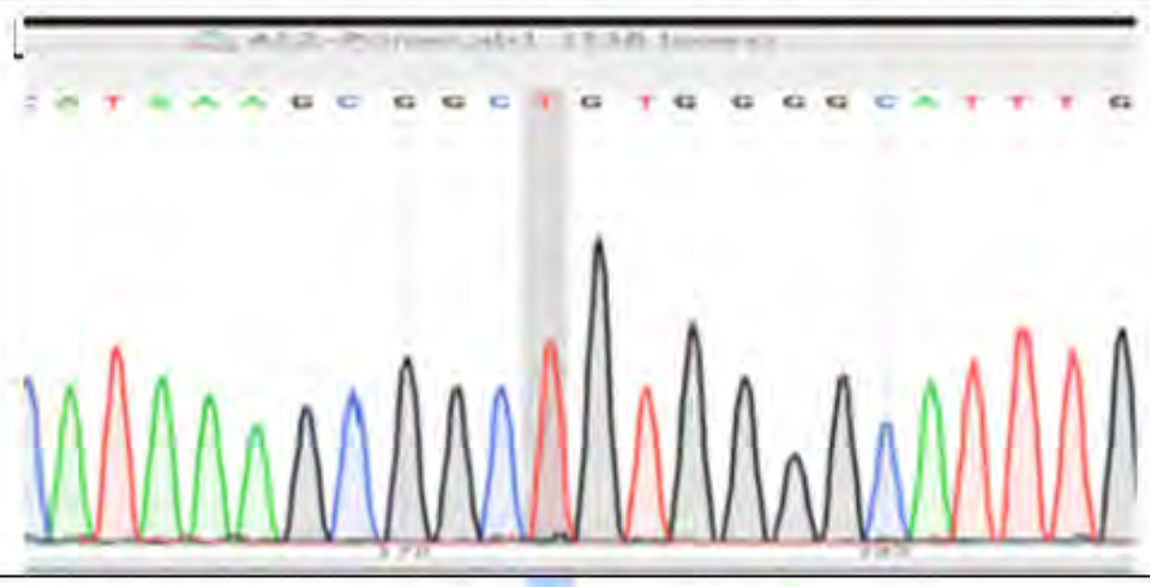
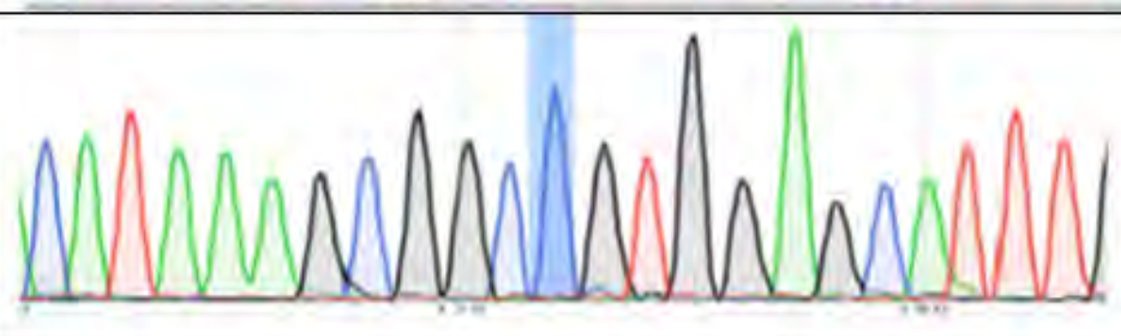
Сэнгер: Выходные данные



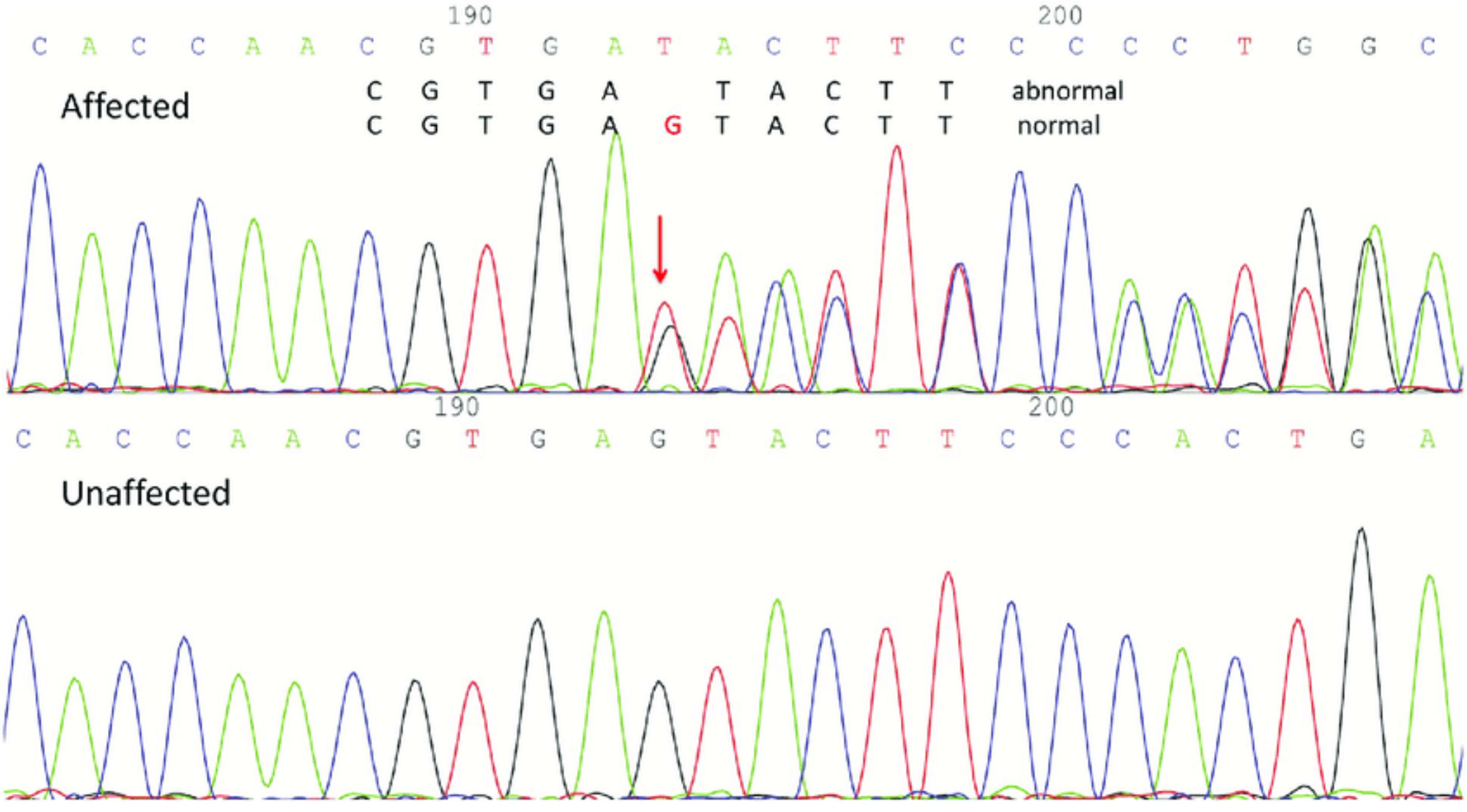
Сэнгер: Выходные данные



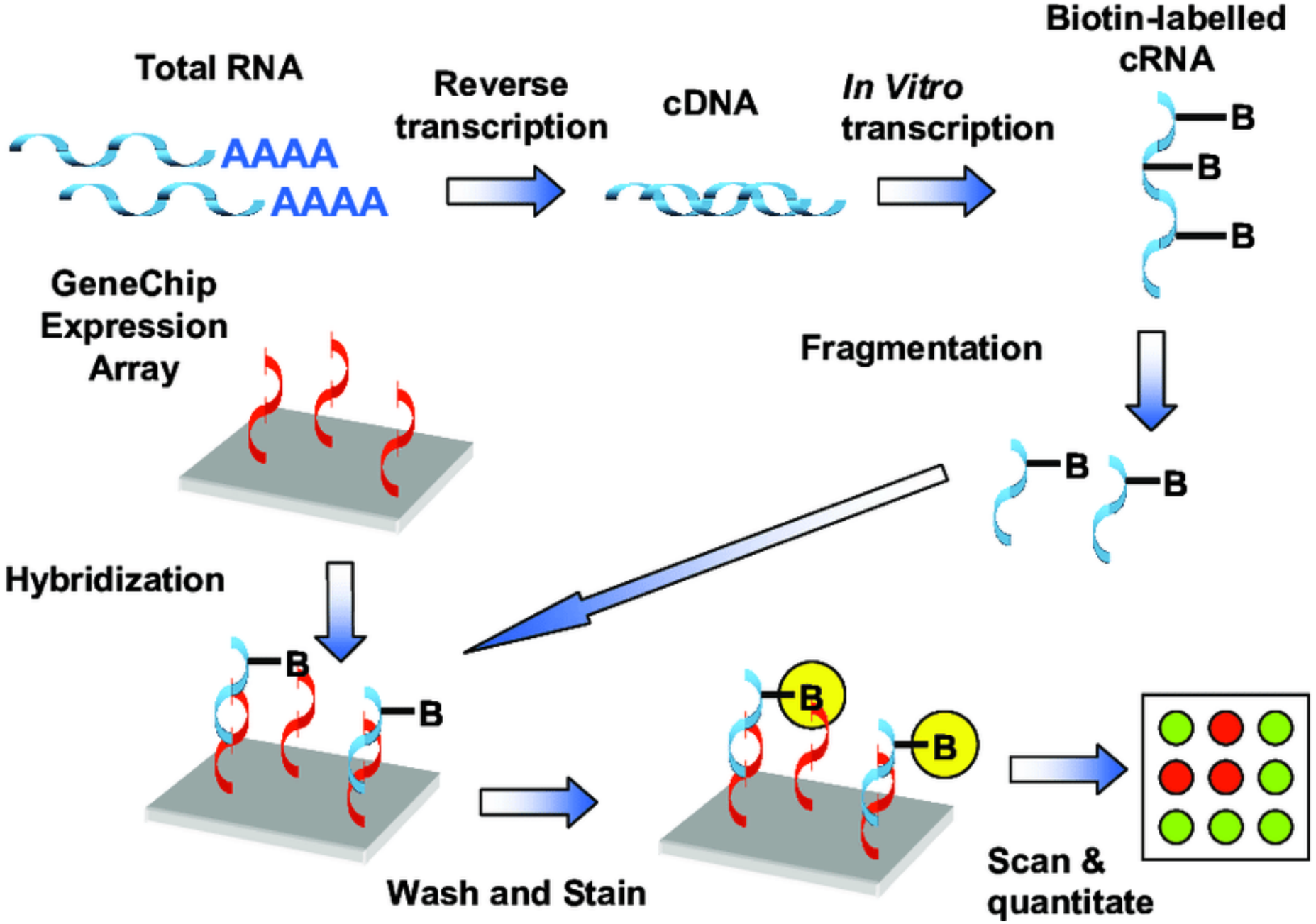
Сэнгер: Выходные данные

A	
B	
C	

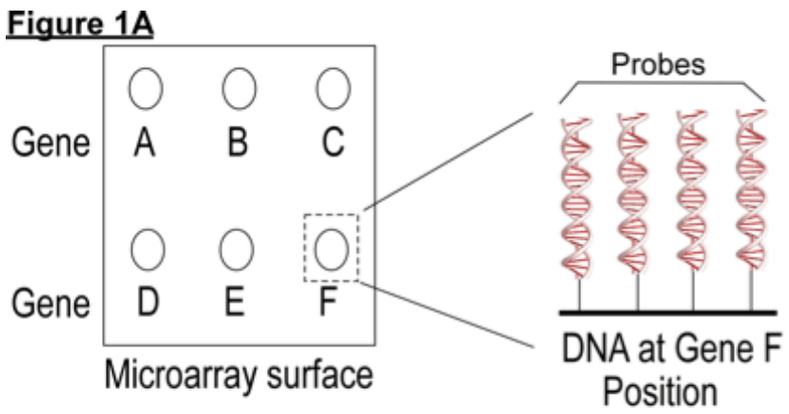
Сэнгер: Выходные данные

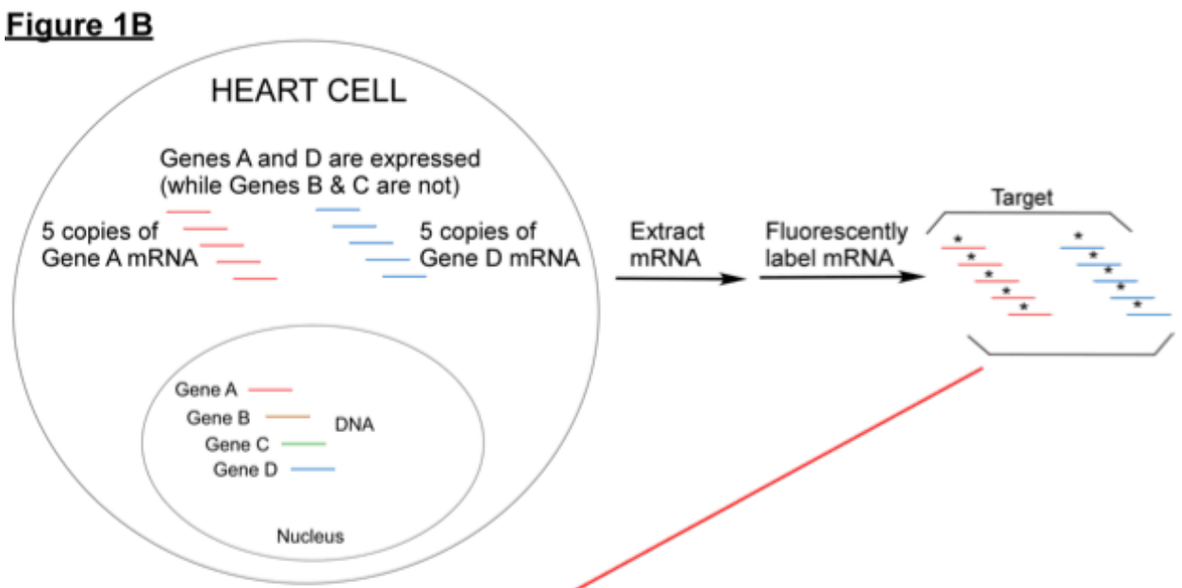


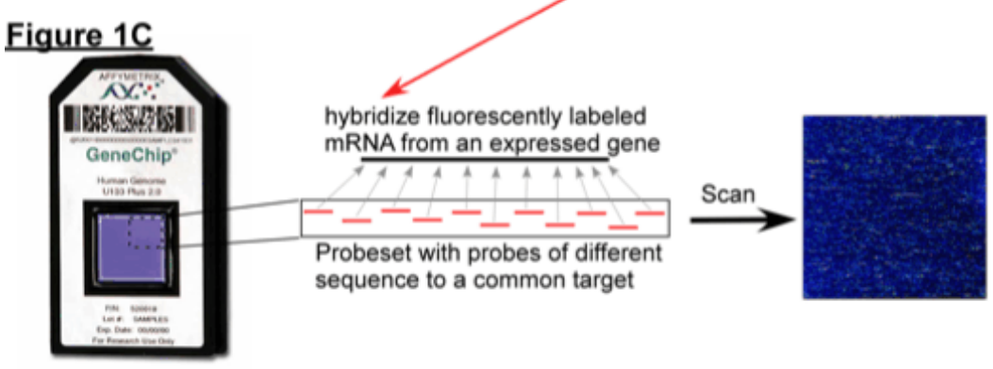
Микрочипы: Введение



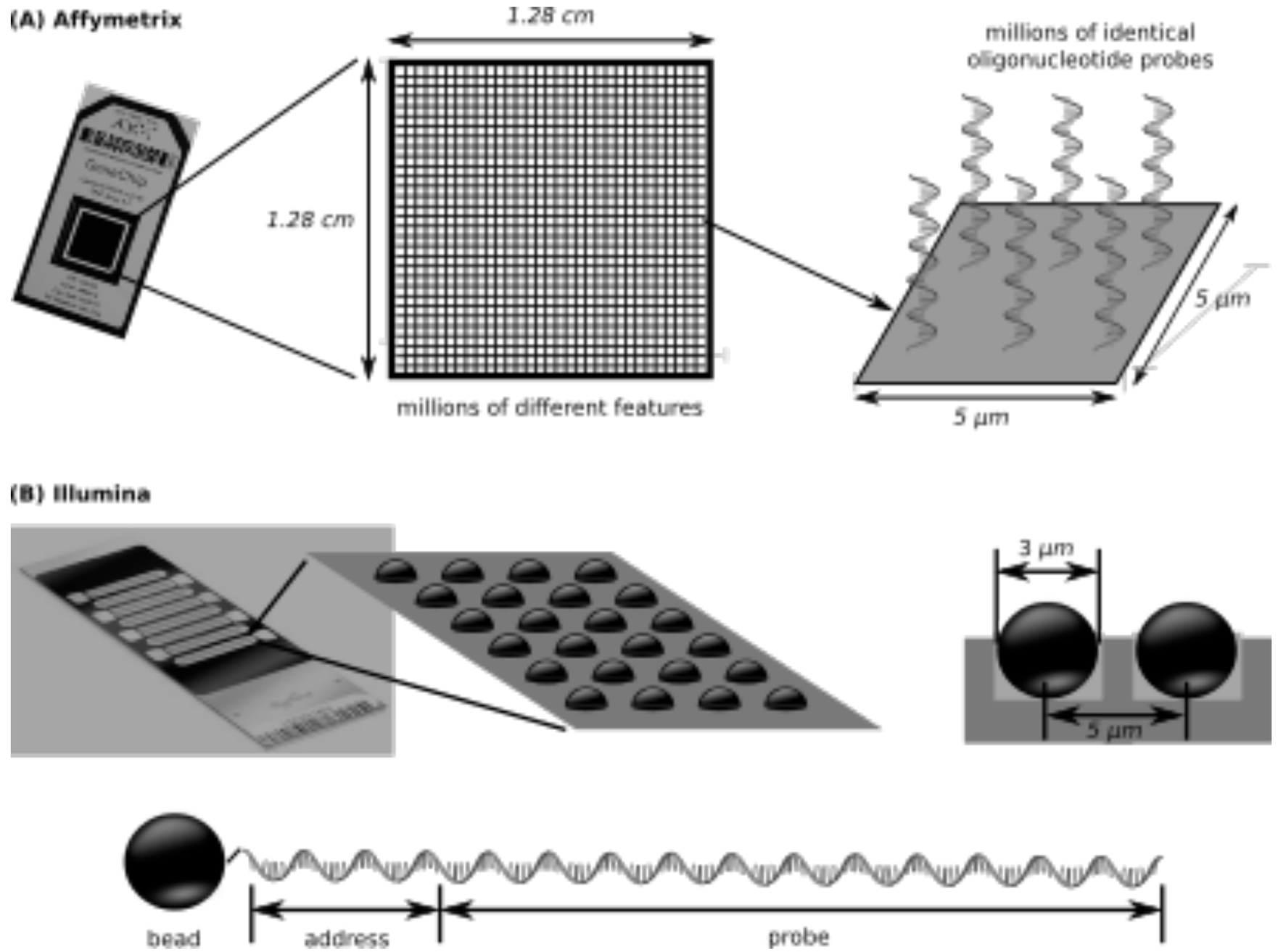
Микрочипы Affymetrix: Особенности технологии



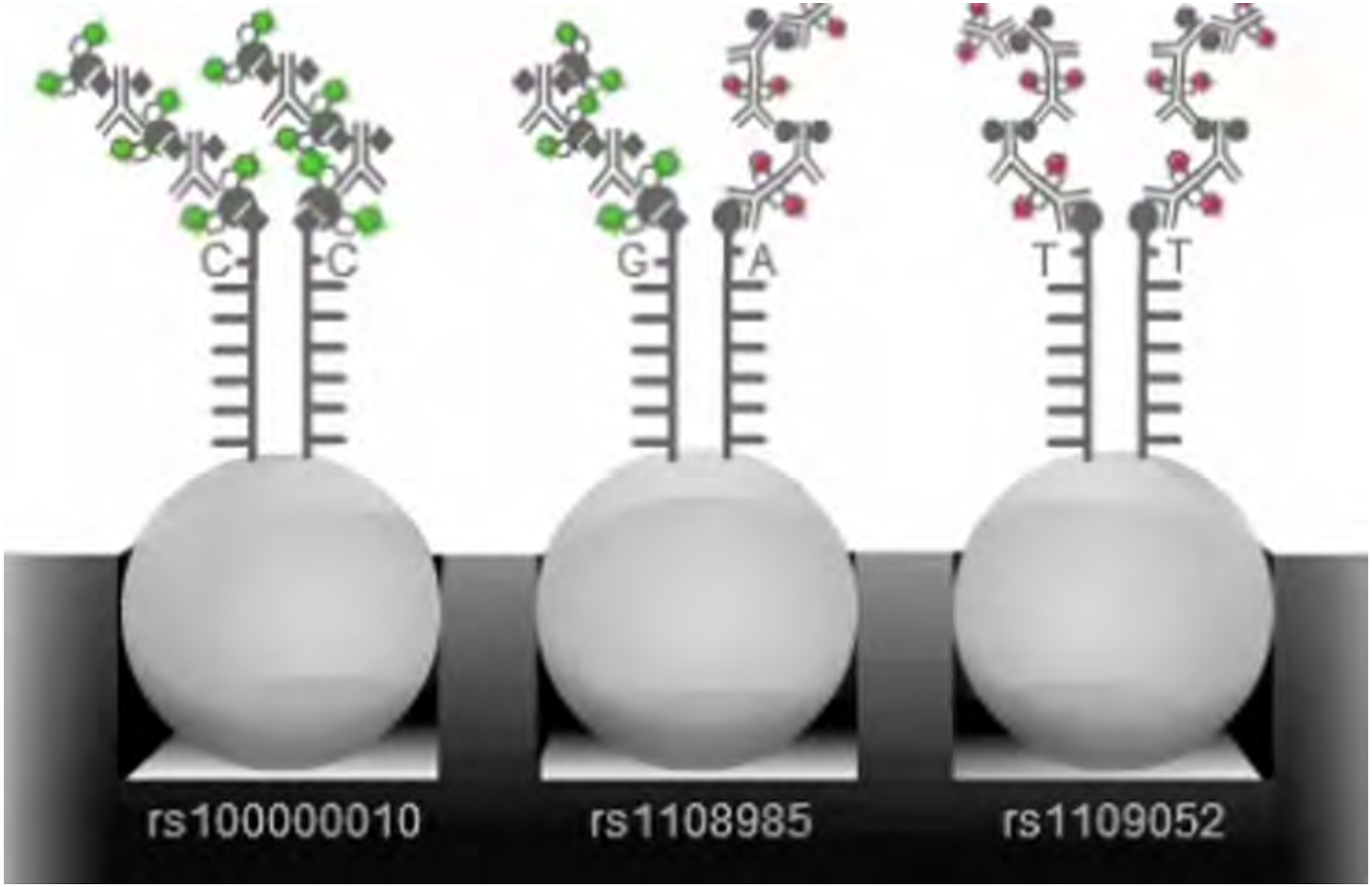




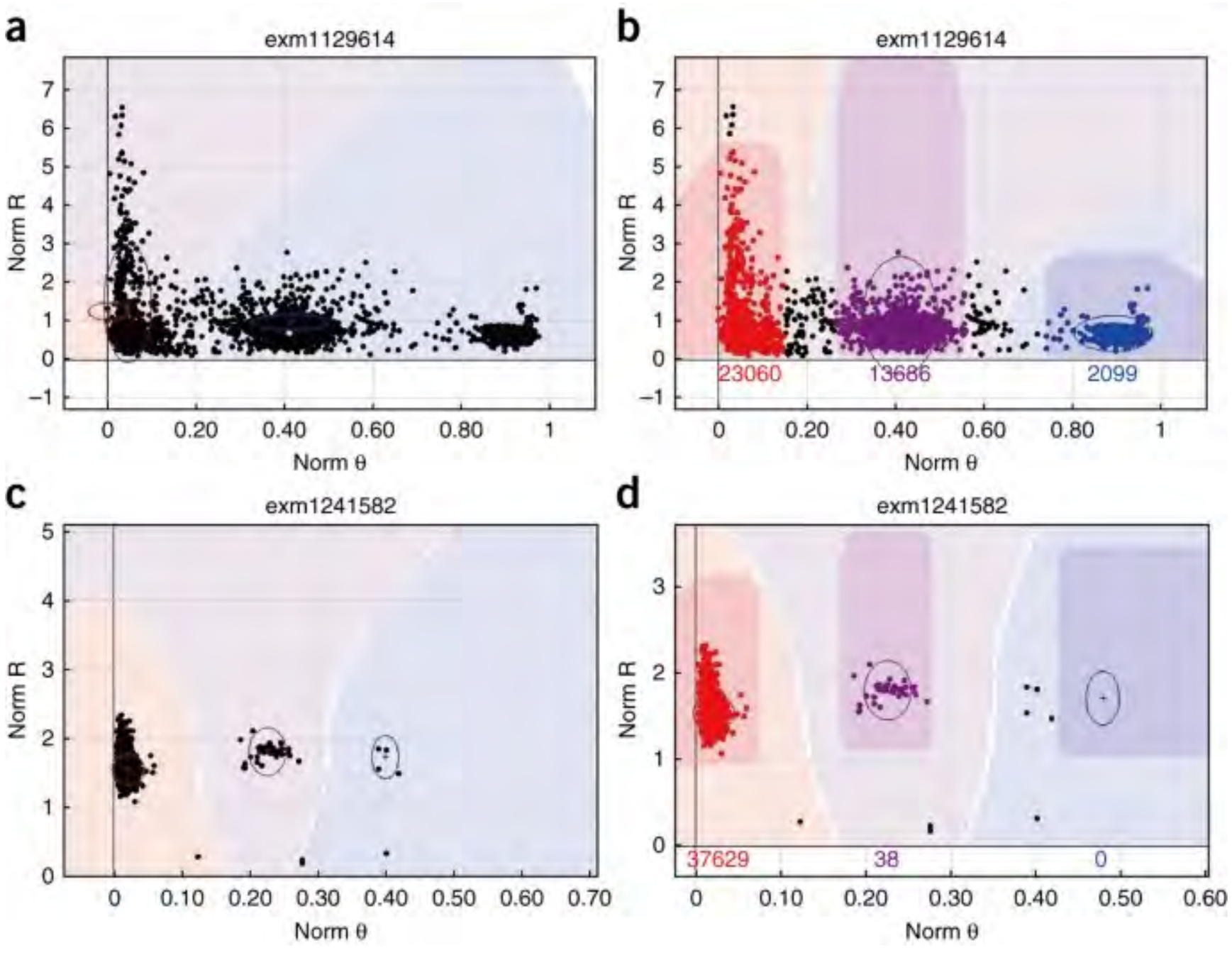
Микрочипы Illumina: Технология



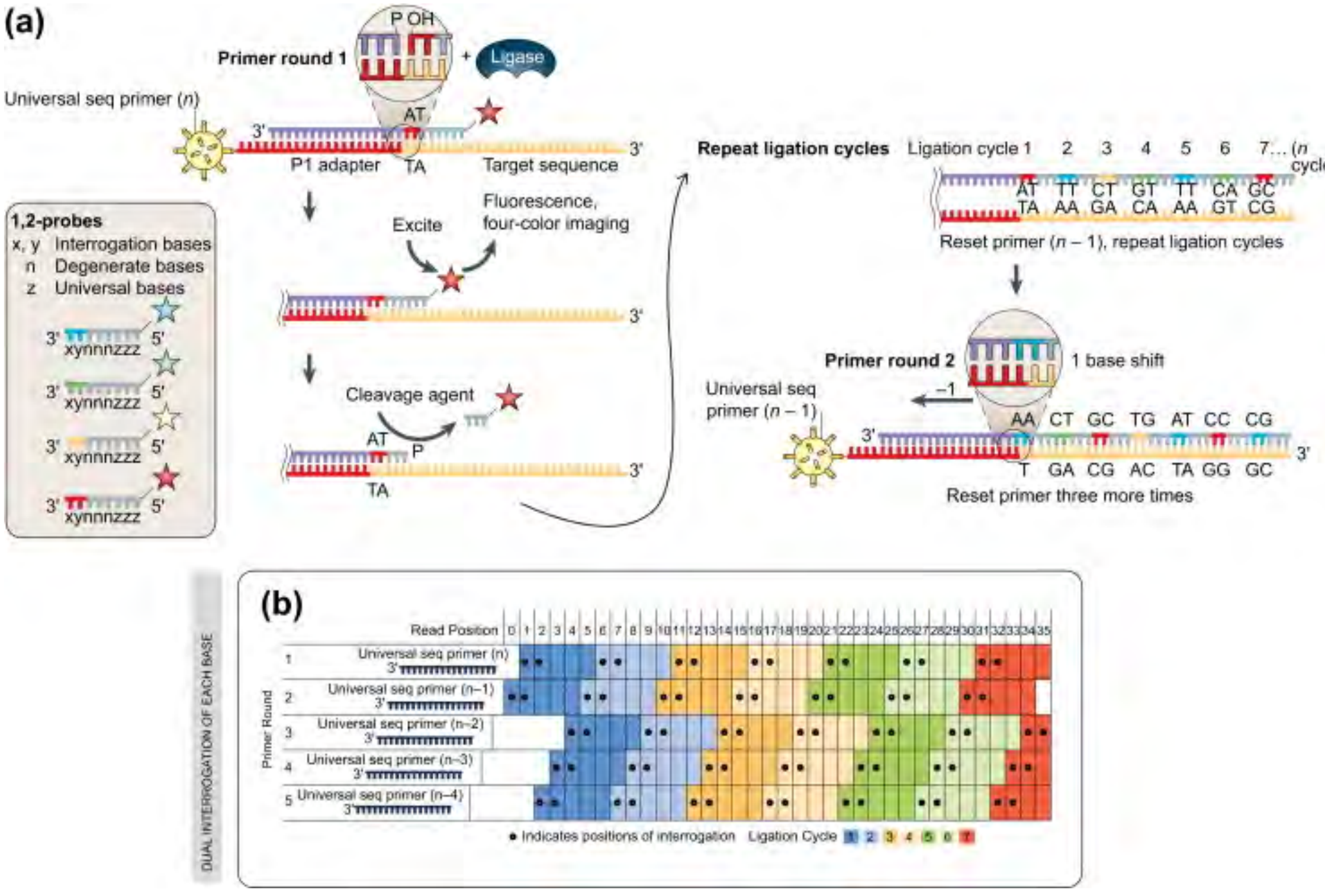
Микрочипы Illumina: Технология



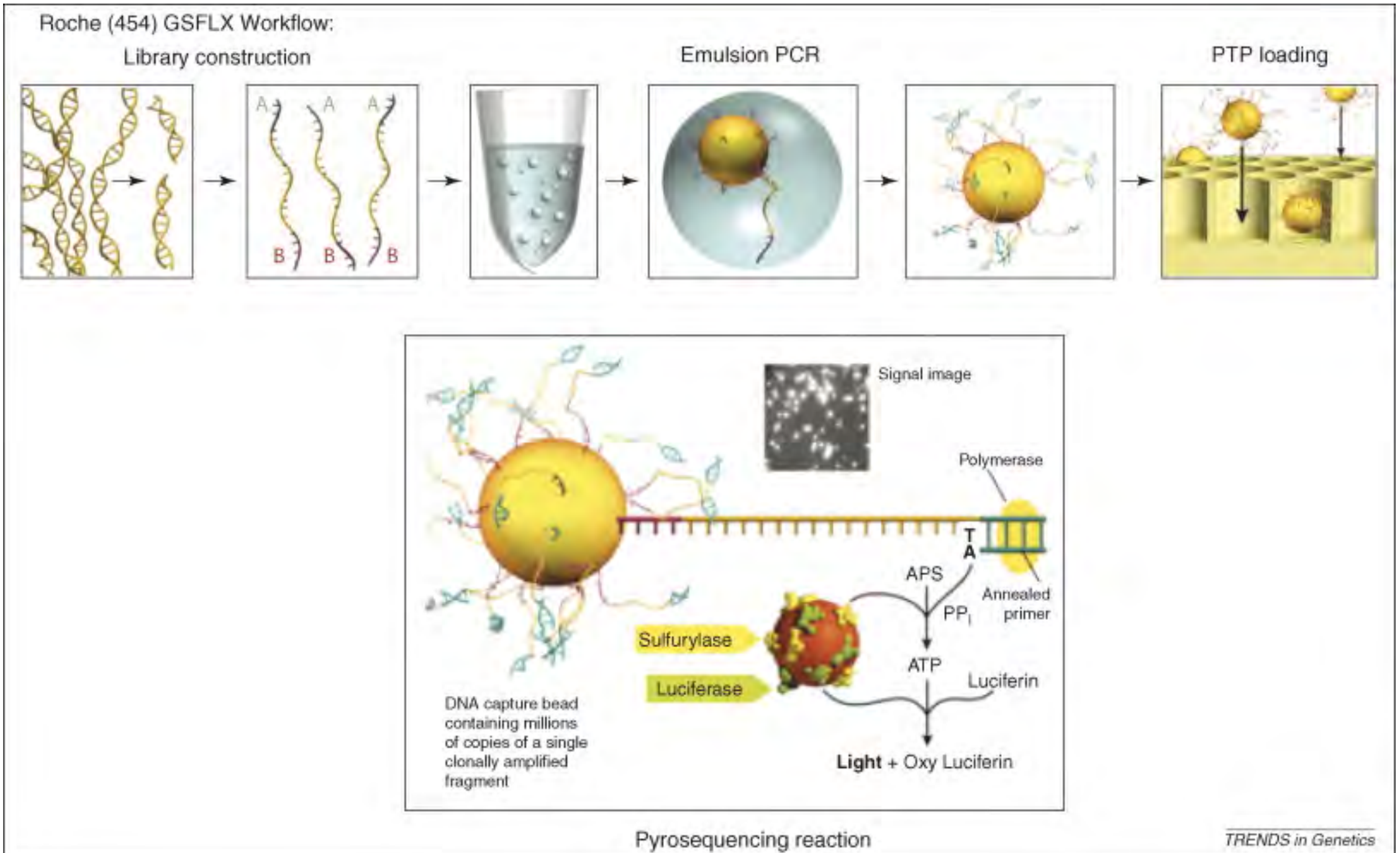
Микрочипы Illumina: обработка данных



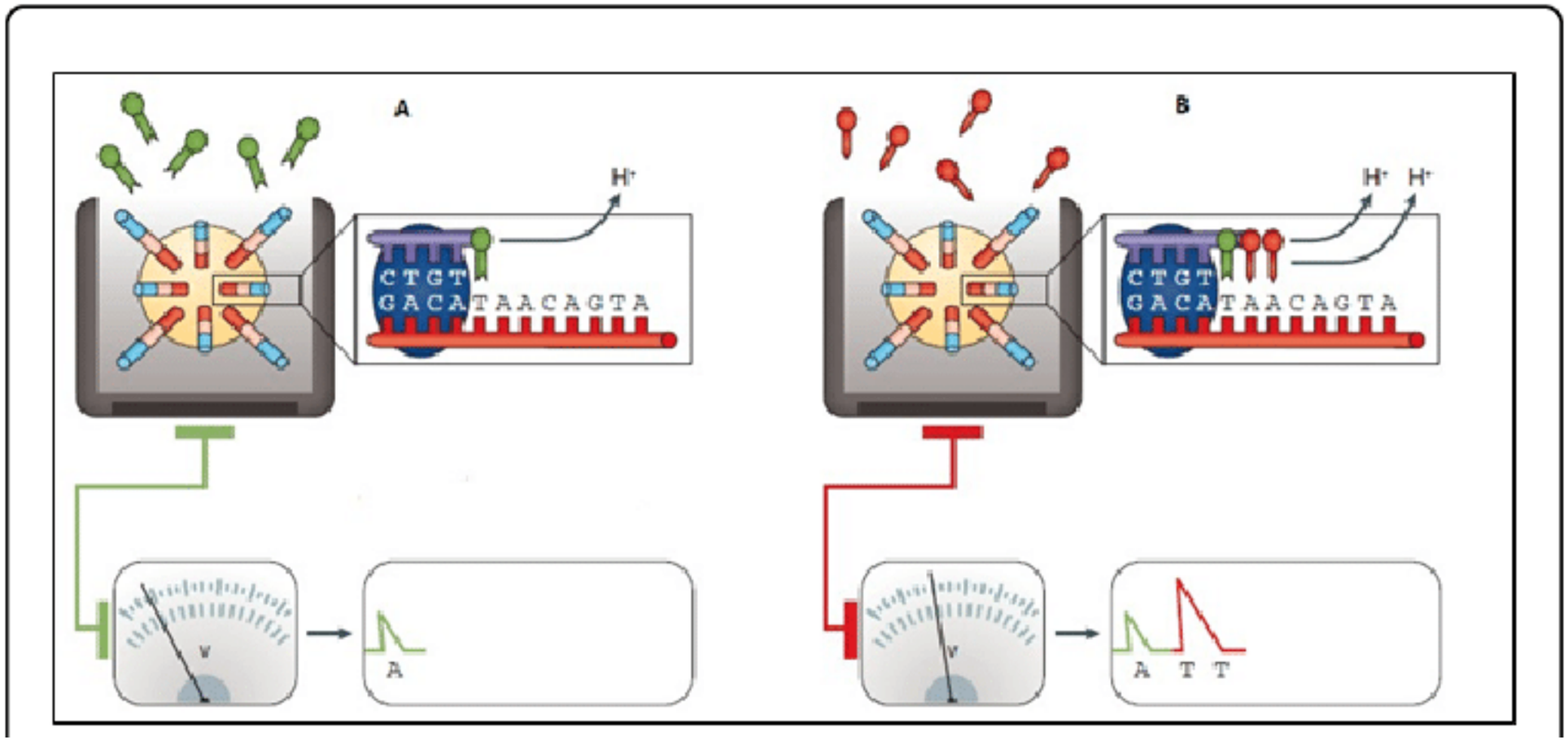
Исторические NGS методы: SOLiD



Исторические NGS методы: 454 Pyrosequencing

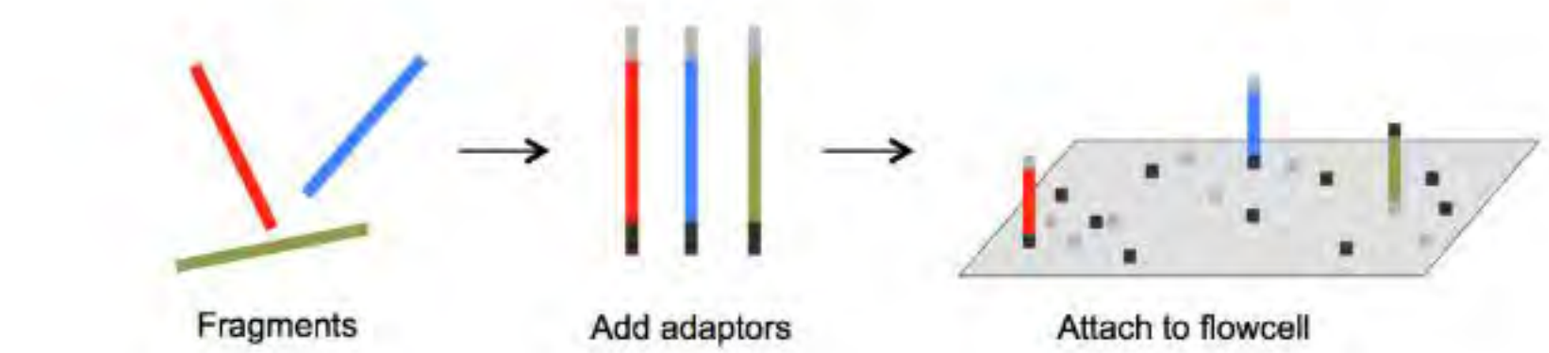


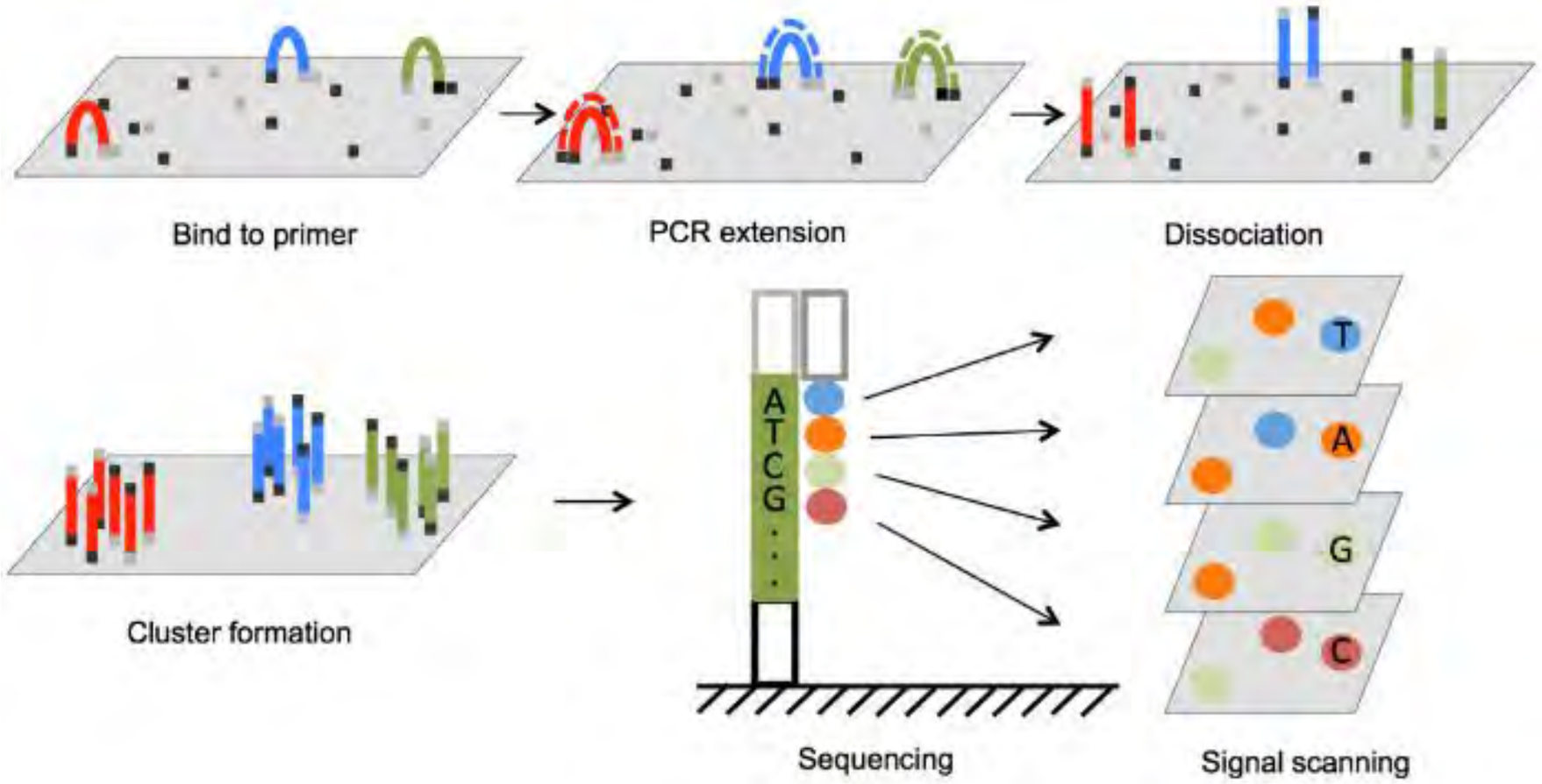
Ion Torrent: Принцип действия



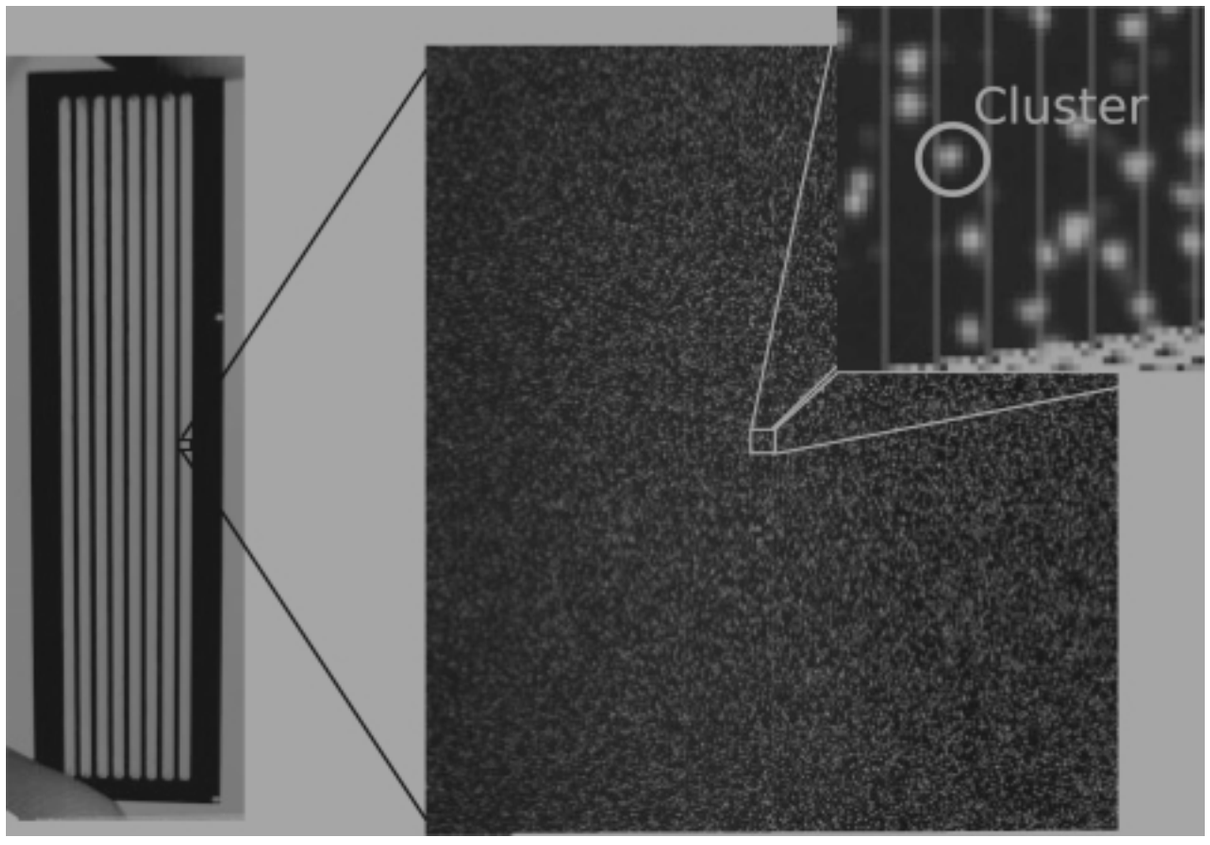
Ion Torrent: Выходные данные

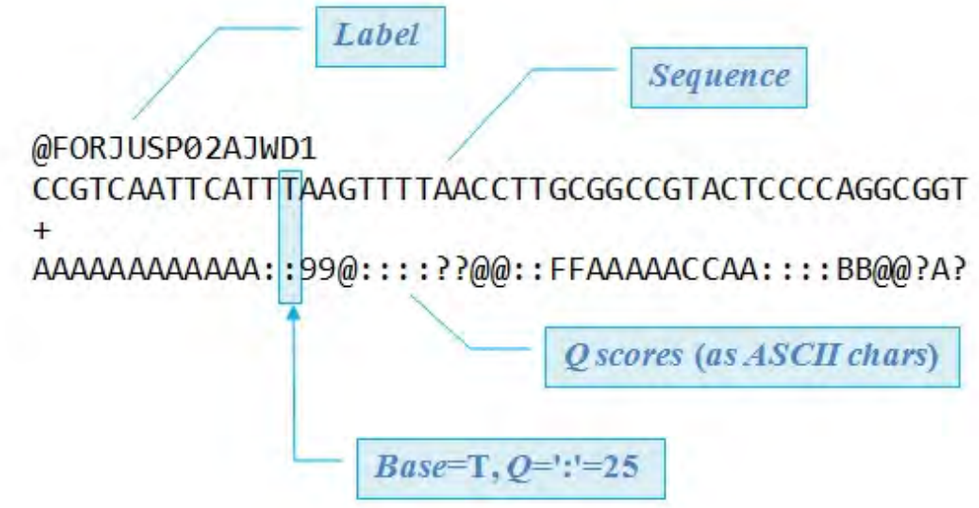
Illumina: Технология секвенирования



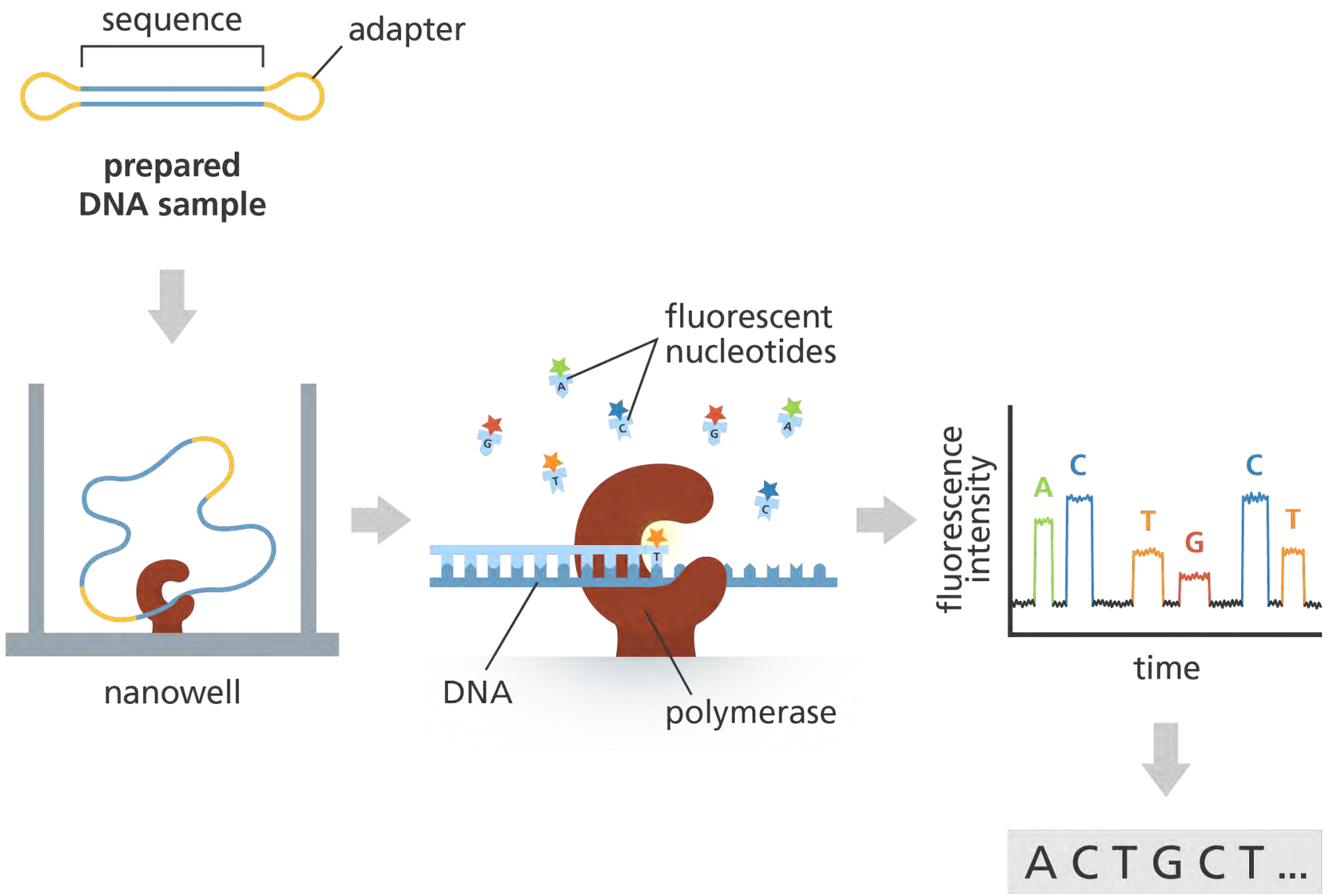


Illumina: Выходные данные

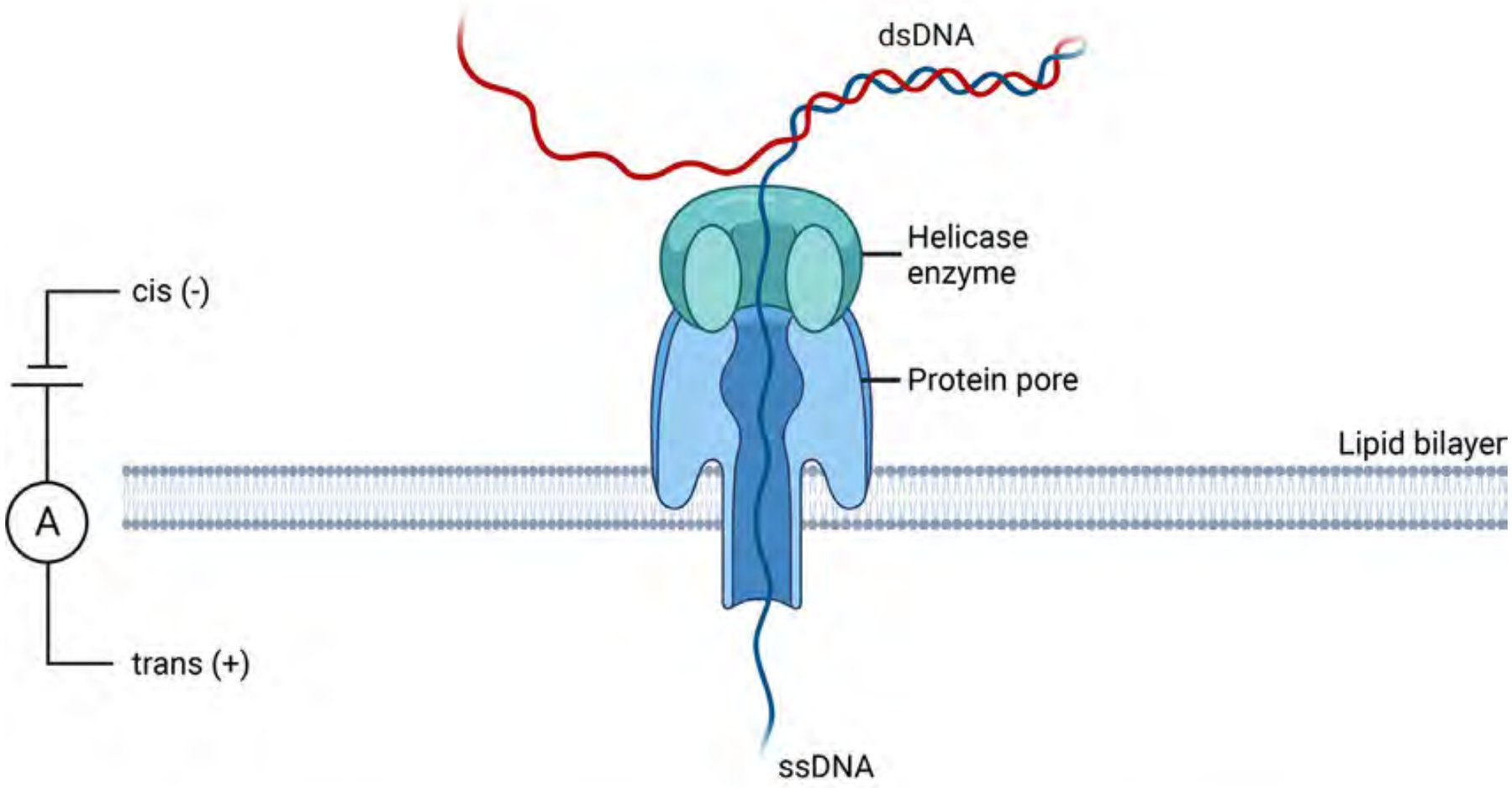


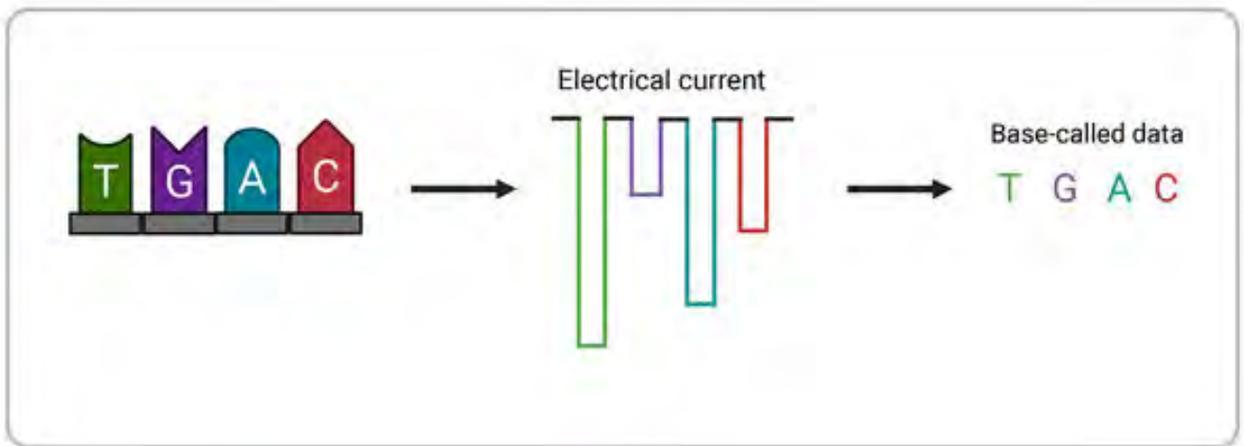


Pacific Biosciences (PacBio): SMRT секвенирование

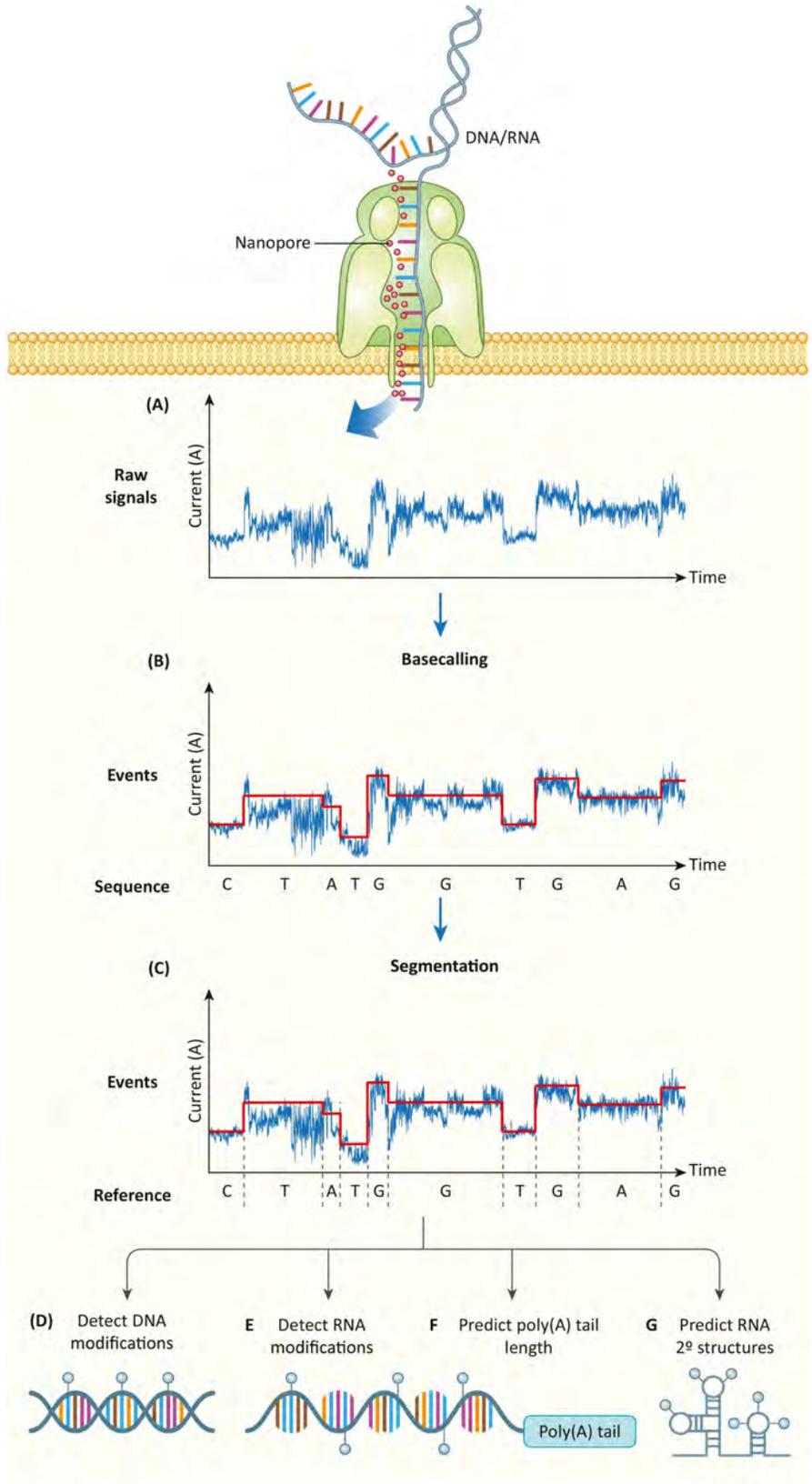


Oxford Nanopore Technologies: Нанопоровое секвенирование

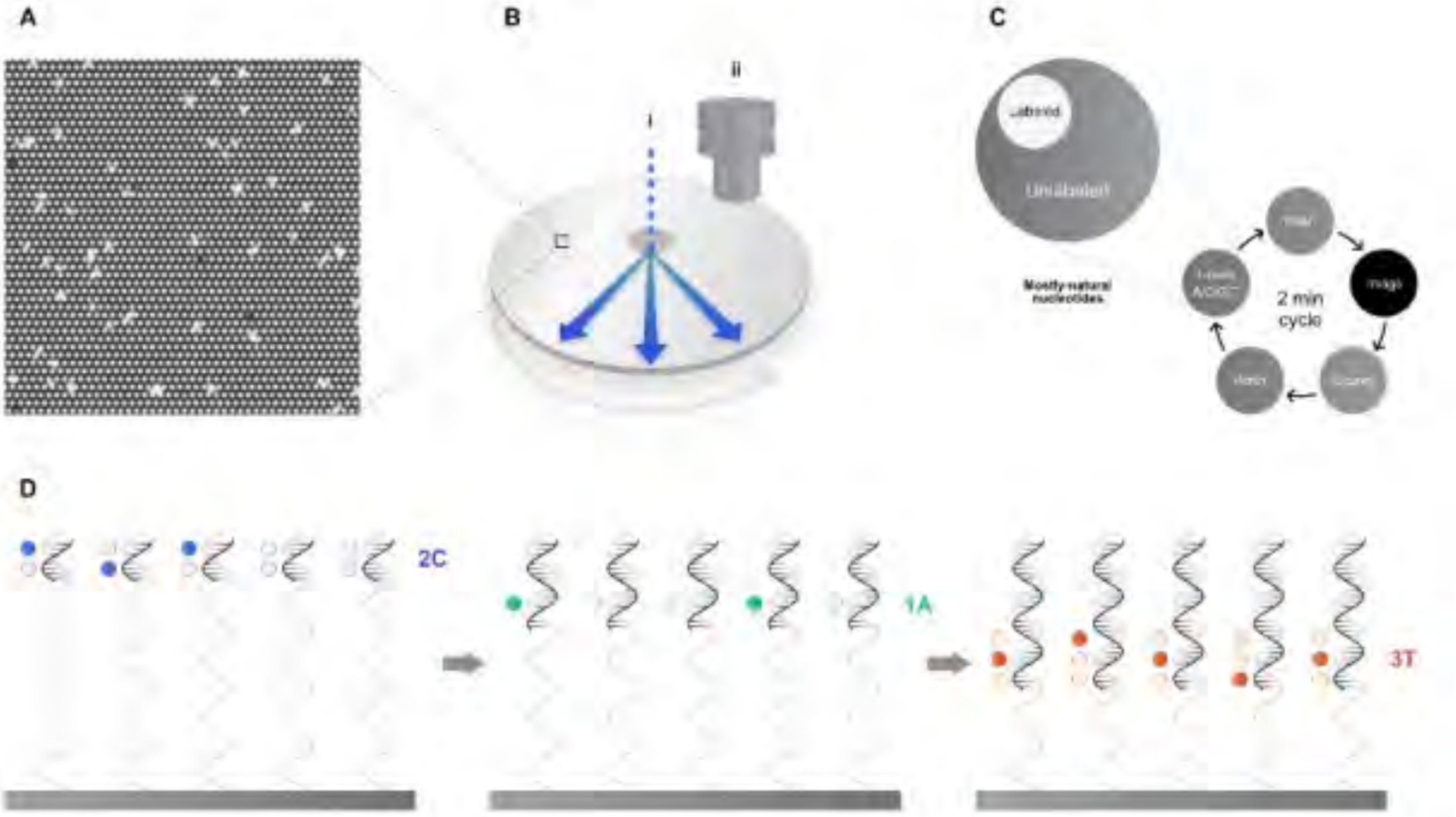




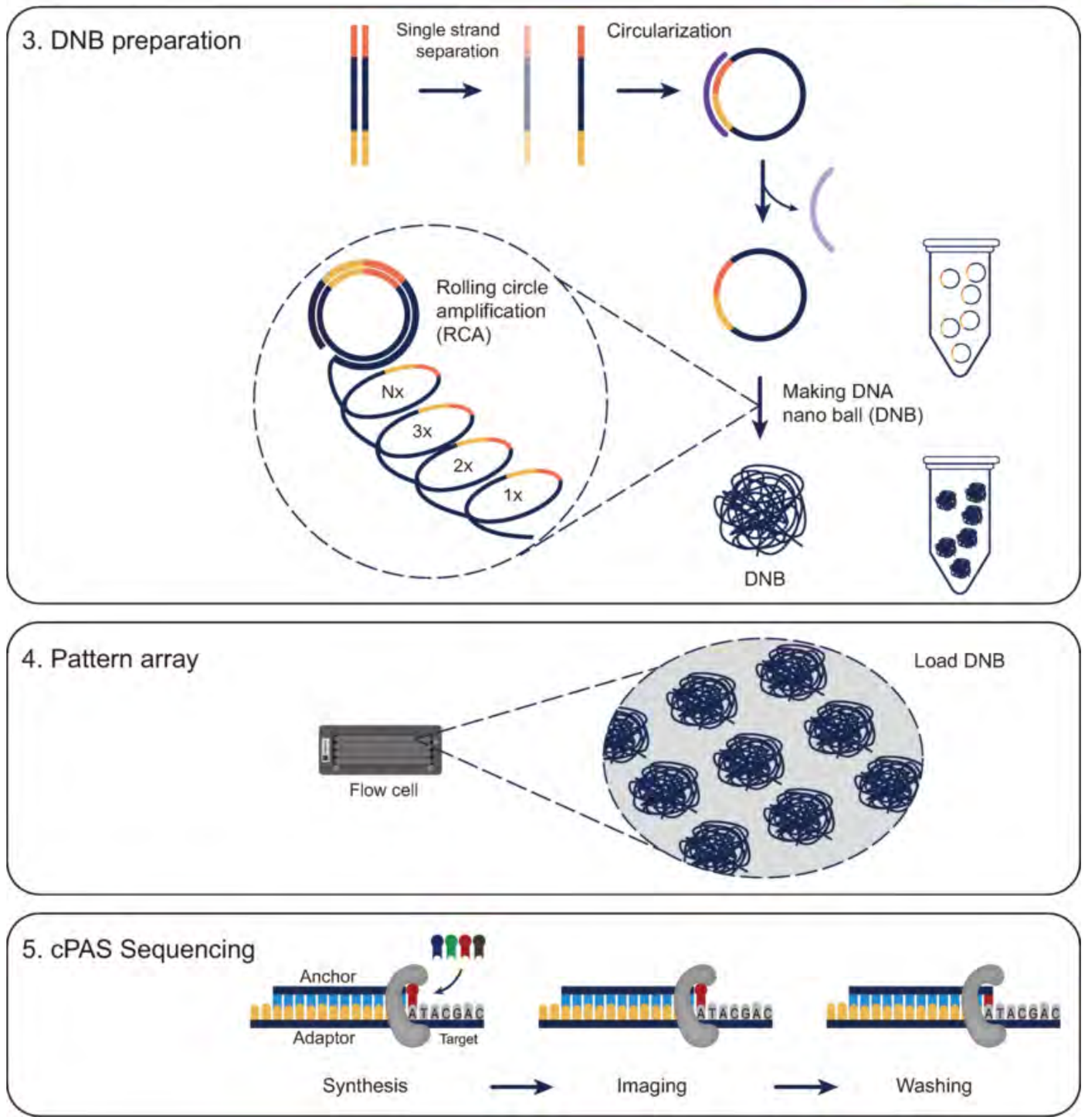
Анализ модификаций с Nanopore



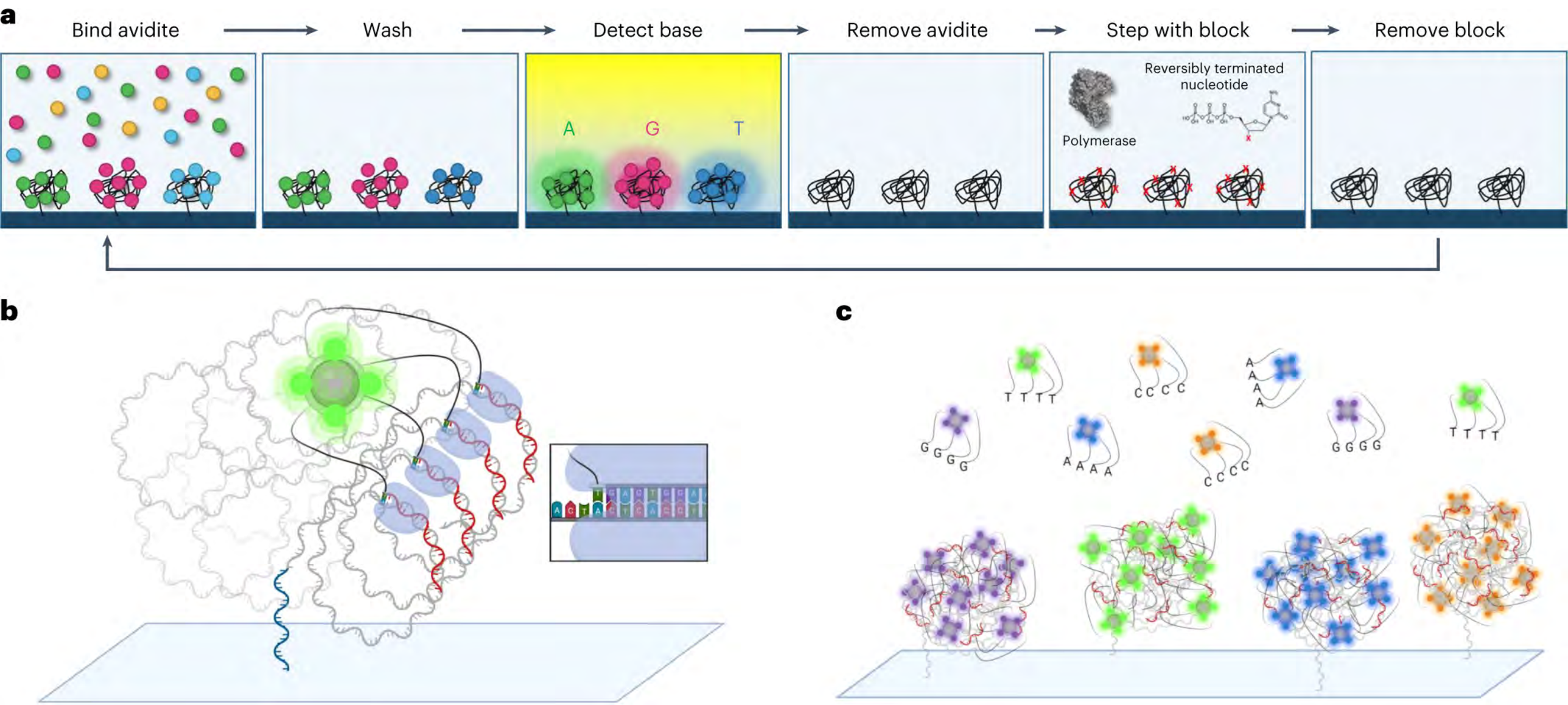
Новые подходы: Ultima Genomics



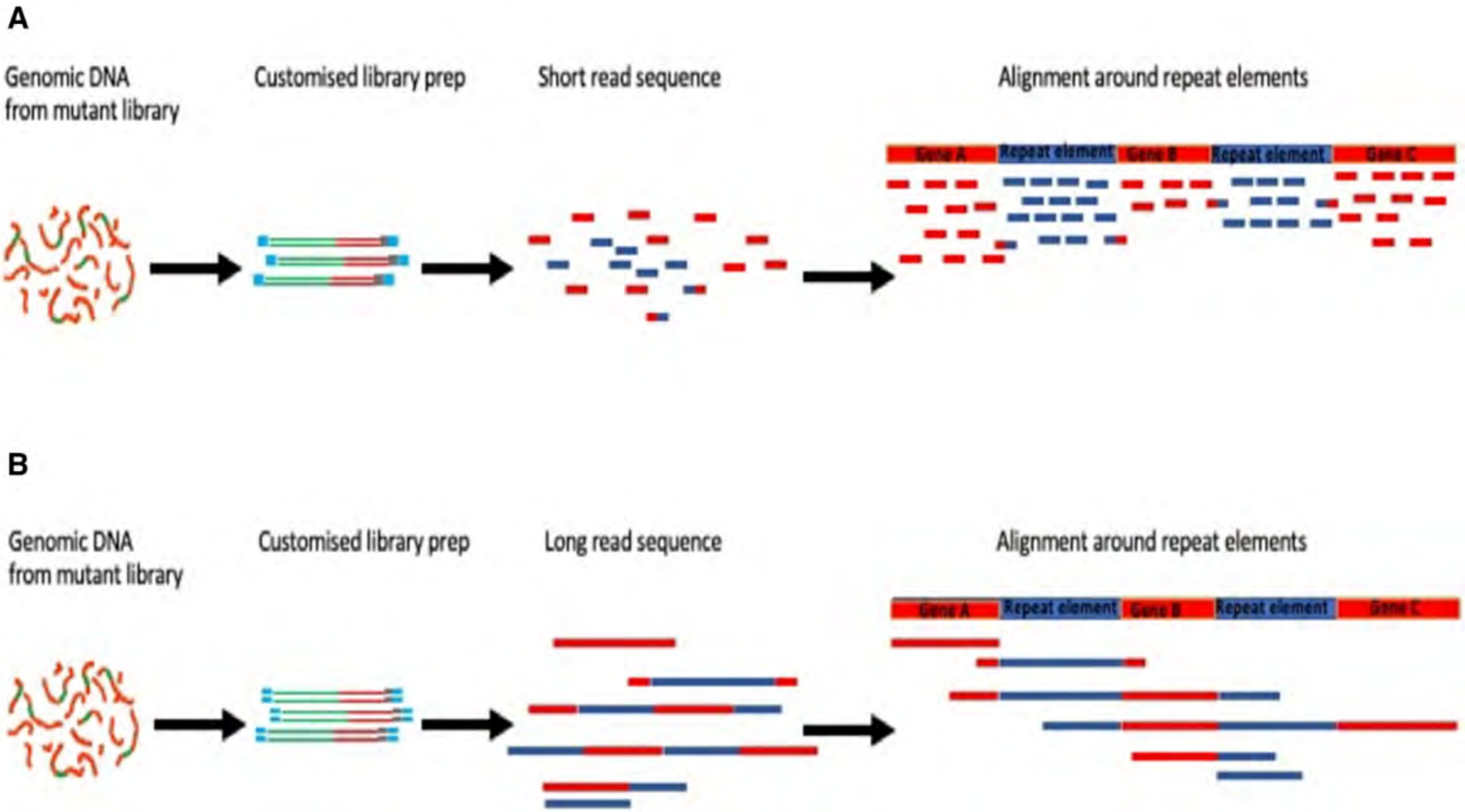
Новые подходы: MGI Tech



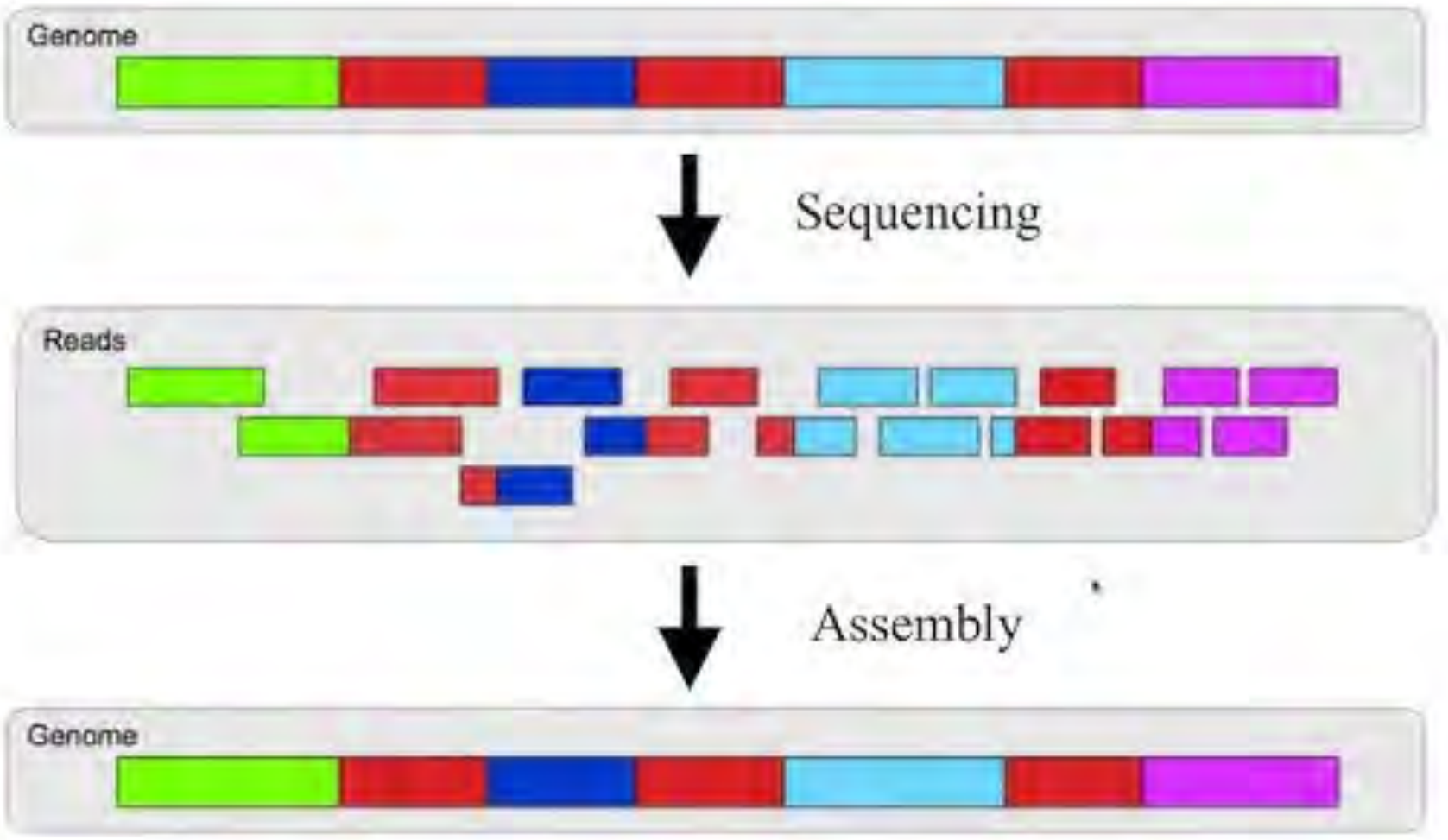
Новые подходы: Aviti



Выравнивание последовательностей



Сборка геномов de novo



Обнаружение генетических вариаций

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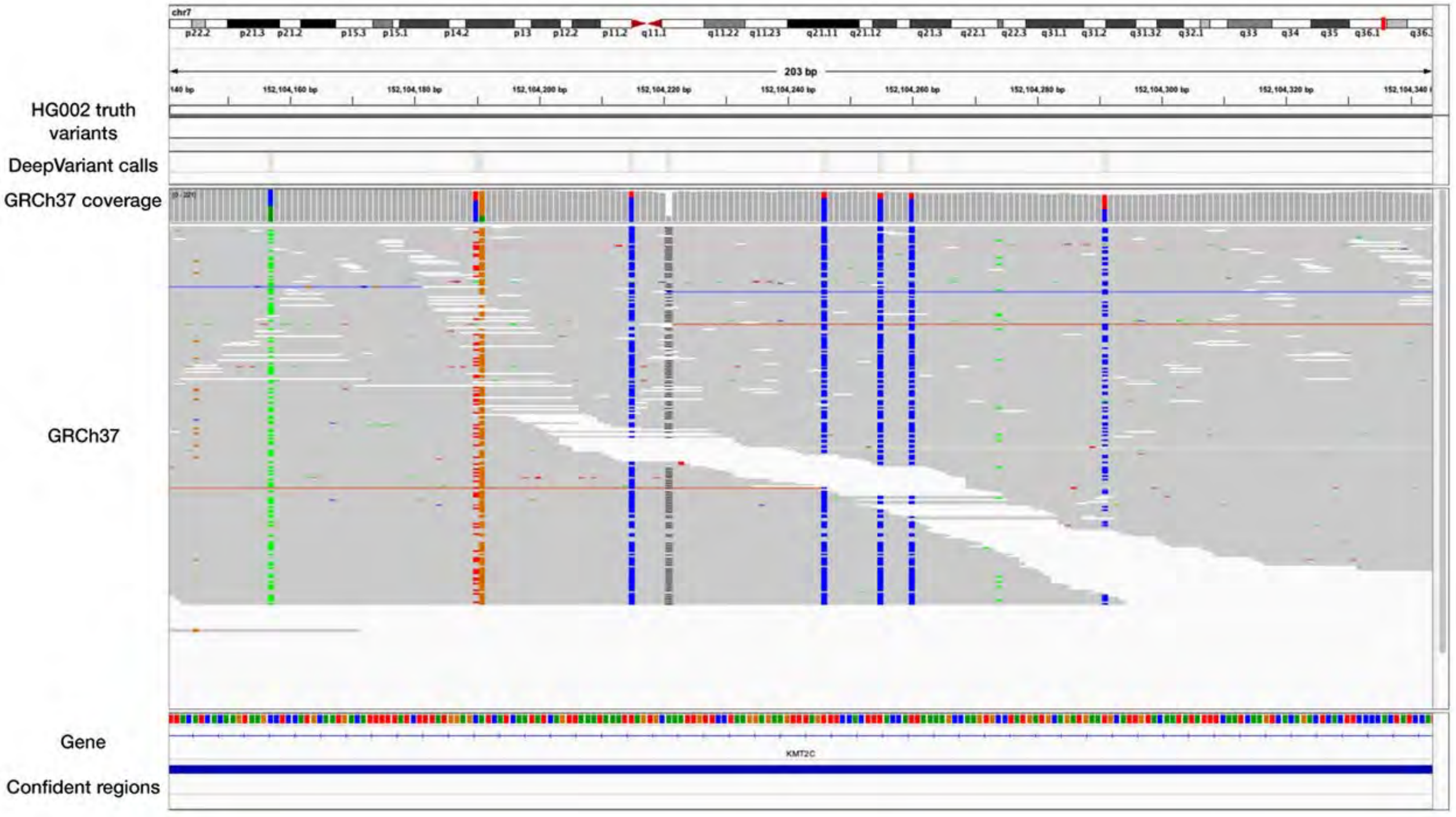
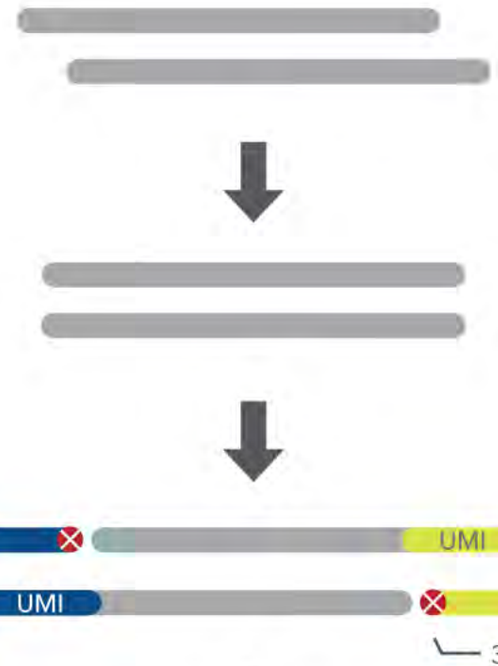


DNA-seq: Подготовка библиотек

Fragmented input DNA



End repair

Input DNA blunting

Ligation 1

Single-stranded ligation of
Ligation 1 Adapter to 3′ ends of insert

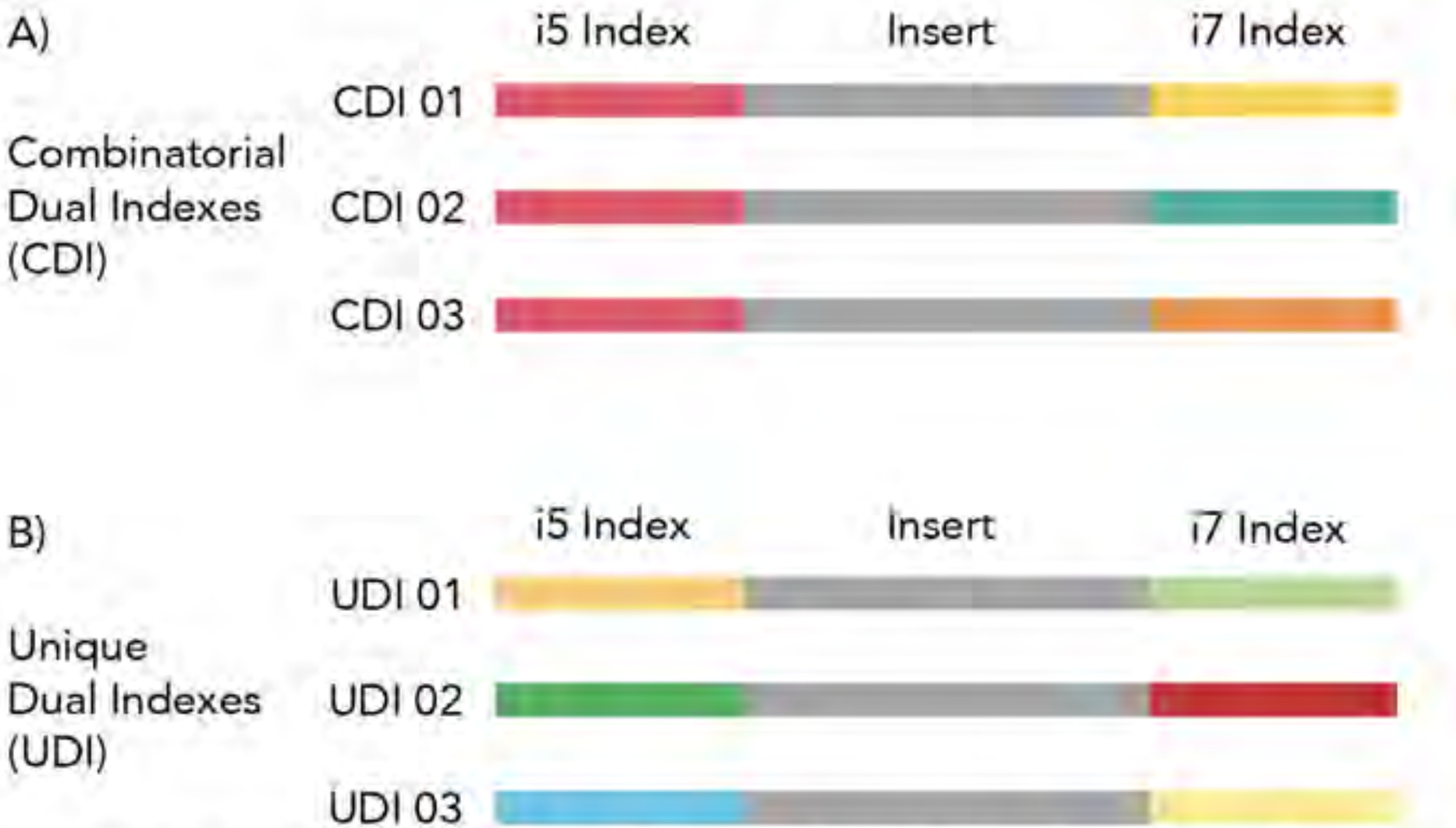
Ligation 2

Ligation 2 Adapter primes gap filling across
the UMI followed by 5′ ligation

PCR

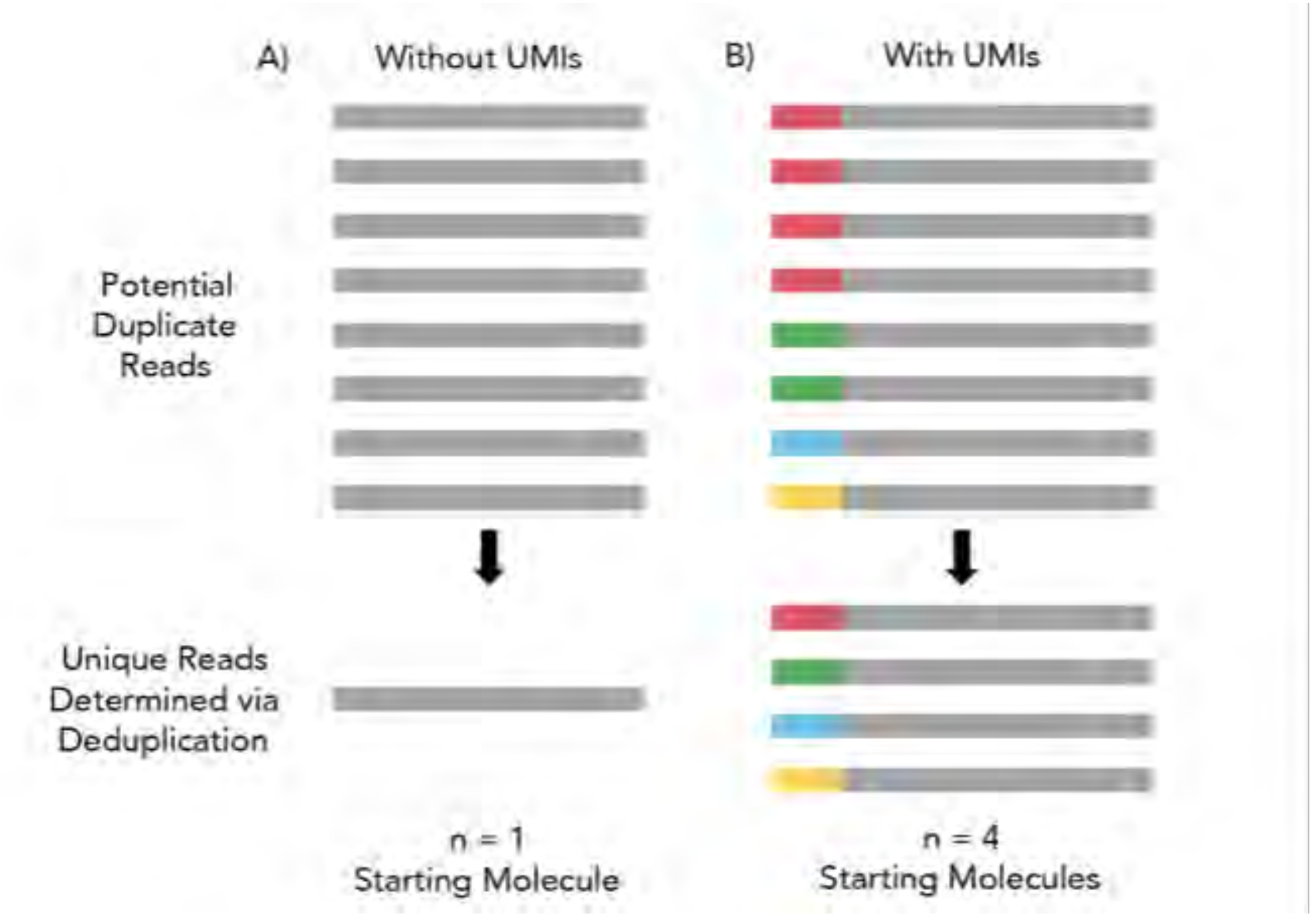
Amplification with xGen™ Unique Dual Index (UDI)
Primer Pairs

DNA-seq: Подготовка библиотек

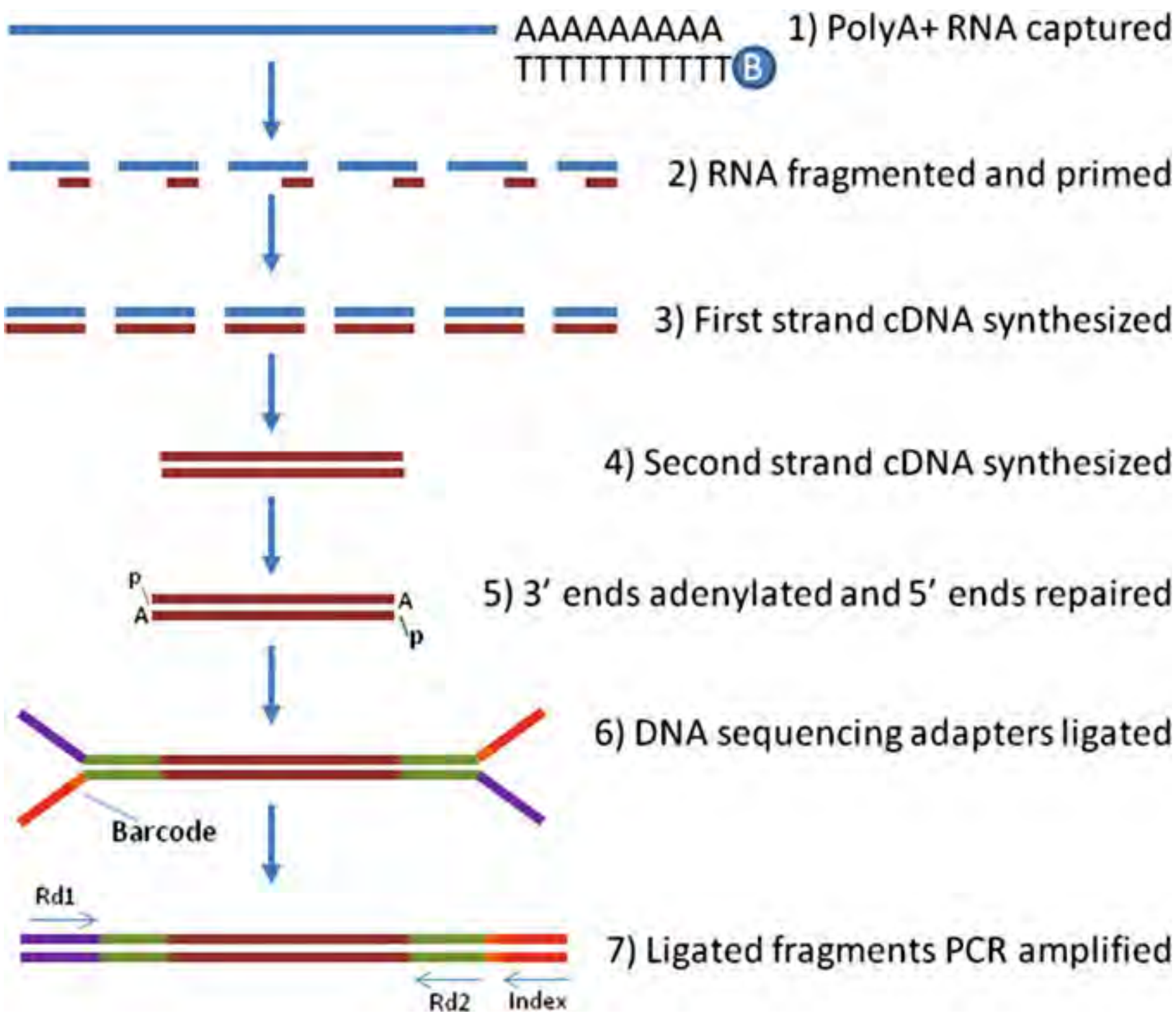


A) Combinatorial dual indexing has repeated sequences across the rows and columns of a primer plate in contrast to B) unique dual indexing where every sequence is unique.

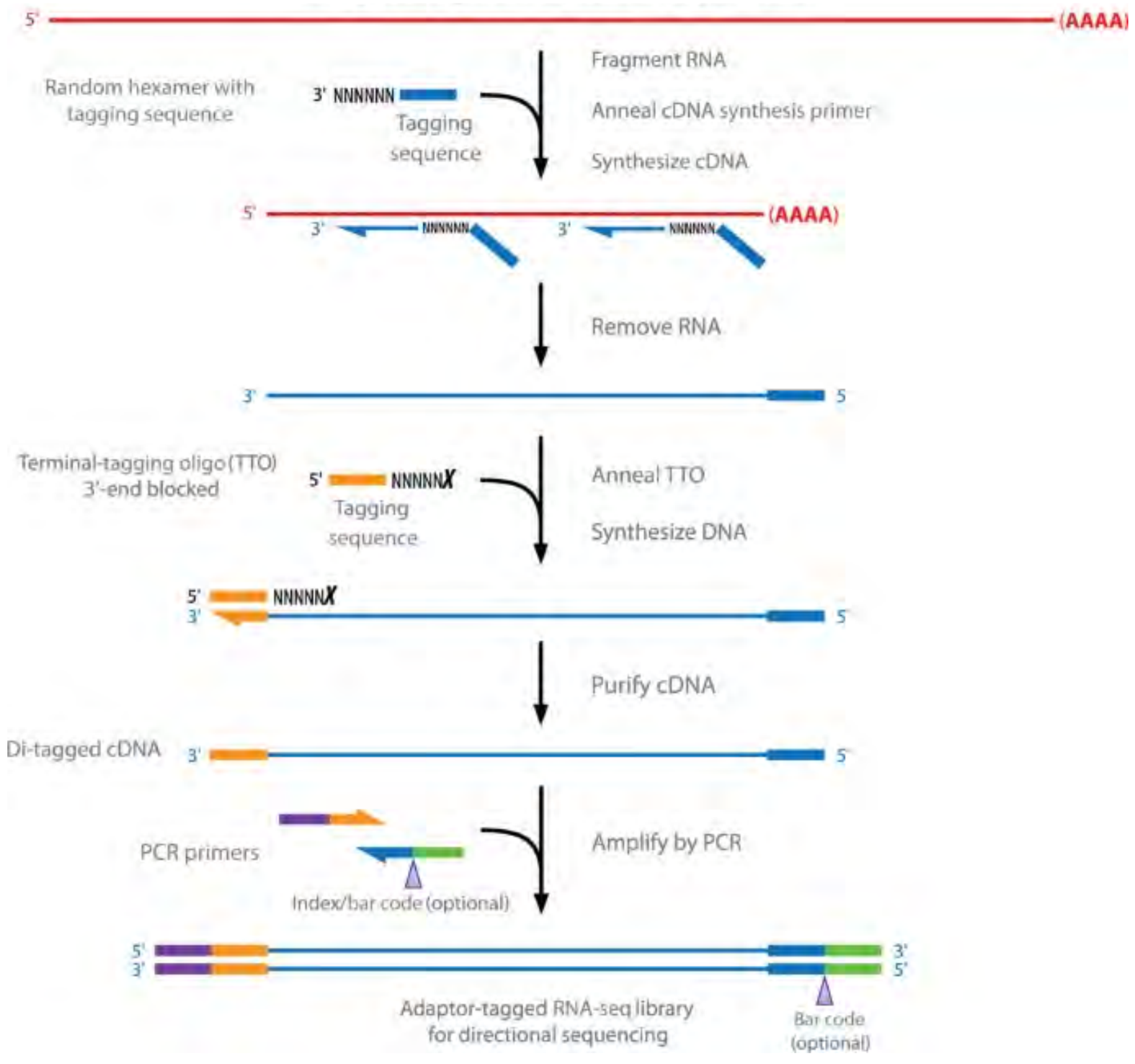
DNA-seq: Подготовка библиотек



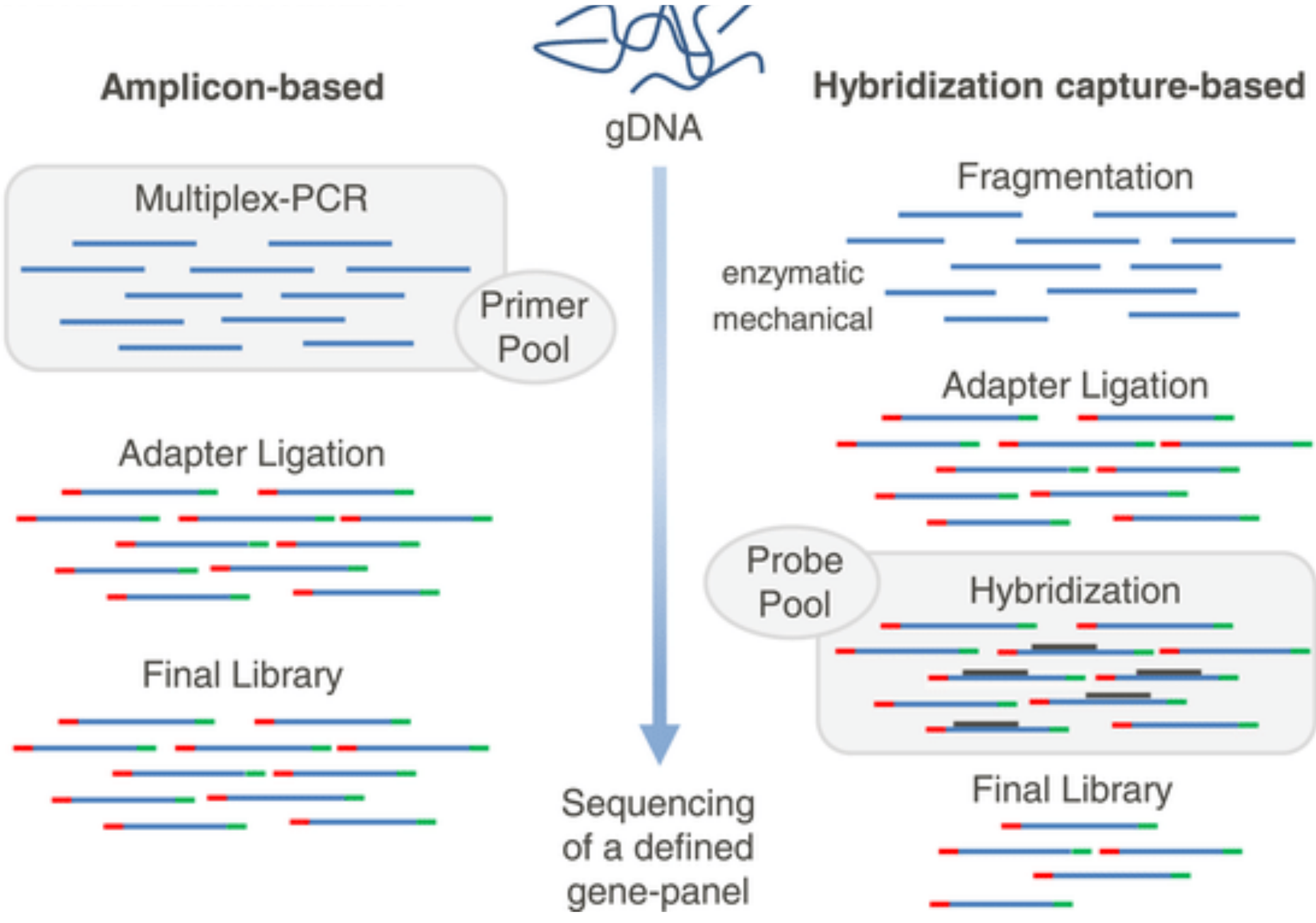
RNA-seq: Подготовка библиотек



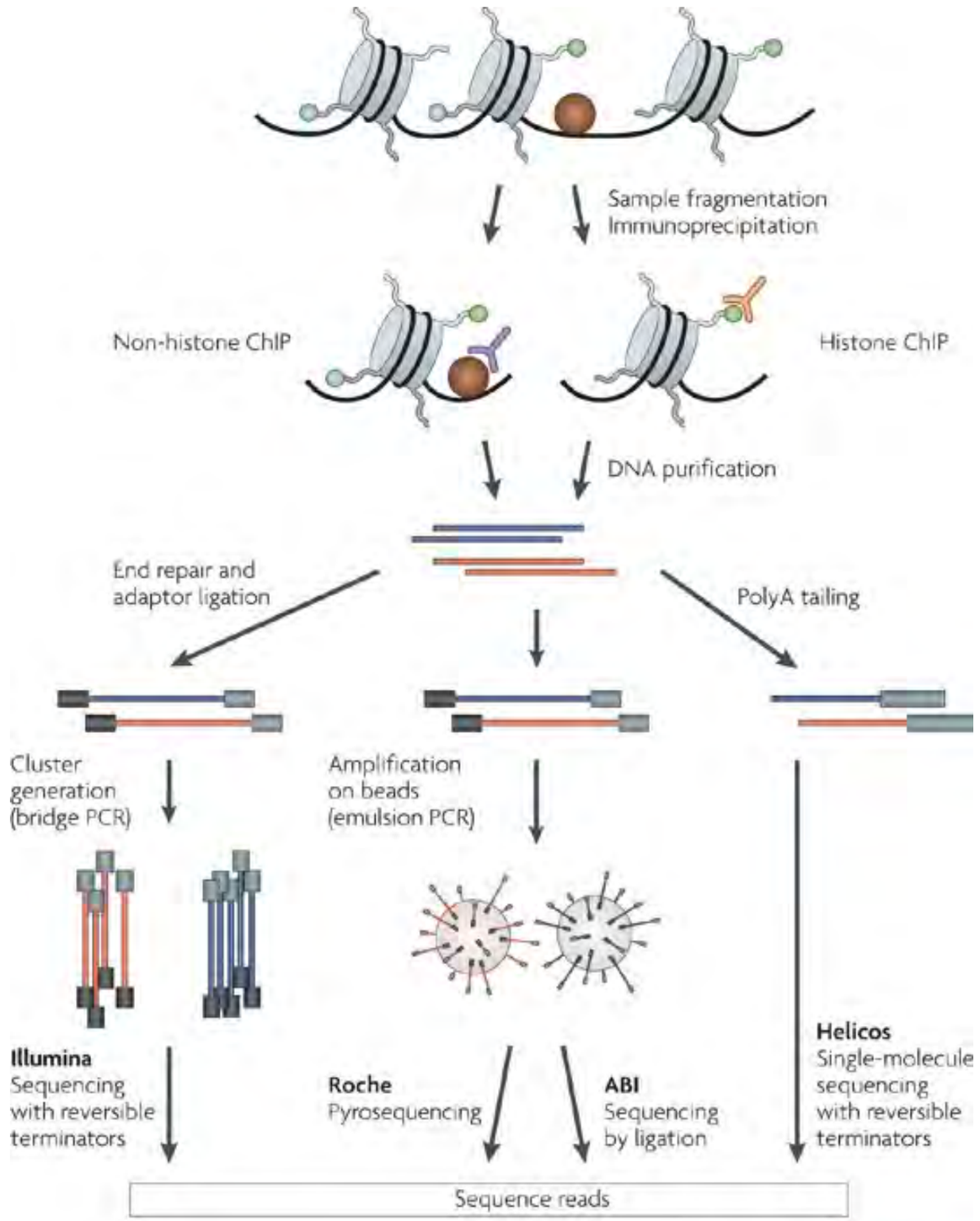
RNA-seq: Stranded vs. Non-stranded



Обогащение и экзомное секвенирование



ChIP-seq: Подготовка образцов



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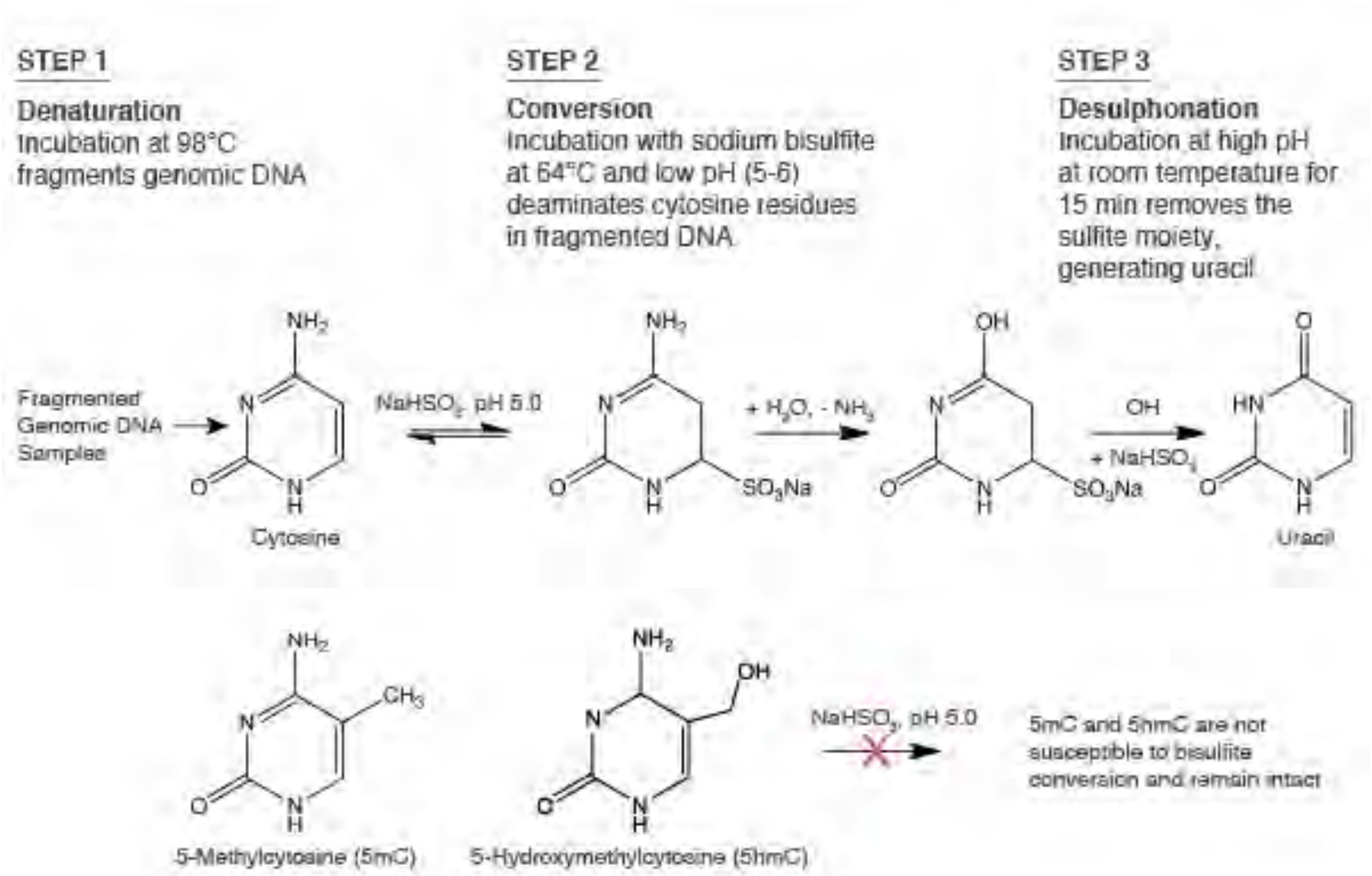
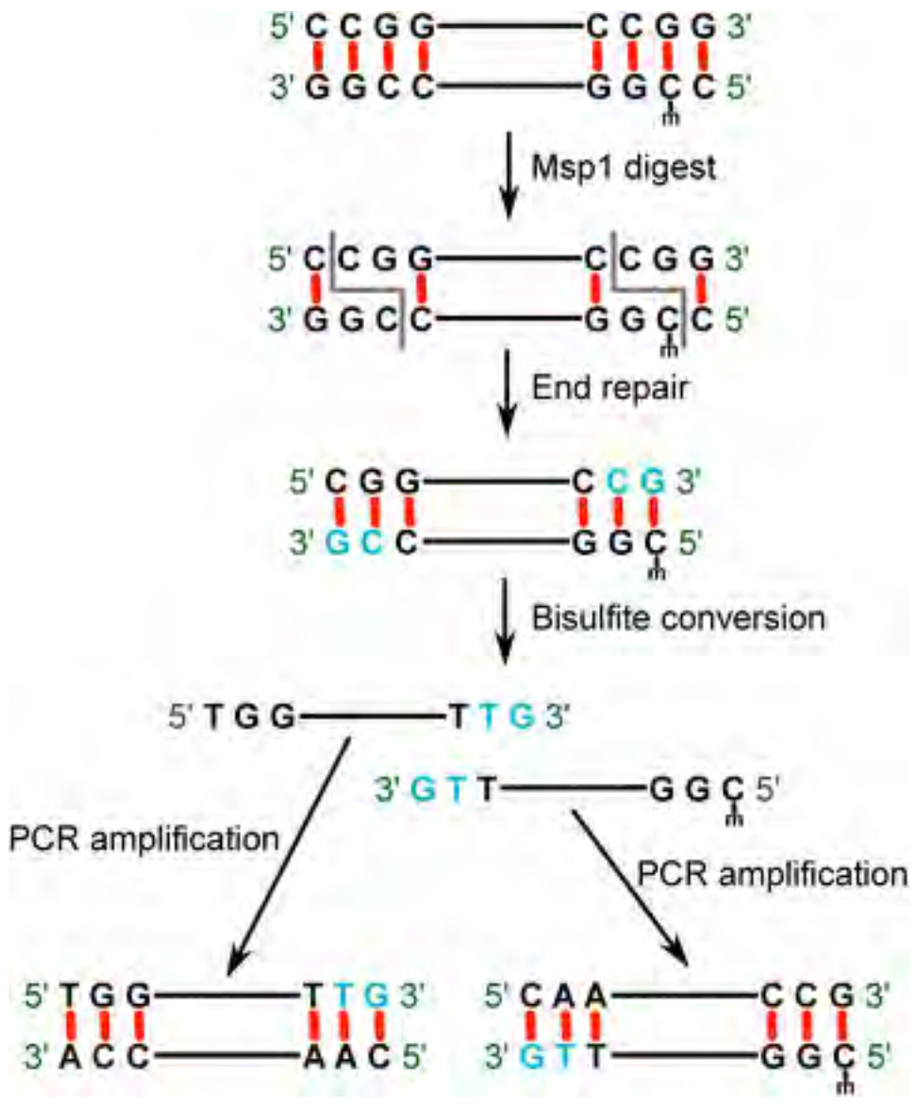
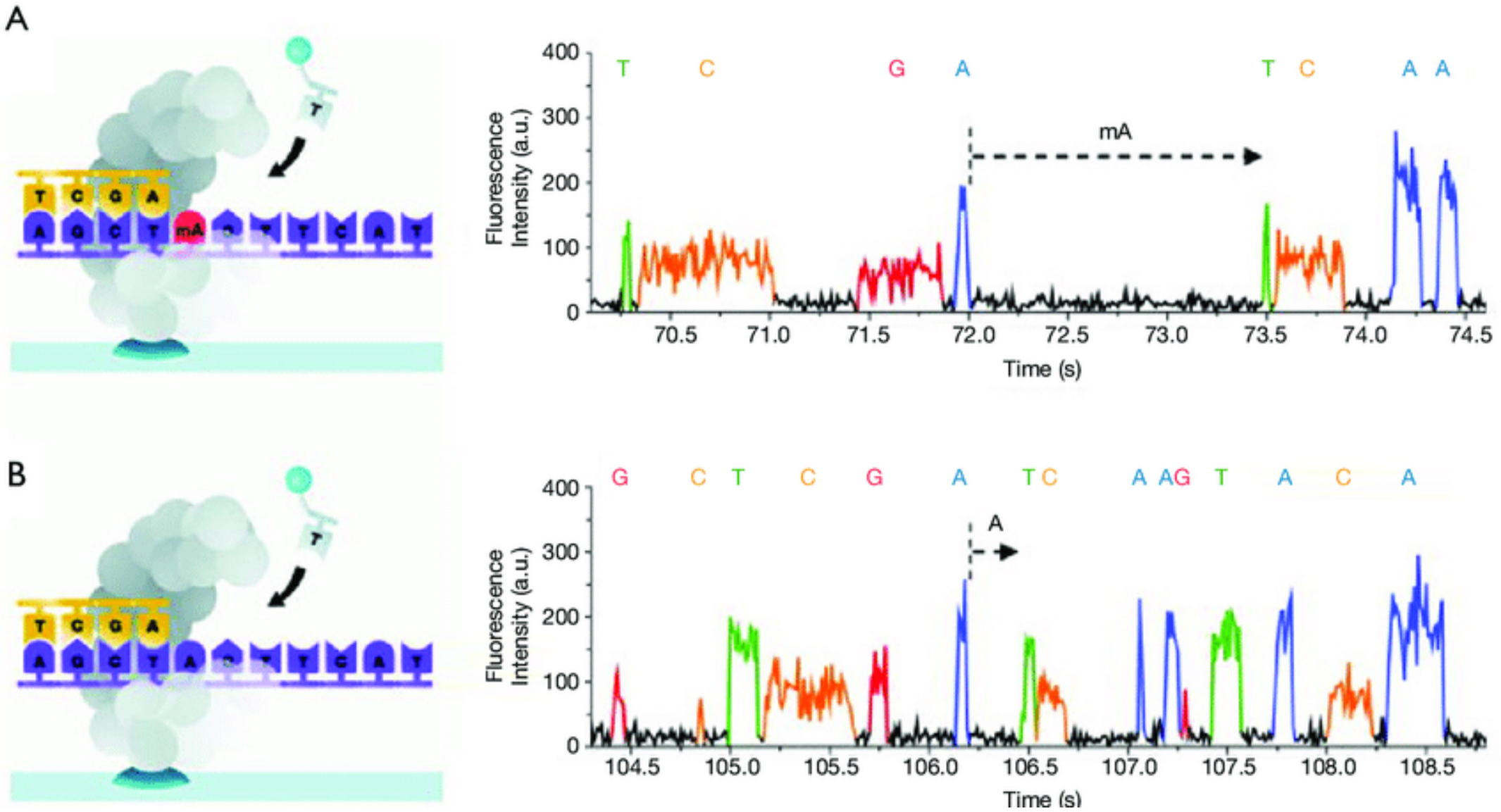
Methyl-seq: Анализ метилирования



RRBS: Анализ метилирования



Анализ модификаций с PacBio



Вопросы и обсуждение