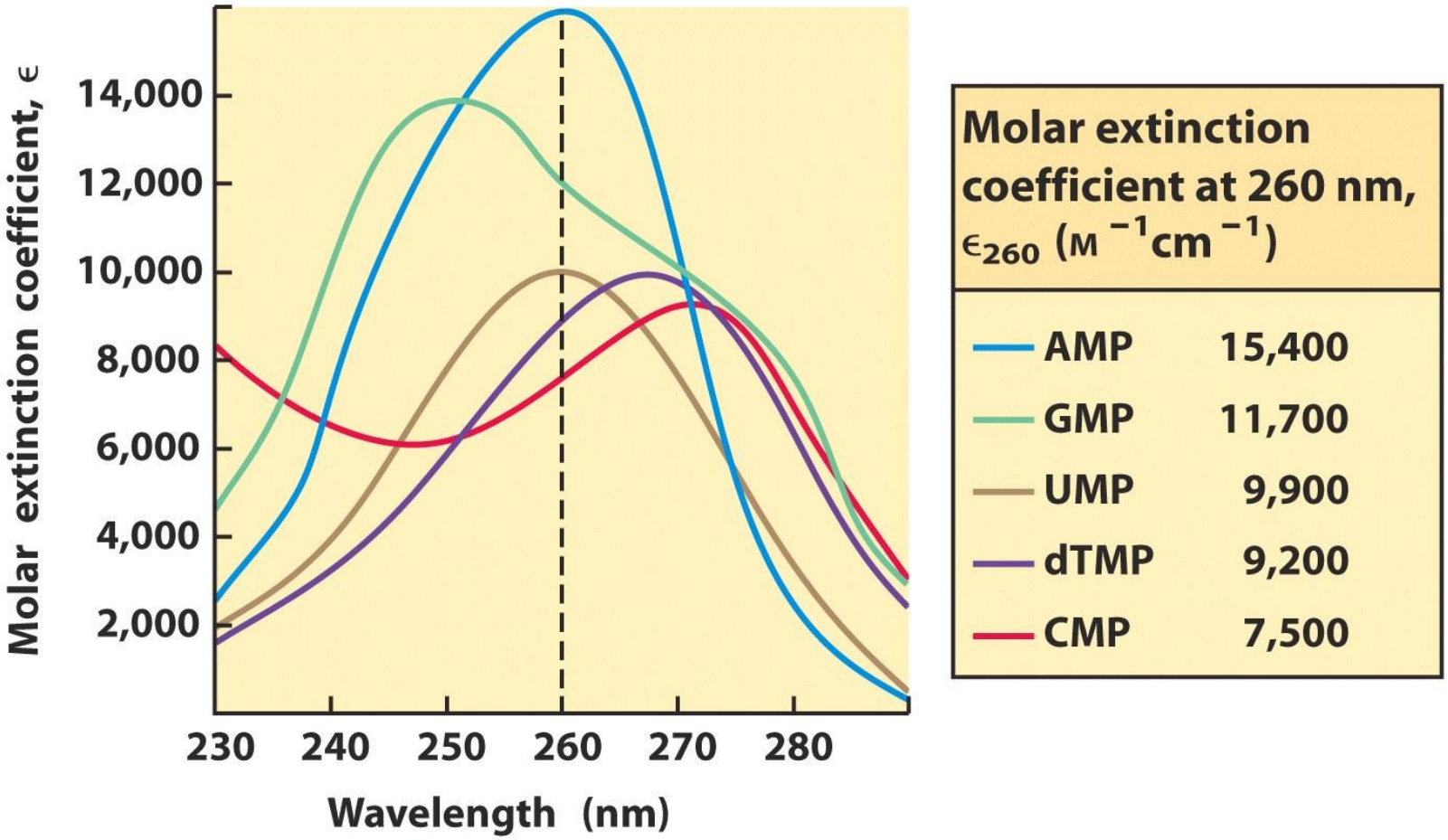
Анализ нуклеиновых кислот

Занятие 2

Физико-химические свойства ДНК

Спектры поглощения нуклеотидов



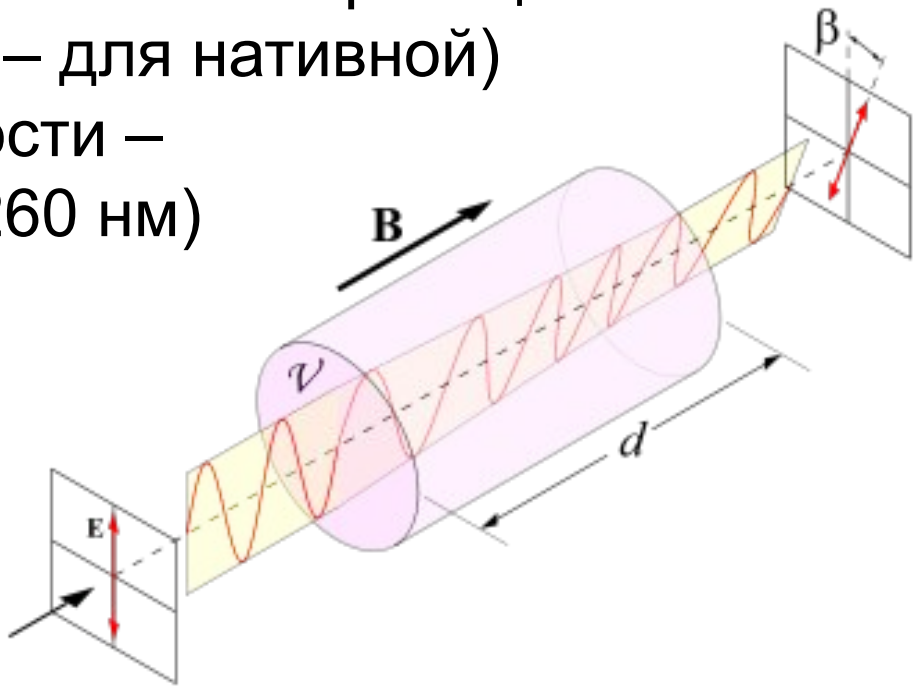
Физико-химические свойства ДНК

Денатурация («плавление») ДНК

Обратный процесс – ренатурация («отжиг»)

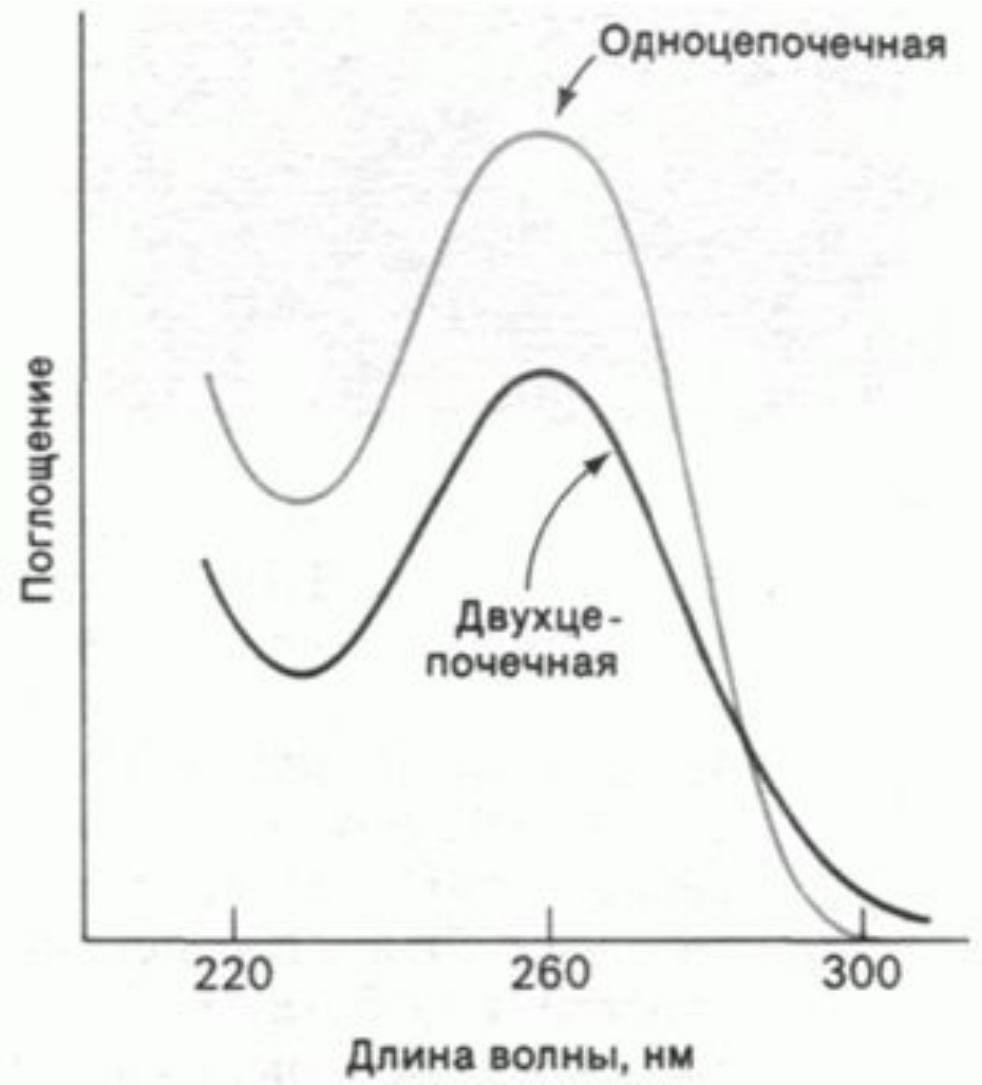
При денатурации наблюдаются:

- Уменьшение коэффициента вязкости раствора
- Увеличение плавучей плотности
- Отрицательное вращение плоскости поляризации света (в отличие от положительного – для нативной)
- Увеличение оптической плотности – *гиперхромный эффект* (при 260 нм)



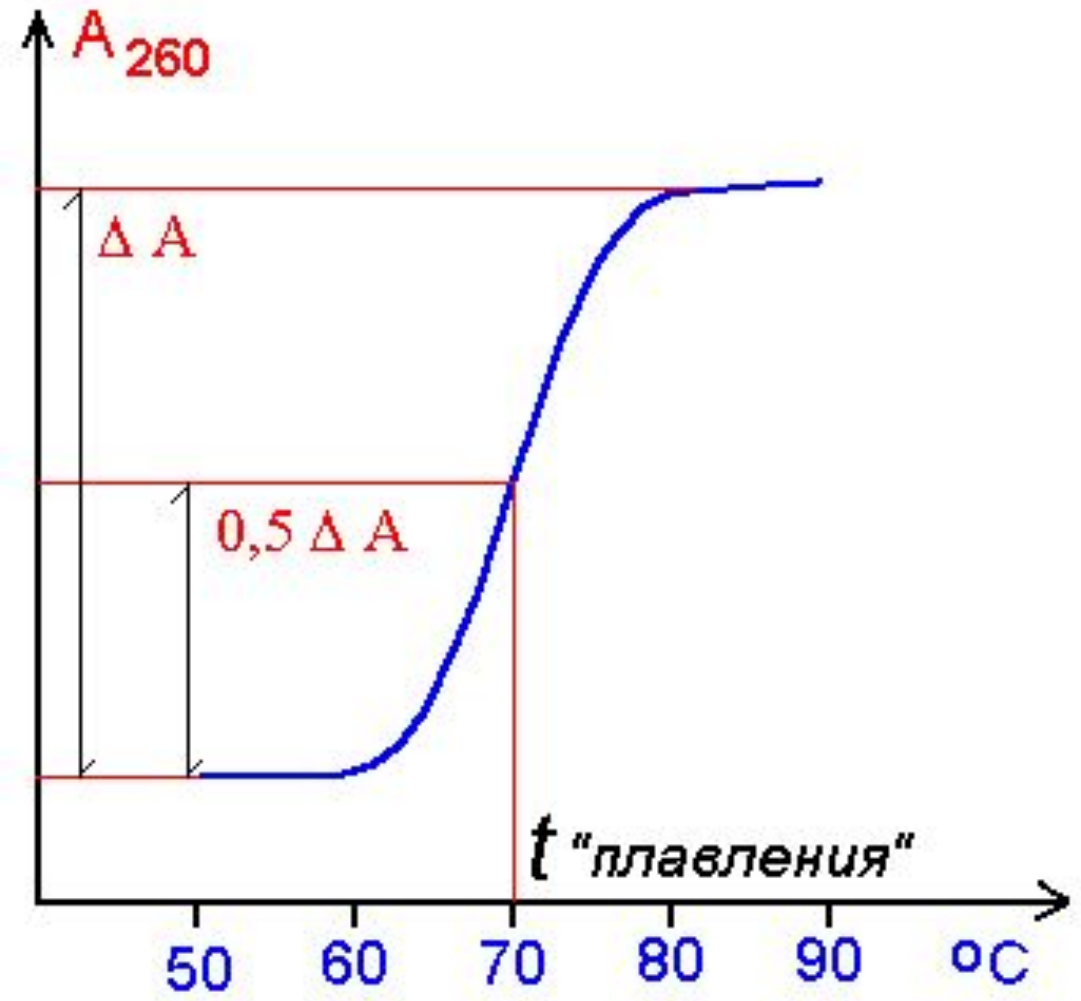
Физико-химические свойства ДНК

Гиперхромный и гипохромный эффекты



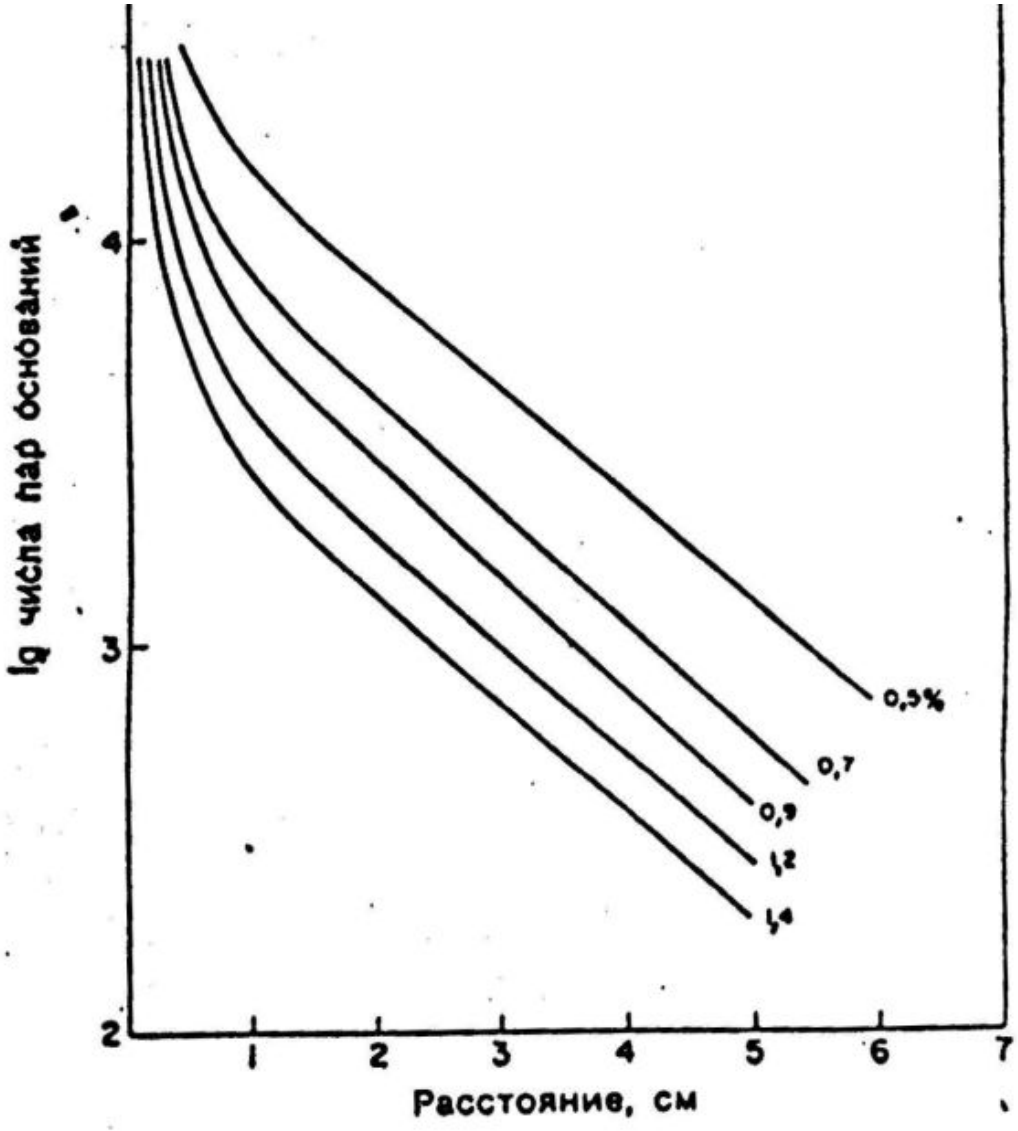
Физико-химические свойства ДНК

Температура «плавления» ДНК

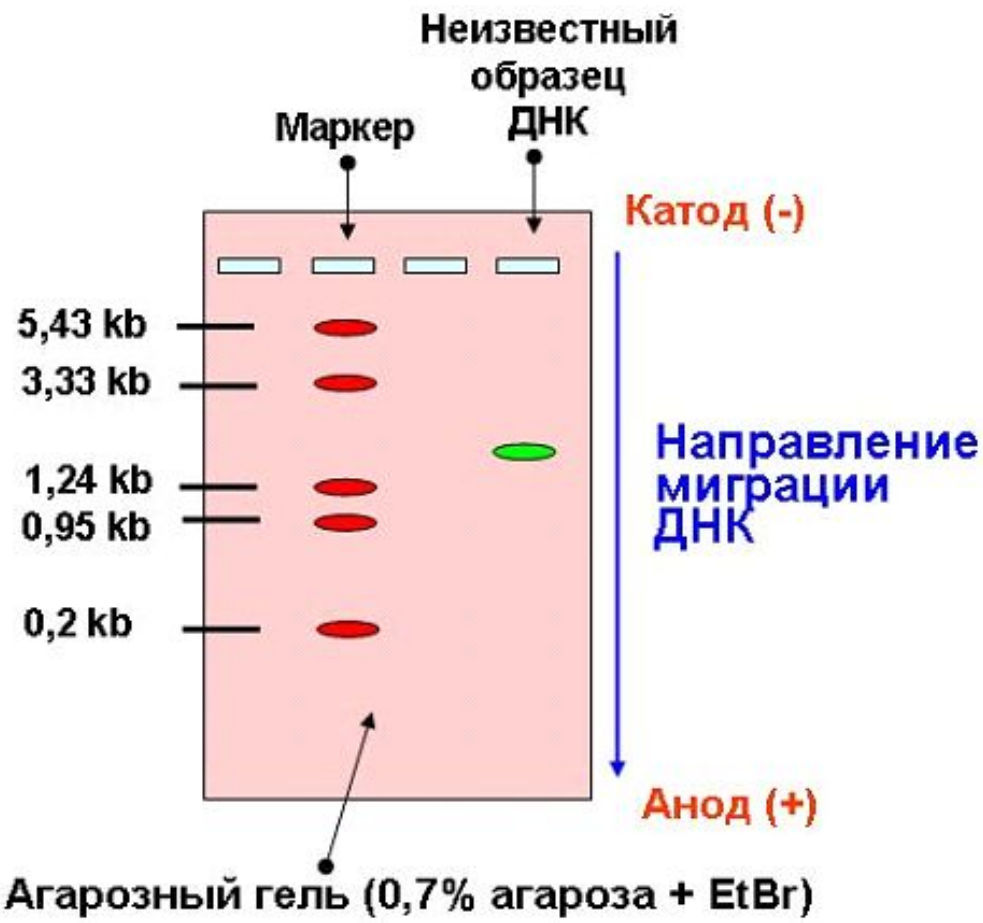


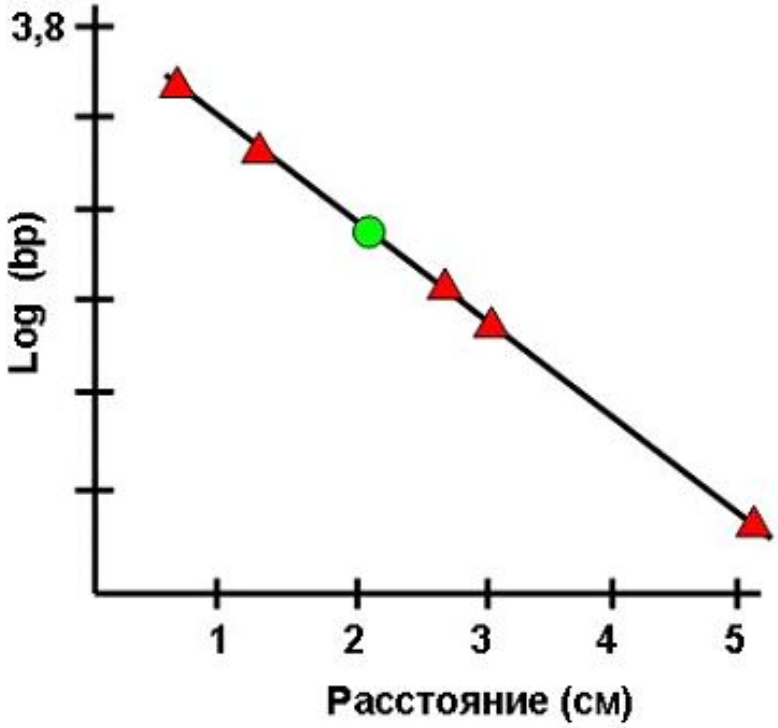
Электрофорез ДНК

Длина фрагм. ДНК, п.о.	Конц. агарозы, %
50–1500	2
300–3000	1.5
400–6000	1.2
500–10000	1
800–10000	0.7
1000–20000	0.5



Электрофорез ДНК

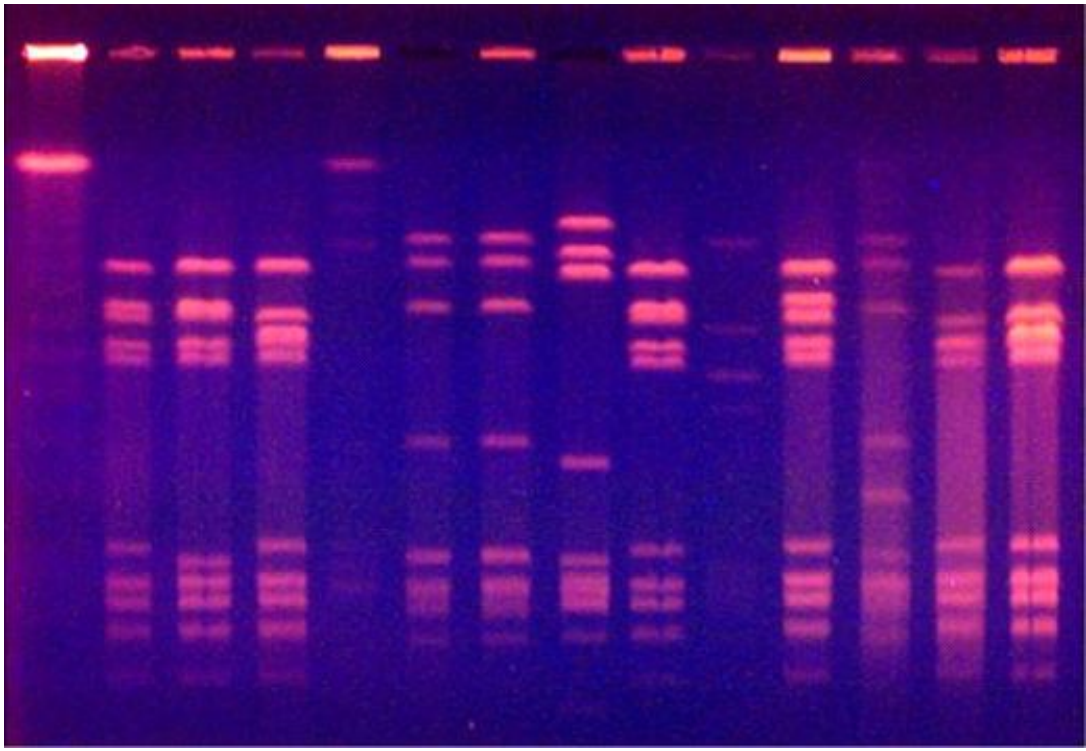


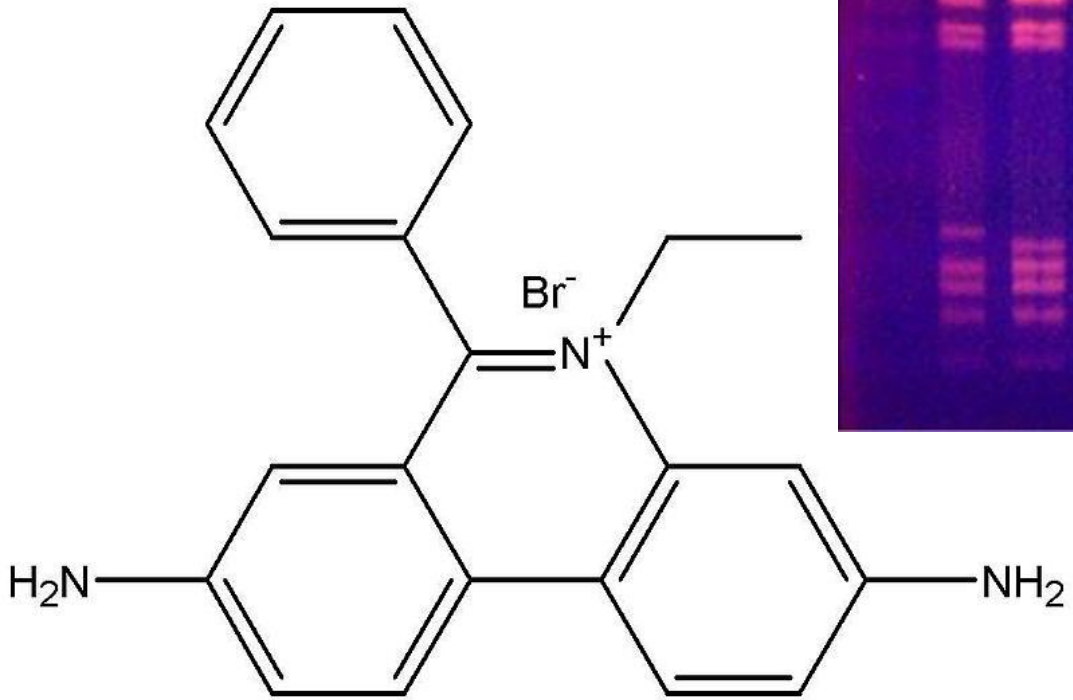


Электрофорез ДНК

Бромистый этидий

(3,8-диамино-5-этил-6-фенилфенантридиум бромид)

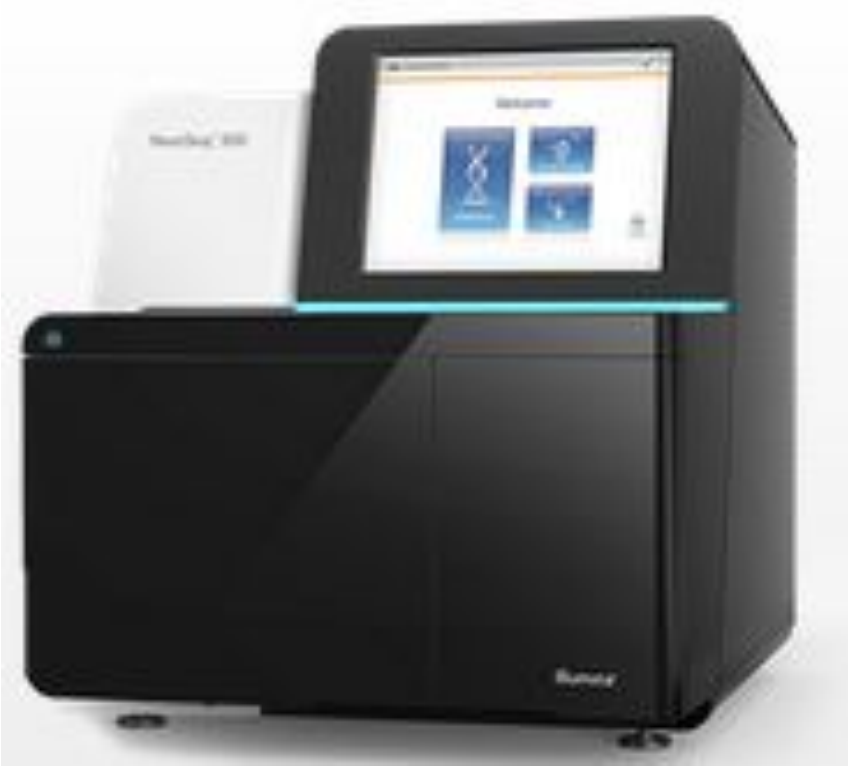




Канцероген!!!

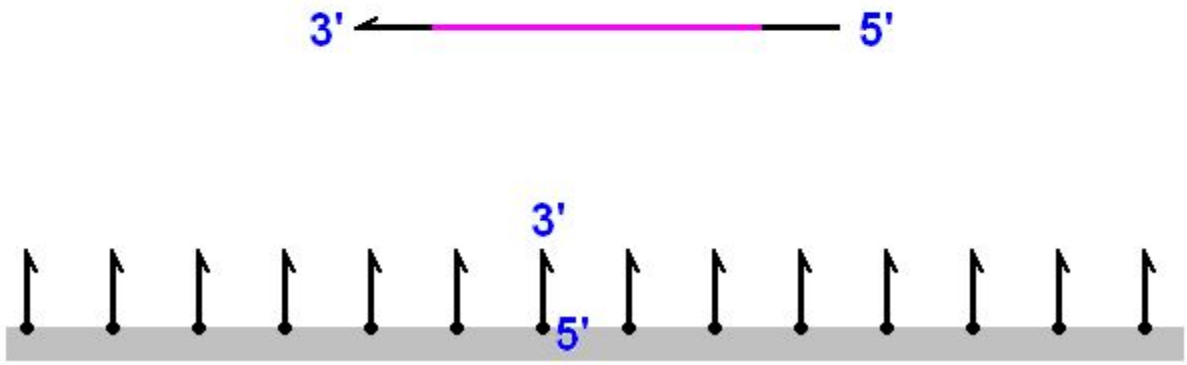
Next Generation Sequening

Illumina



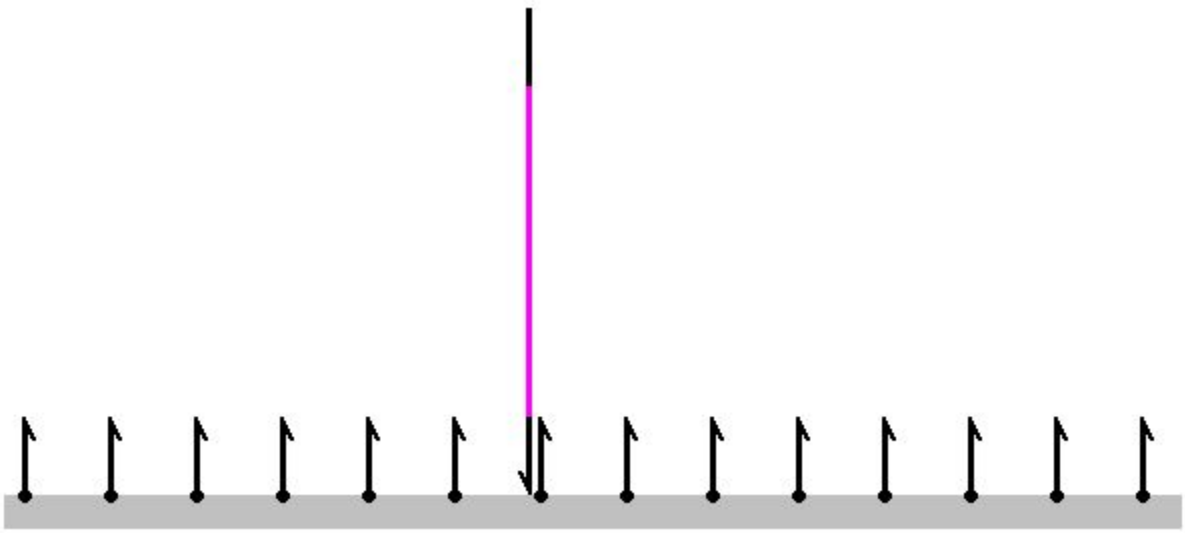
Next Generation Sequening

Illumina



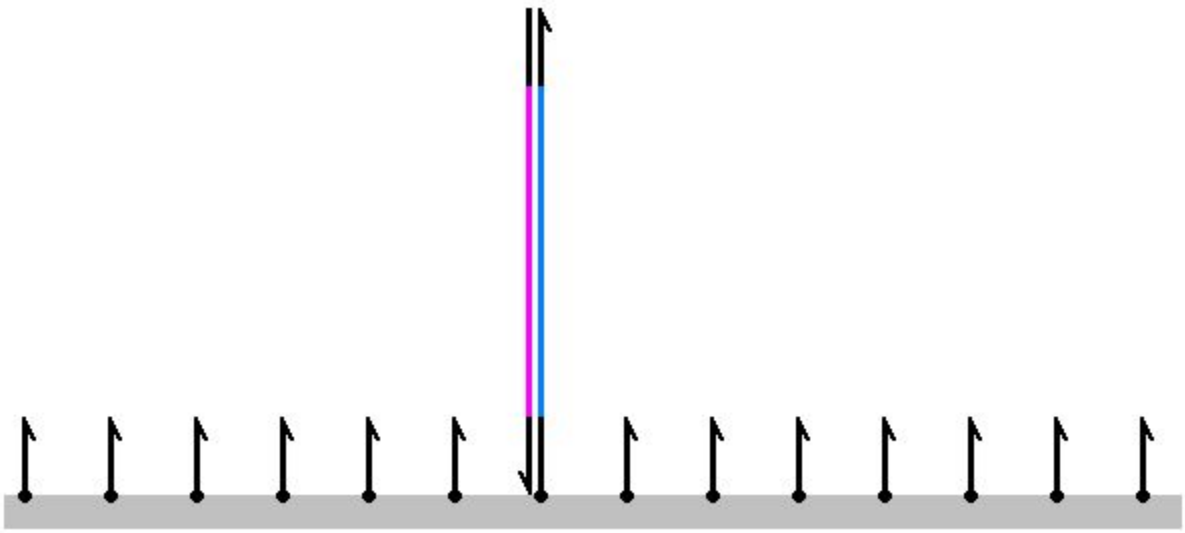
Next Generation Sequening

Illumina



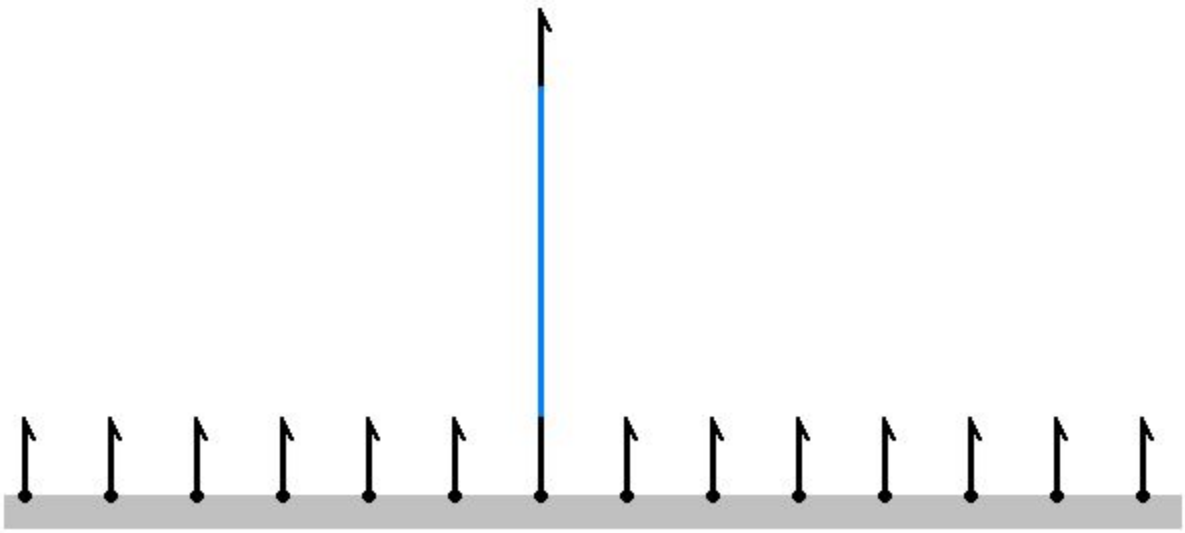
Next Generation Sequening

Illumina



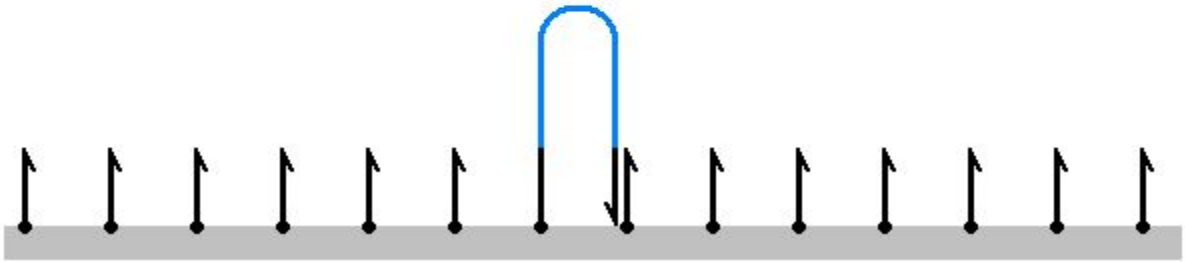
Next Generation Sequening

Illumina



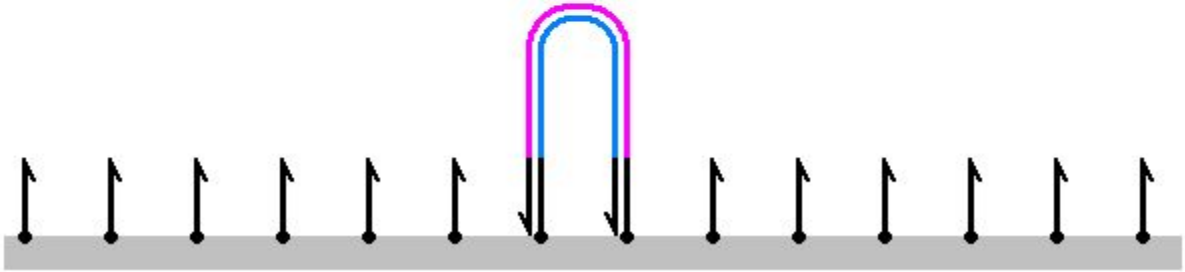
Next Generation Sequening

Illumina



Next Generation Sequening

Illumina



Next Generation Sequening

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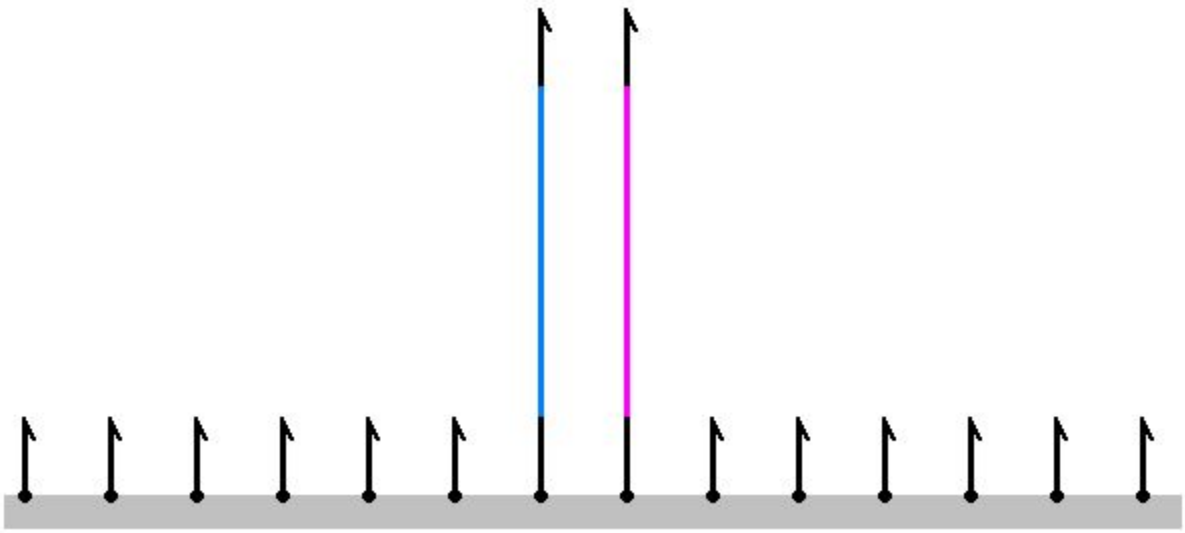

Next Generation Sequening

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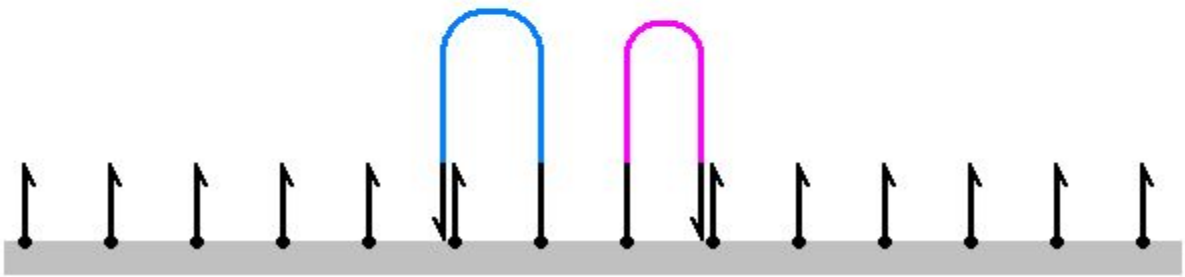
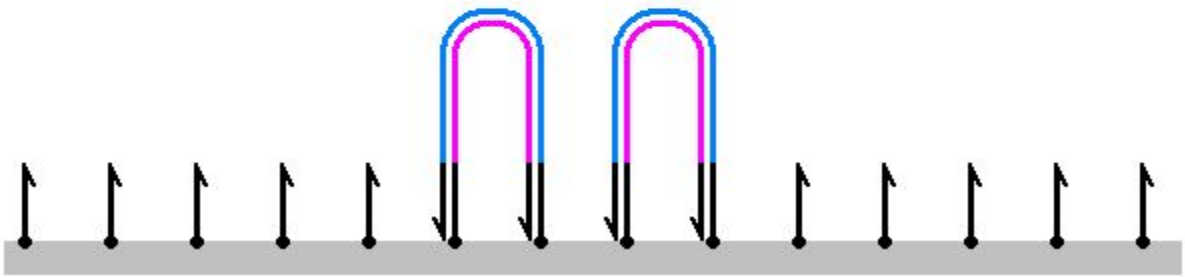


Next Generation Sequening

Illumina



Next Generation Sequening

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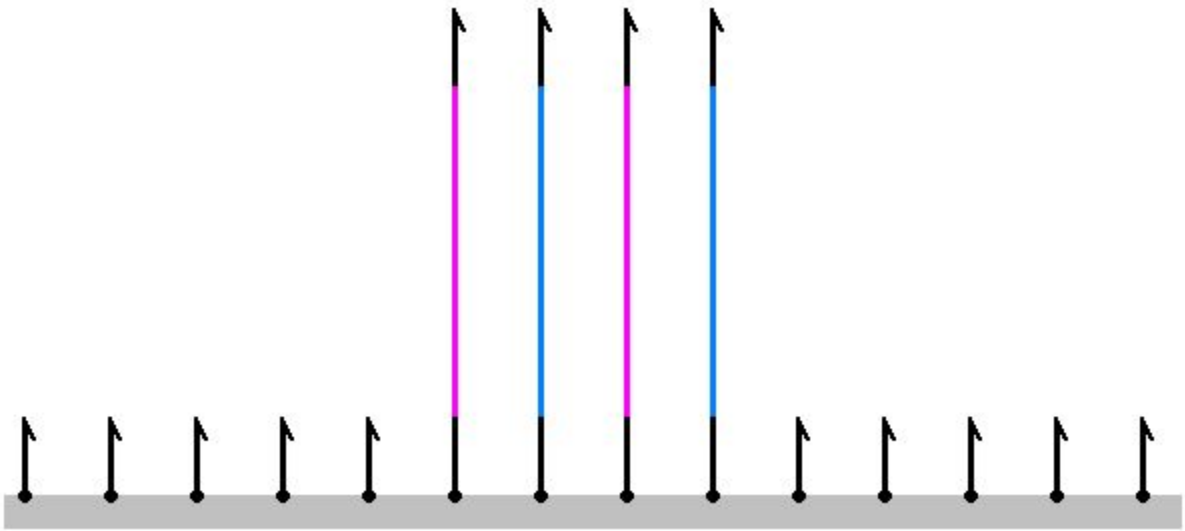

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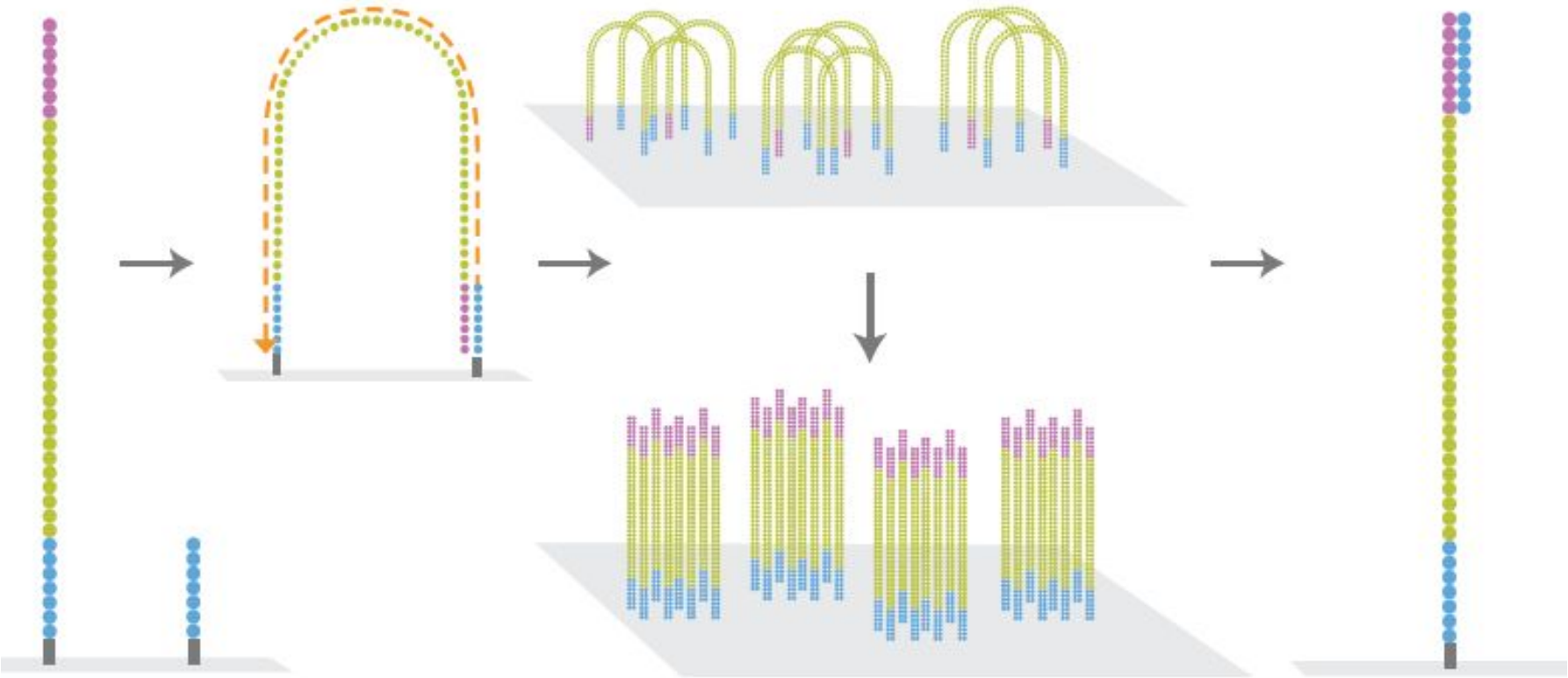

Next Generation Sequening

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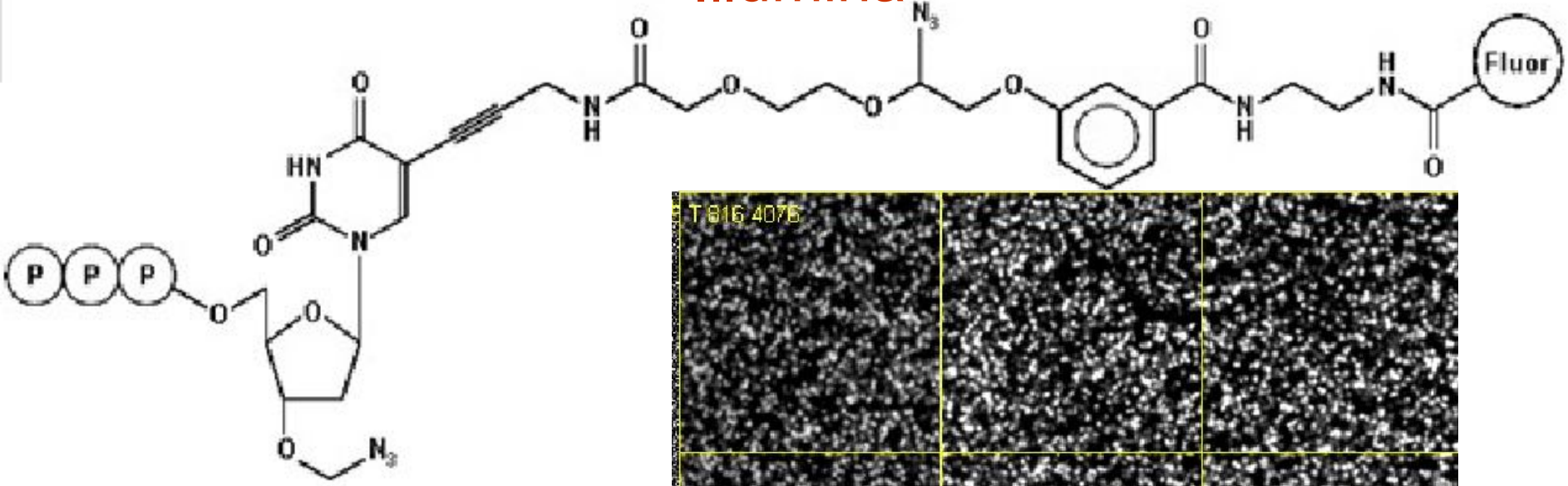
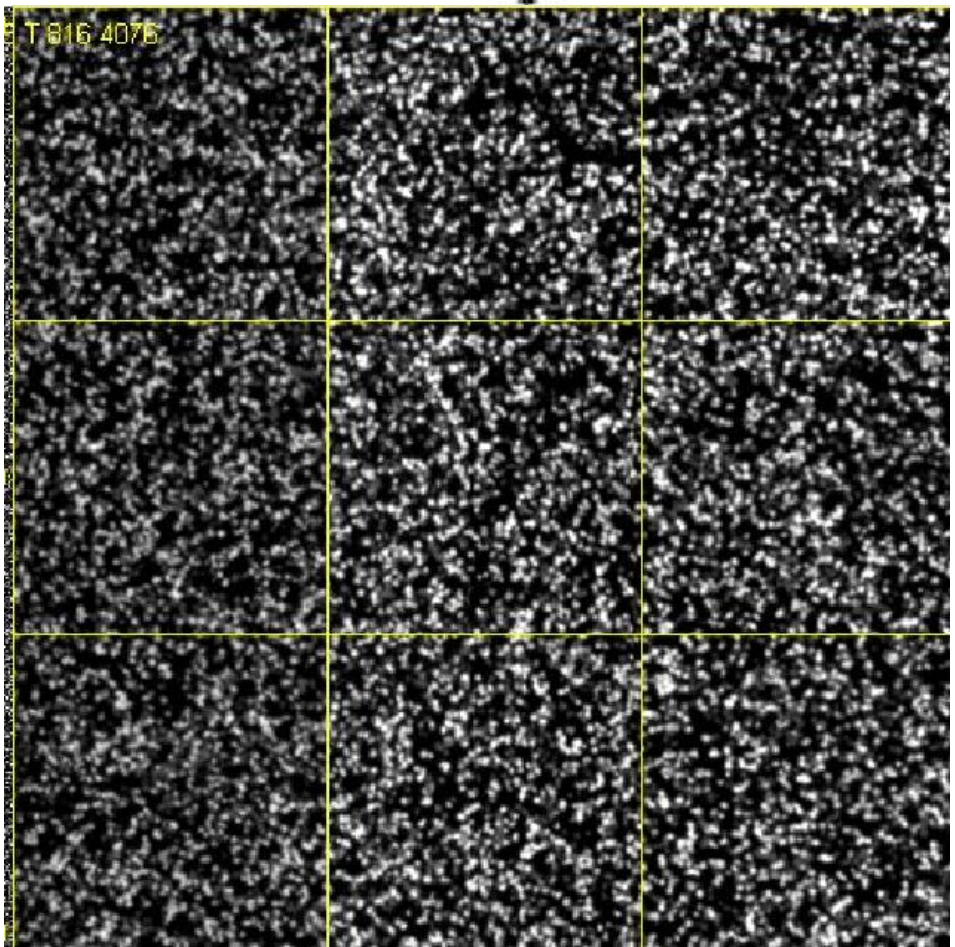
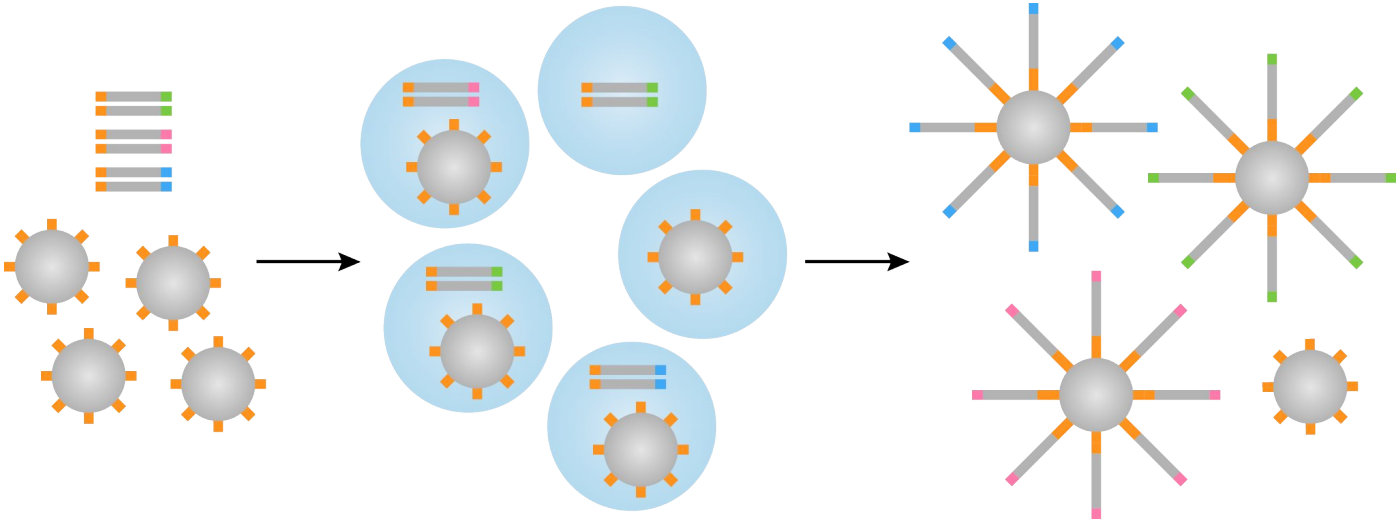
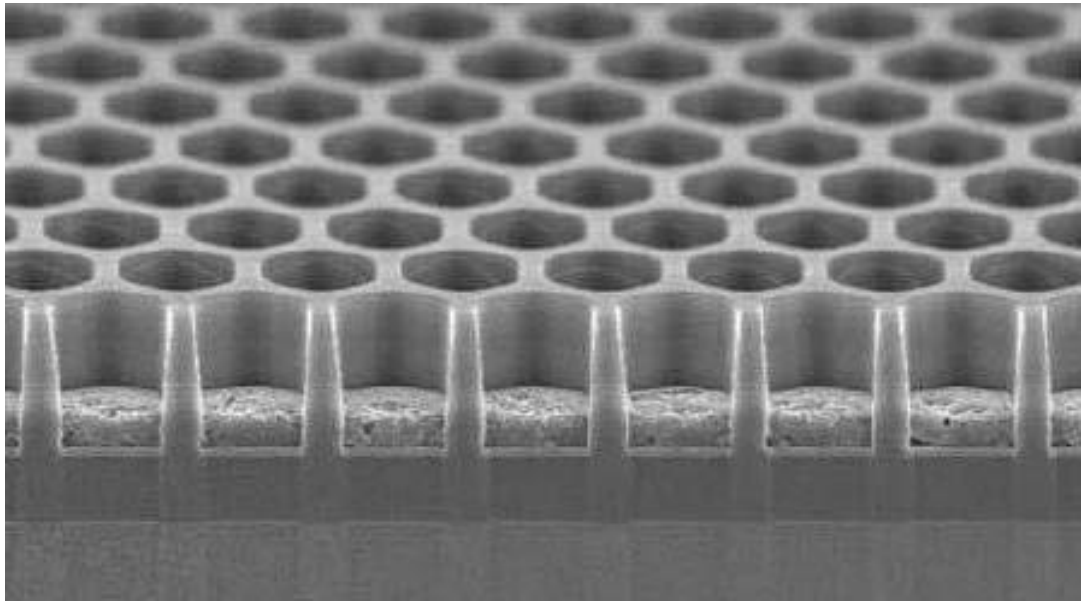




Next Generation Sequening

Ion Torrent





Next Generation Sequening

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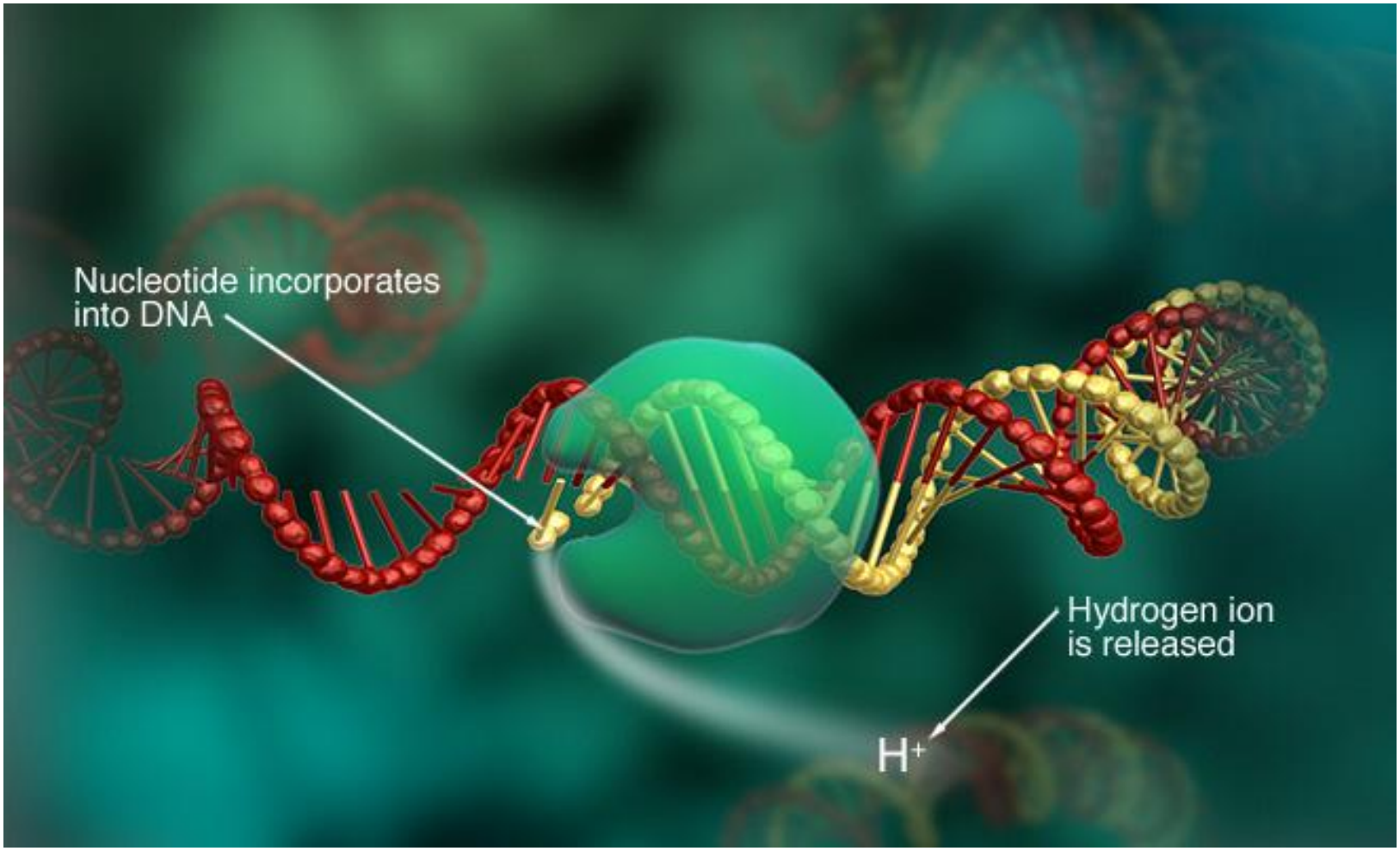
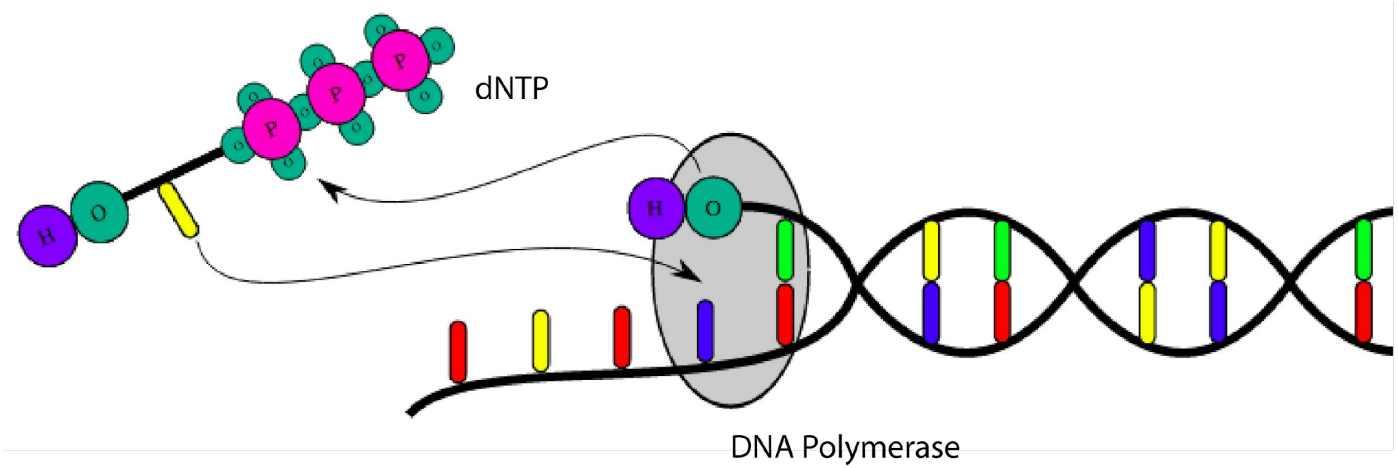
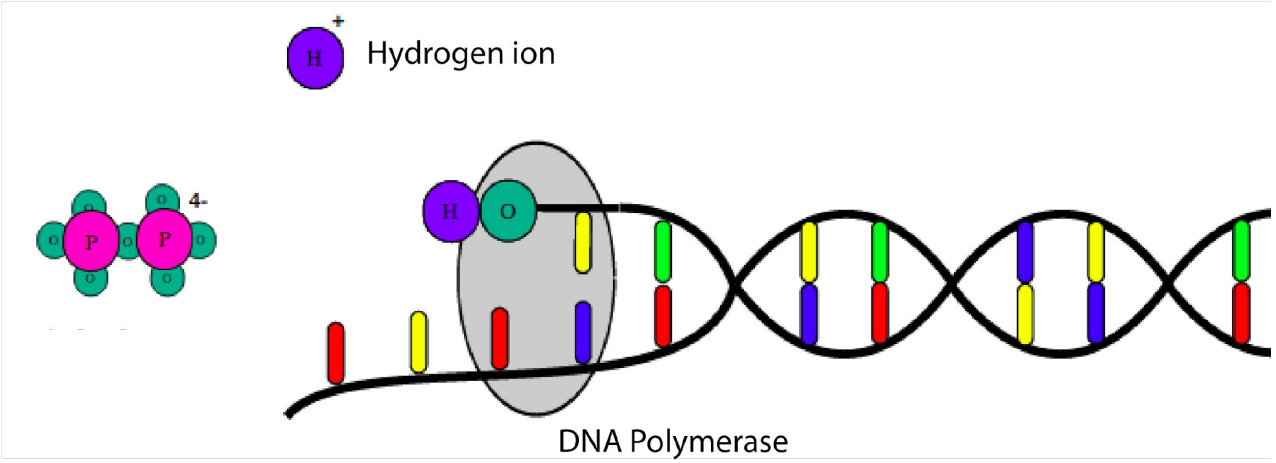


Next Generation Sequening

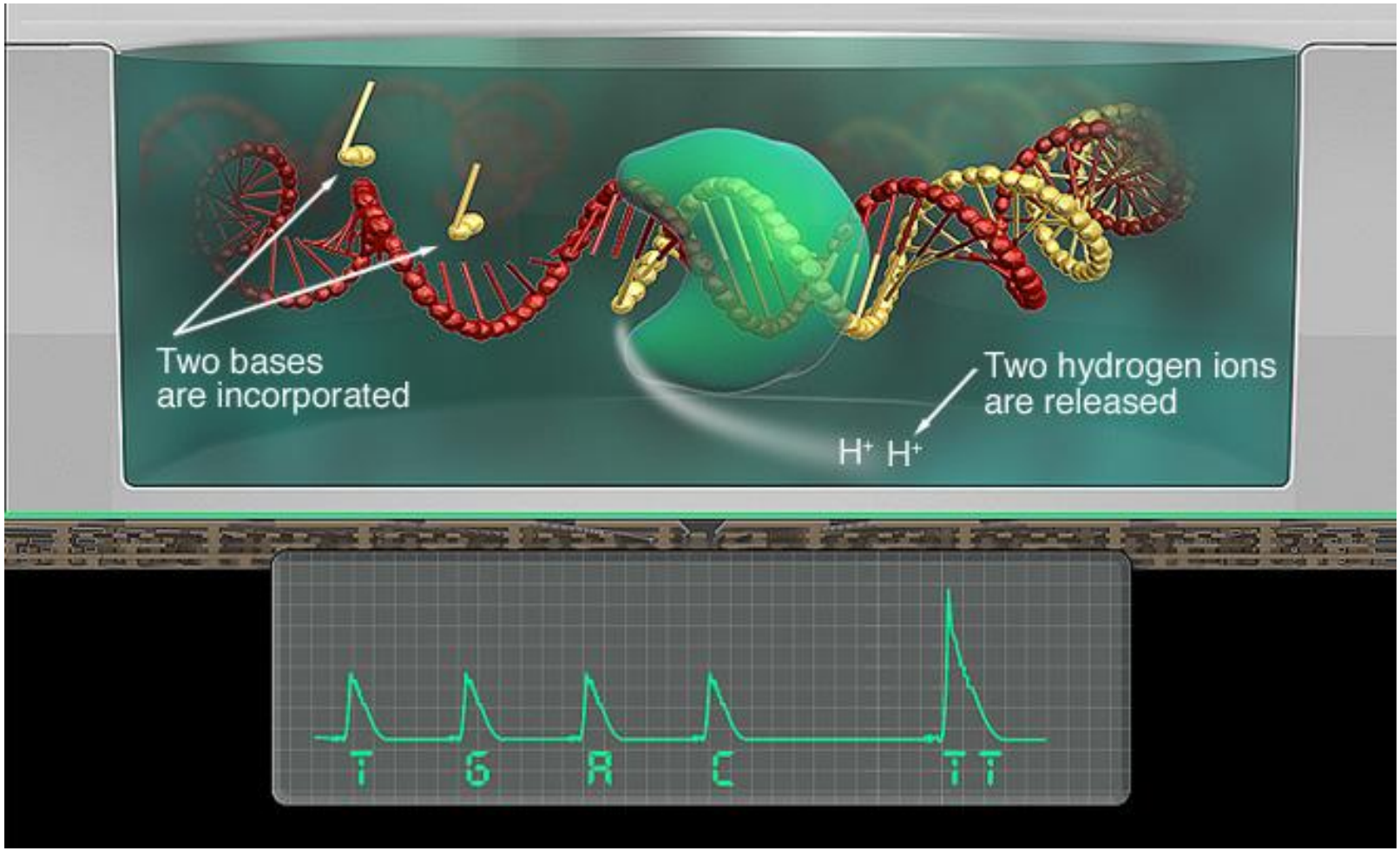
Ion Torrent





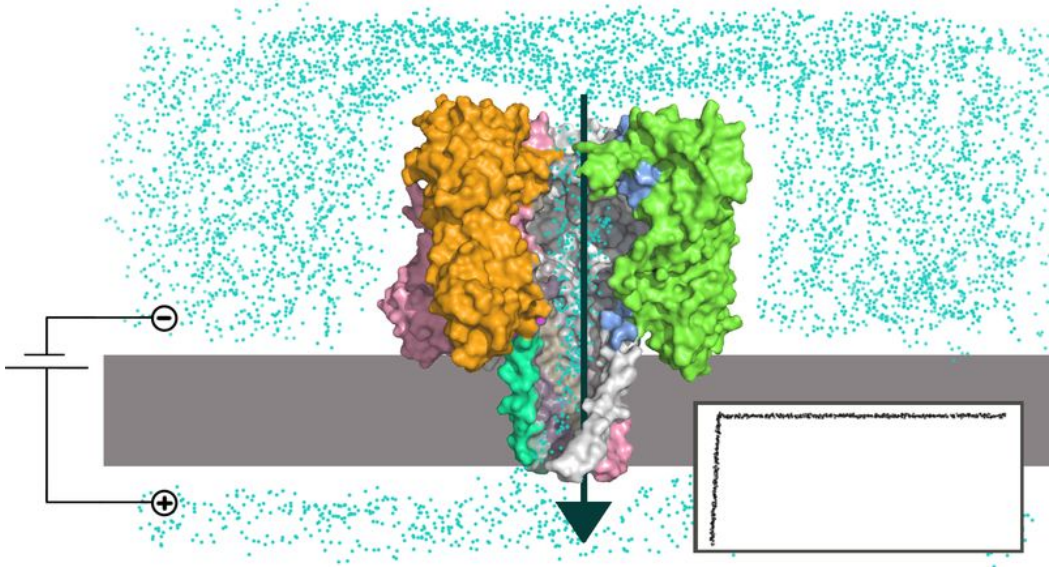
Next Generation Sequening

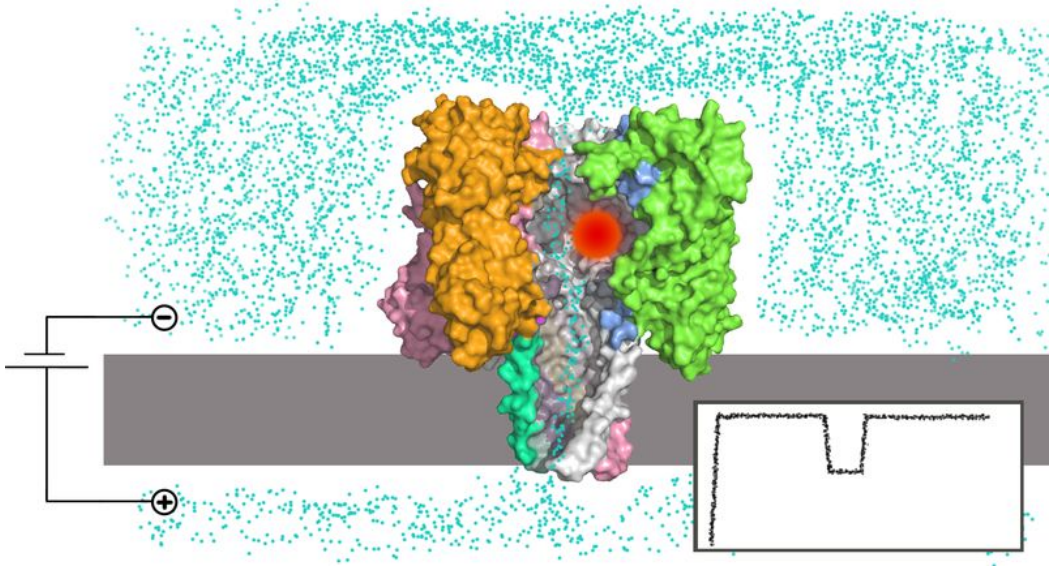
Ion Torrent



Next Generation Sequening

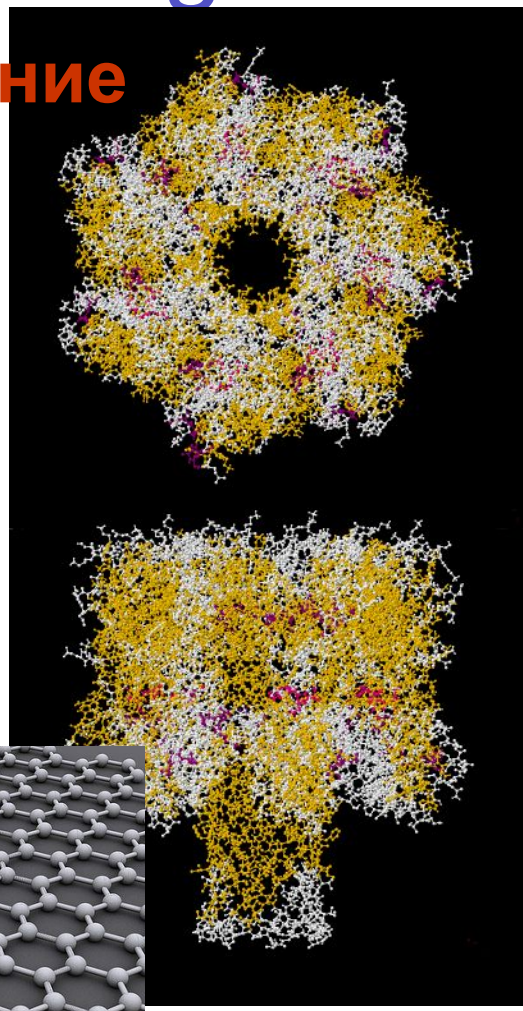
Нанопоровое секвенирование

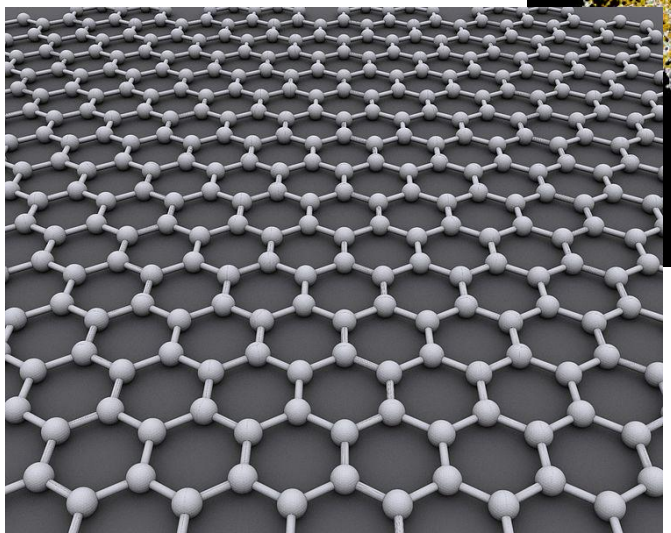




Next Generation Sequening

Нанопоровое секвенирование



- Белковые нанопоры
  - Альфа-гемолизин *Staphylococcus aureus*
  - MspA – порин А *Mycobacterium smegmatis*
  - Моторный белок упаковки ДНК бактериофага *phi*29 (модифицированный)

- Твердотельные нанопоры
  - нитрид кремния
  - графен