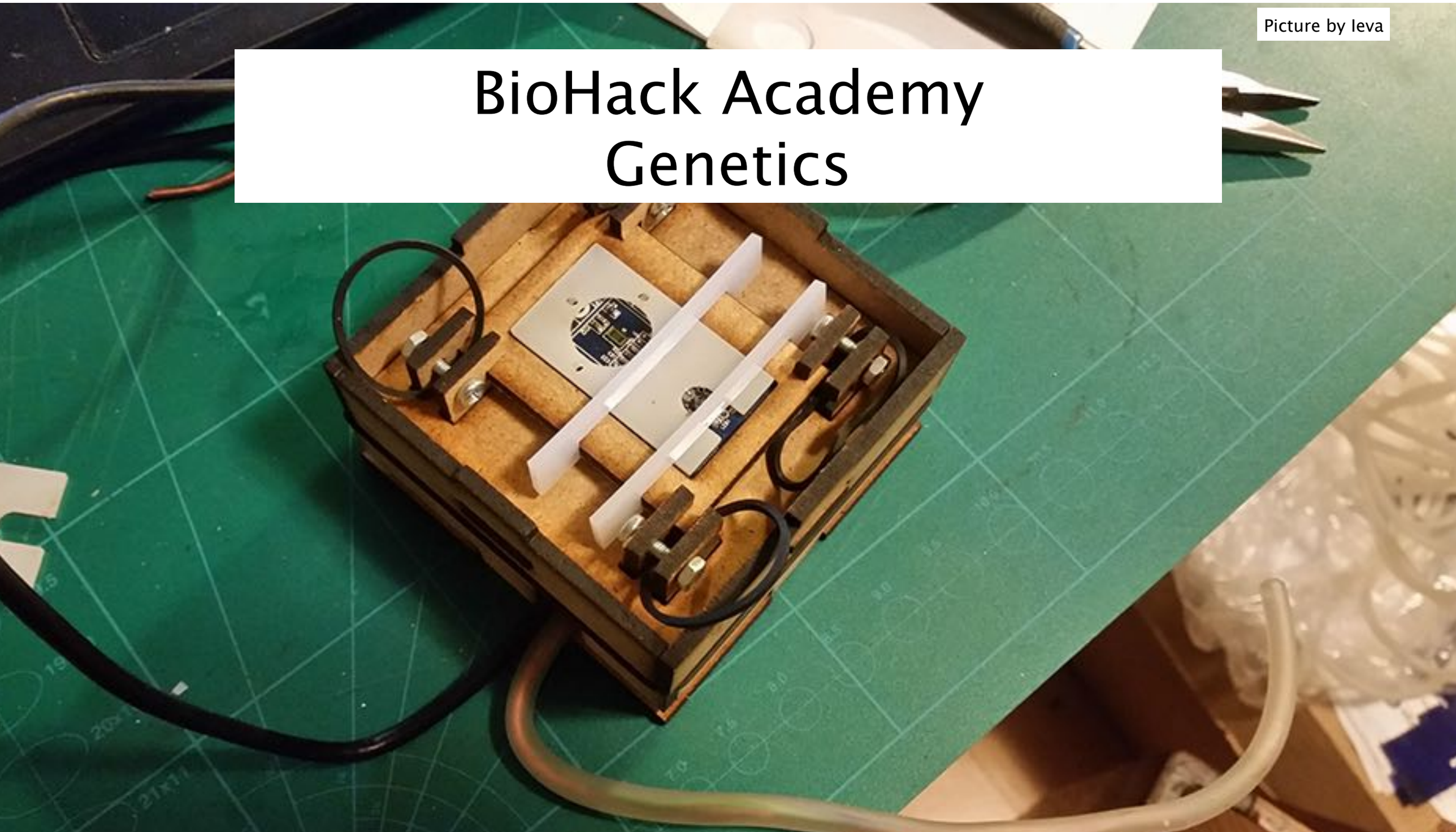
waag society

institute for art, science and technology

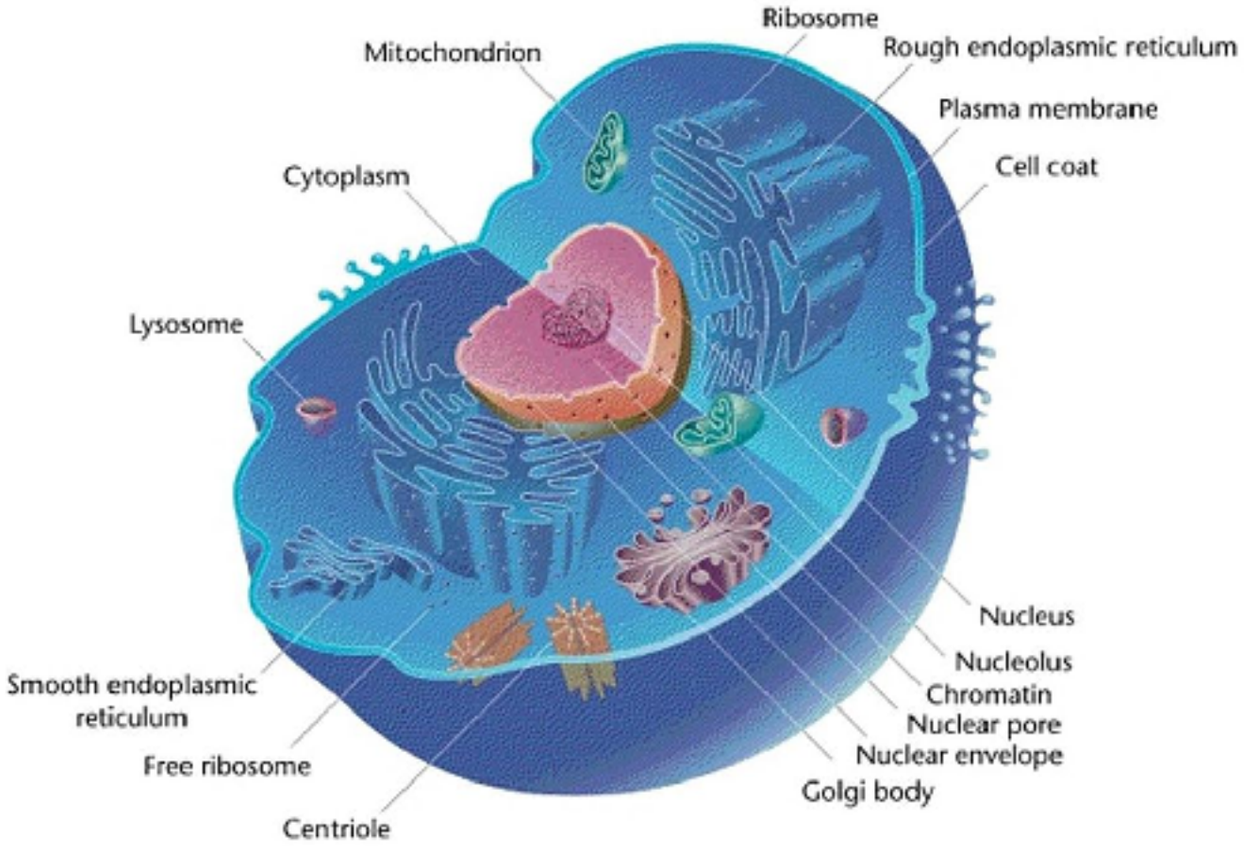


Picture by Ieva

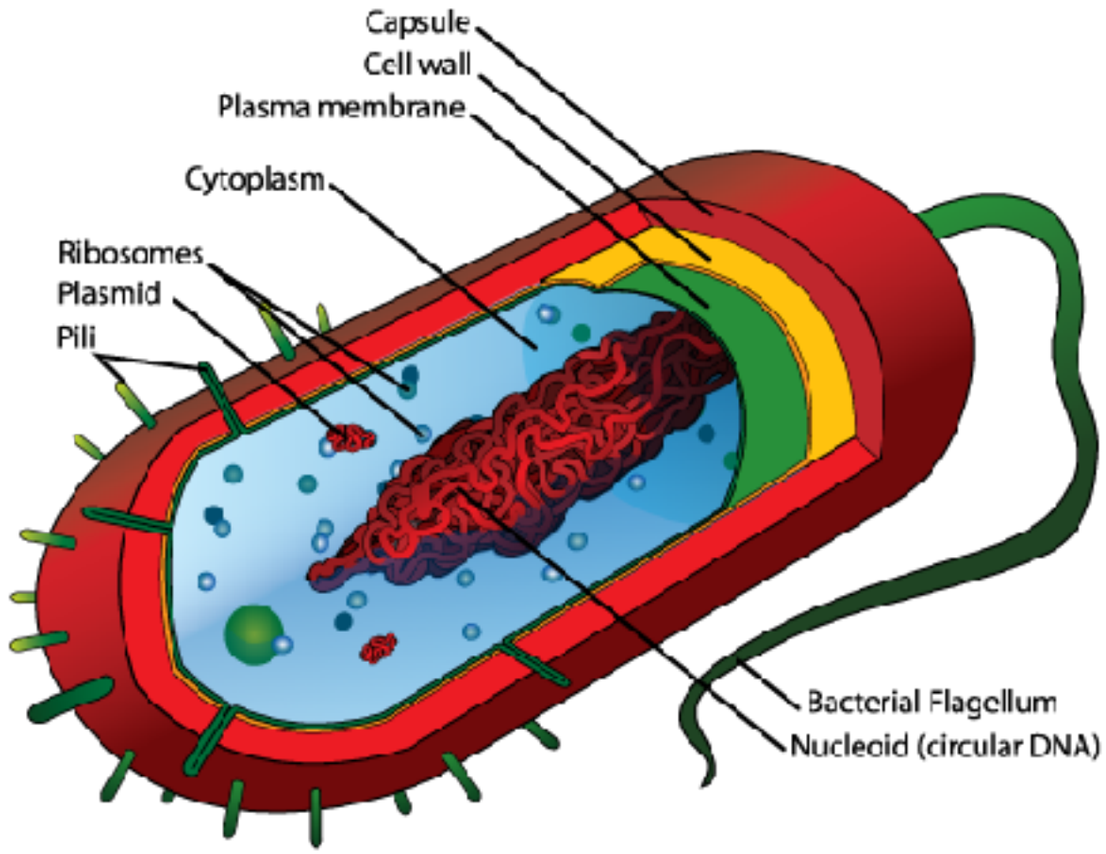
BioHack Academy
Genetics

DNA in cells

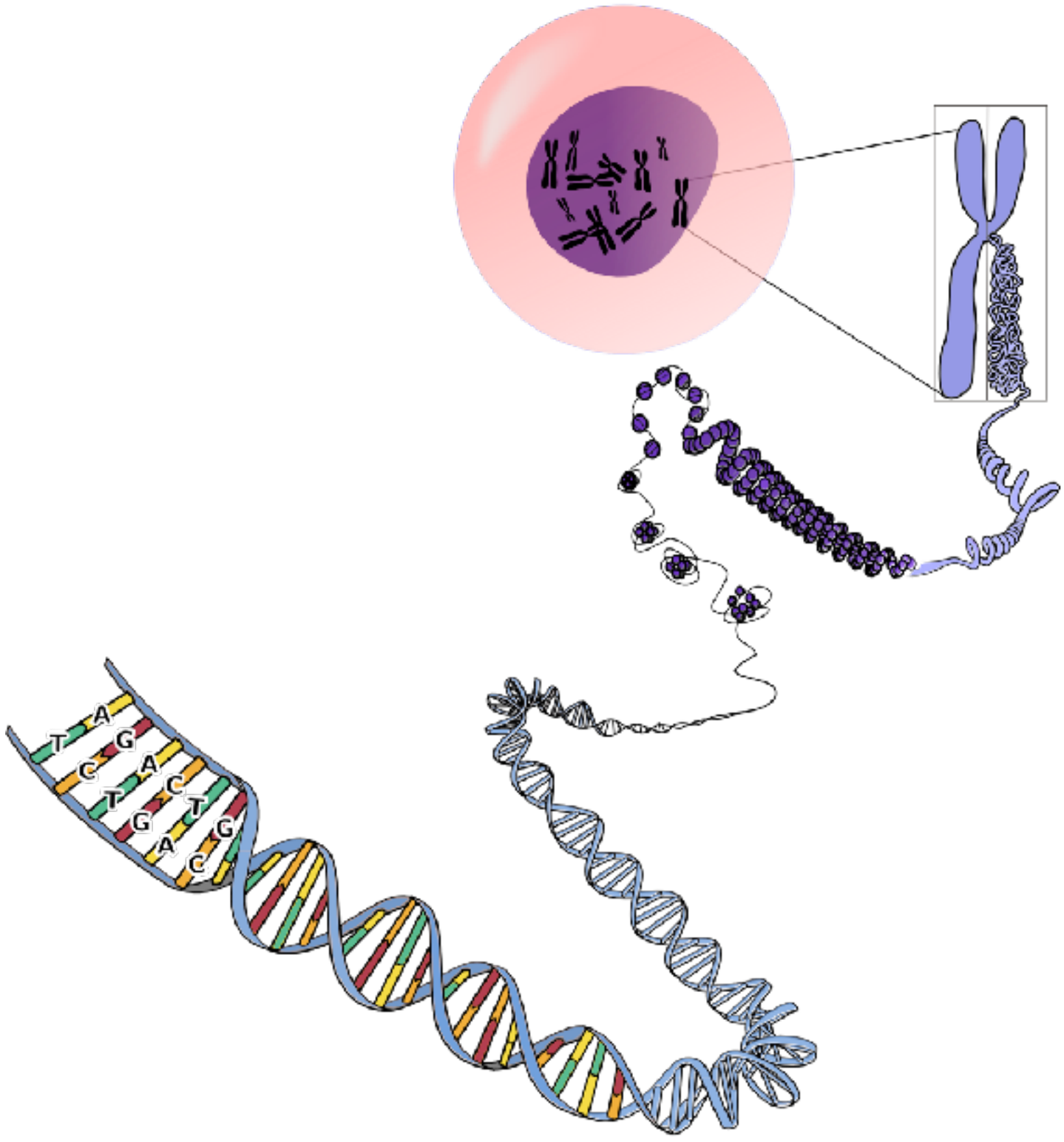
Eukaryotic cell



Prokaryotic cell



DNA in the cell



10^{1} meter

10^0 meter

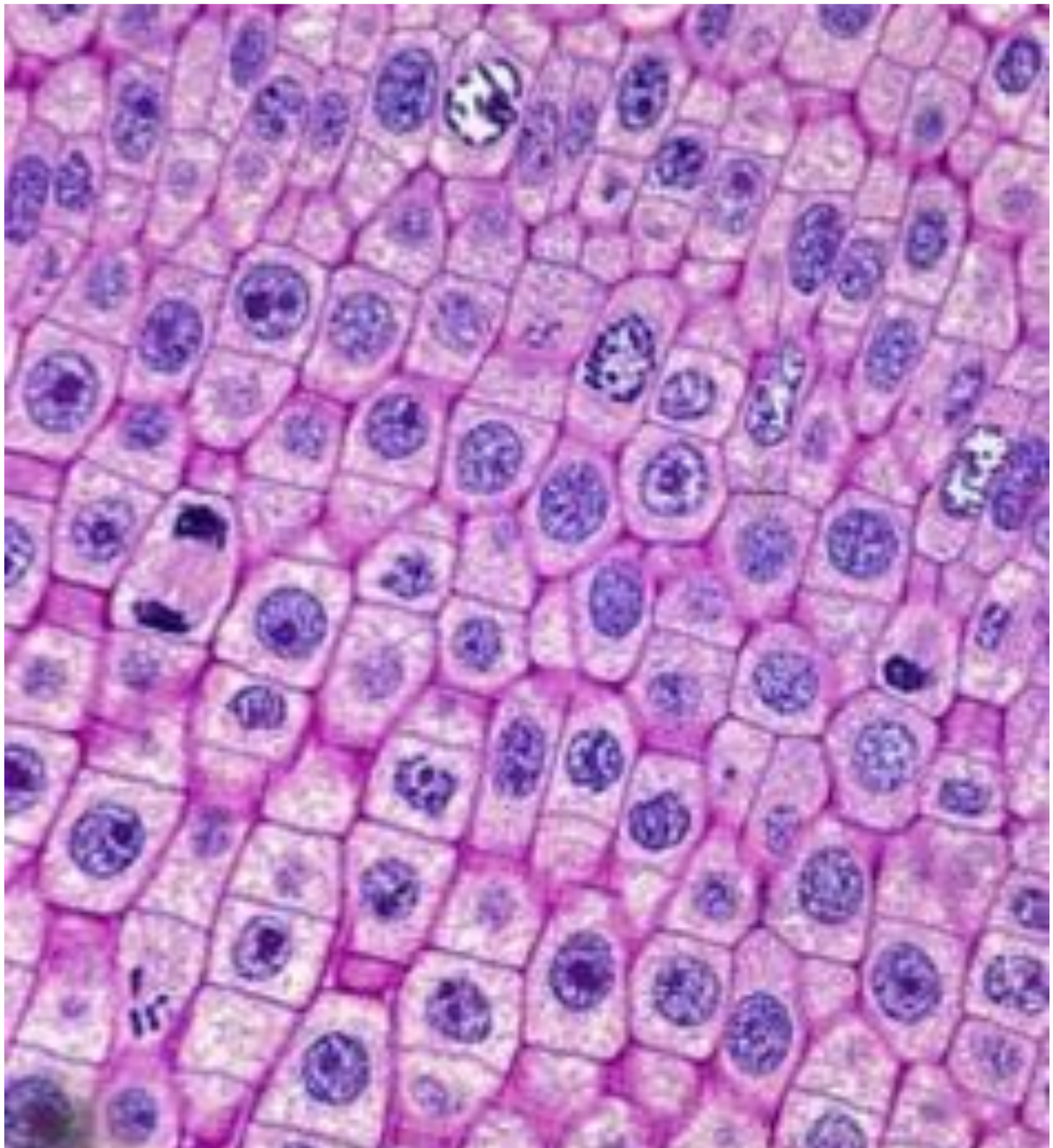
10^{-1} meter

10^{-2} meter

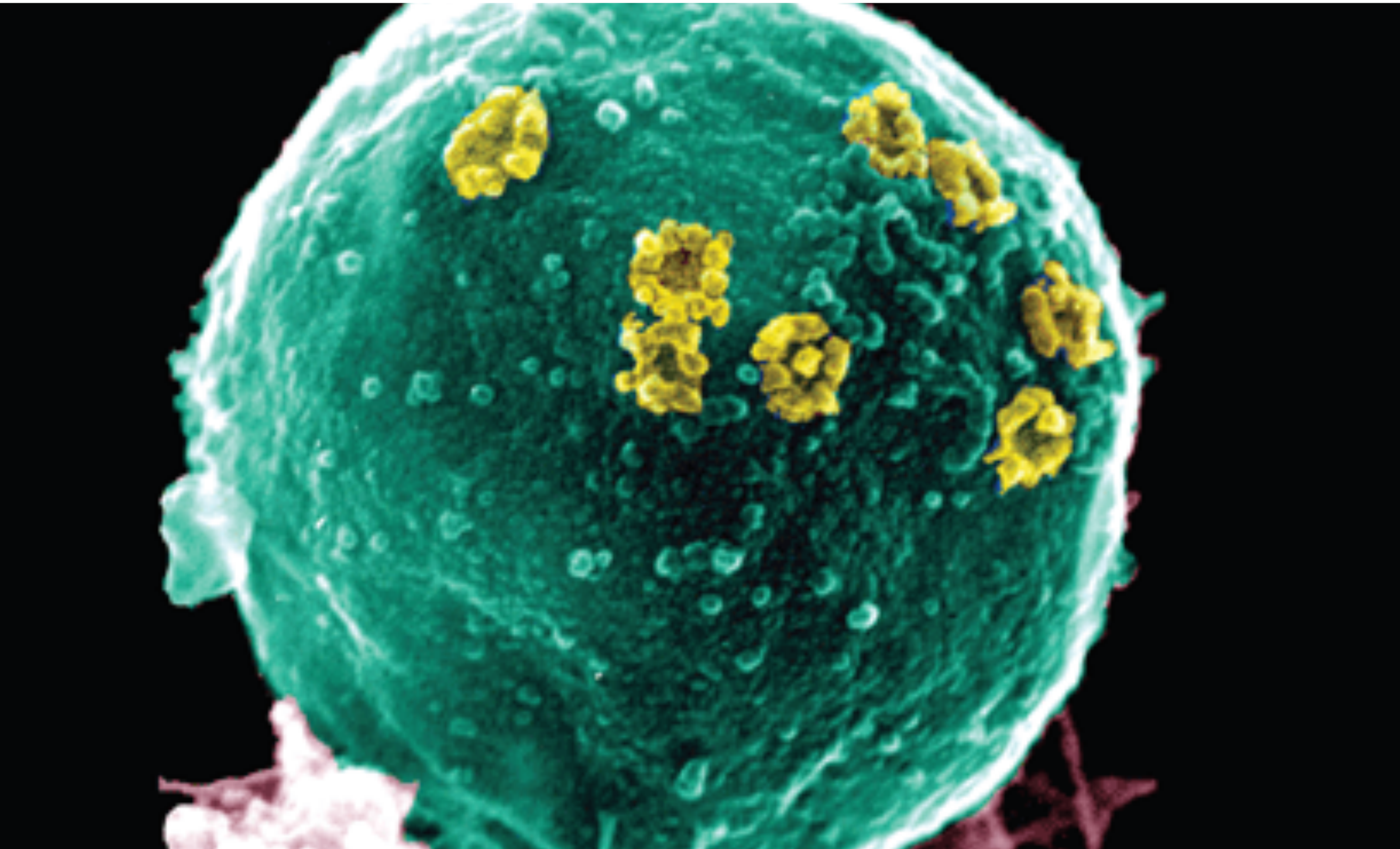
10^{-3} meter

10^{-4} meter

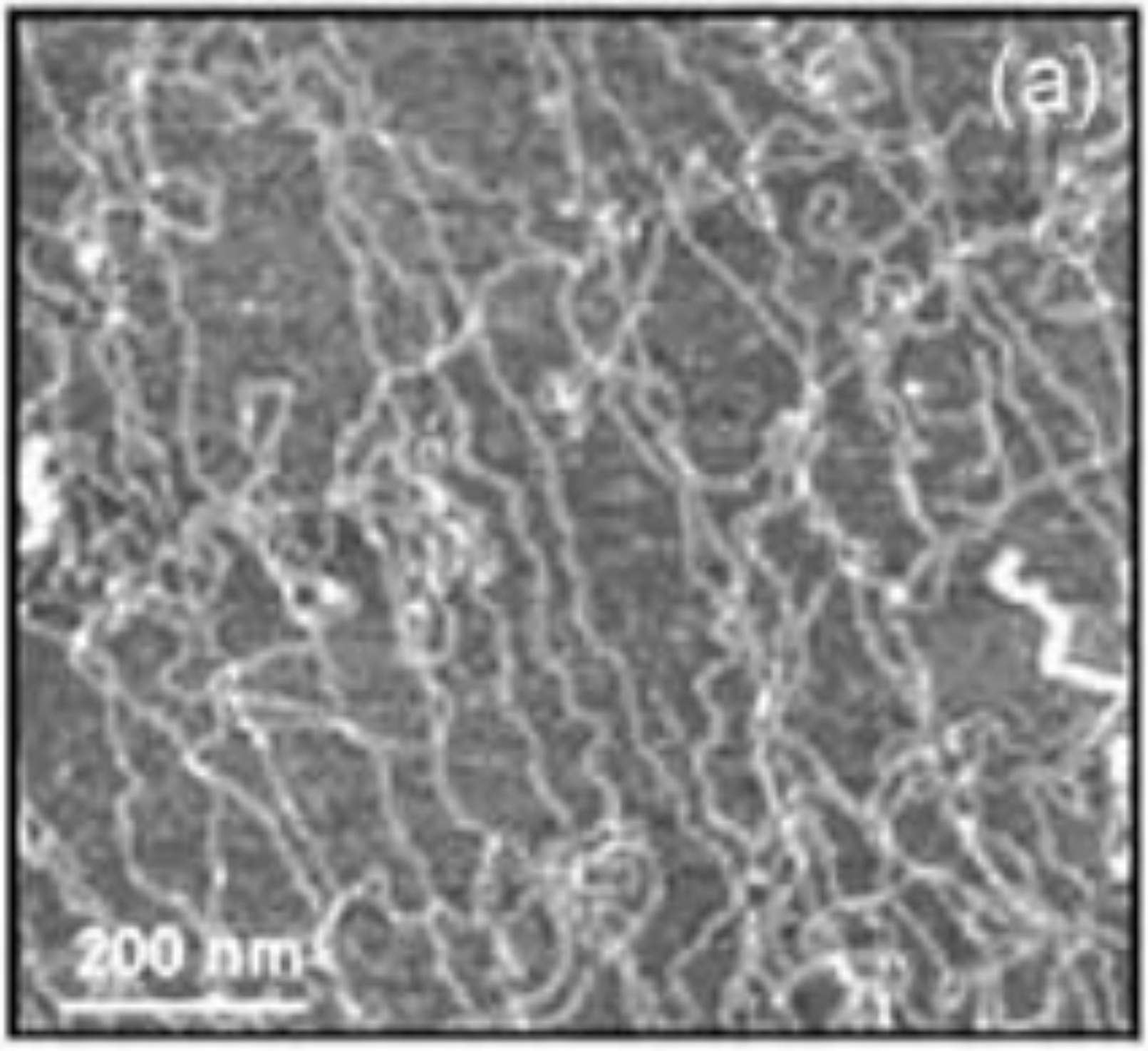
10^{-5} meter



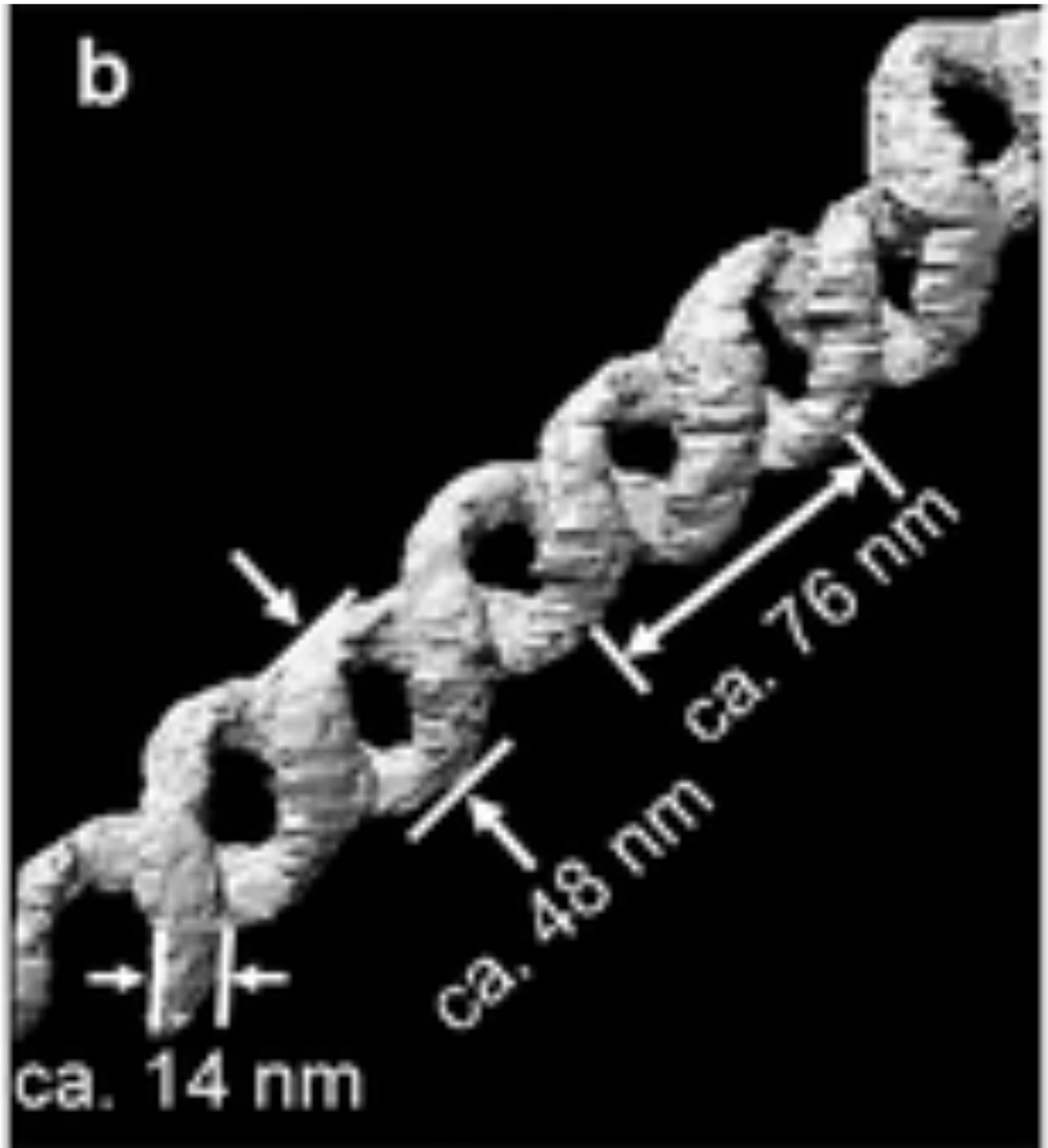
10^{-6} meter



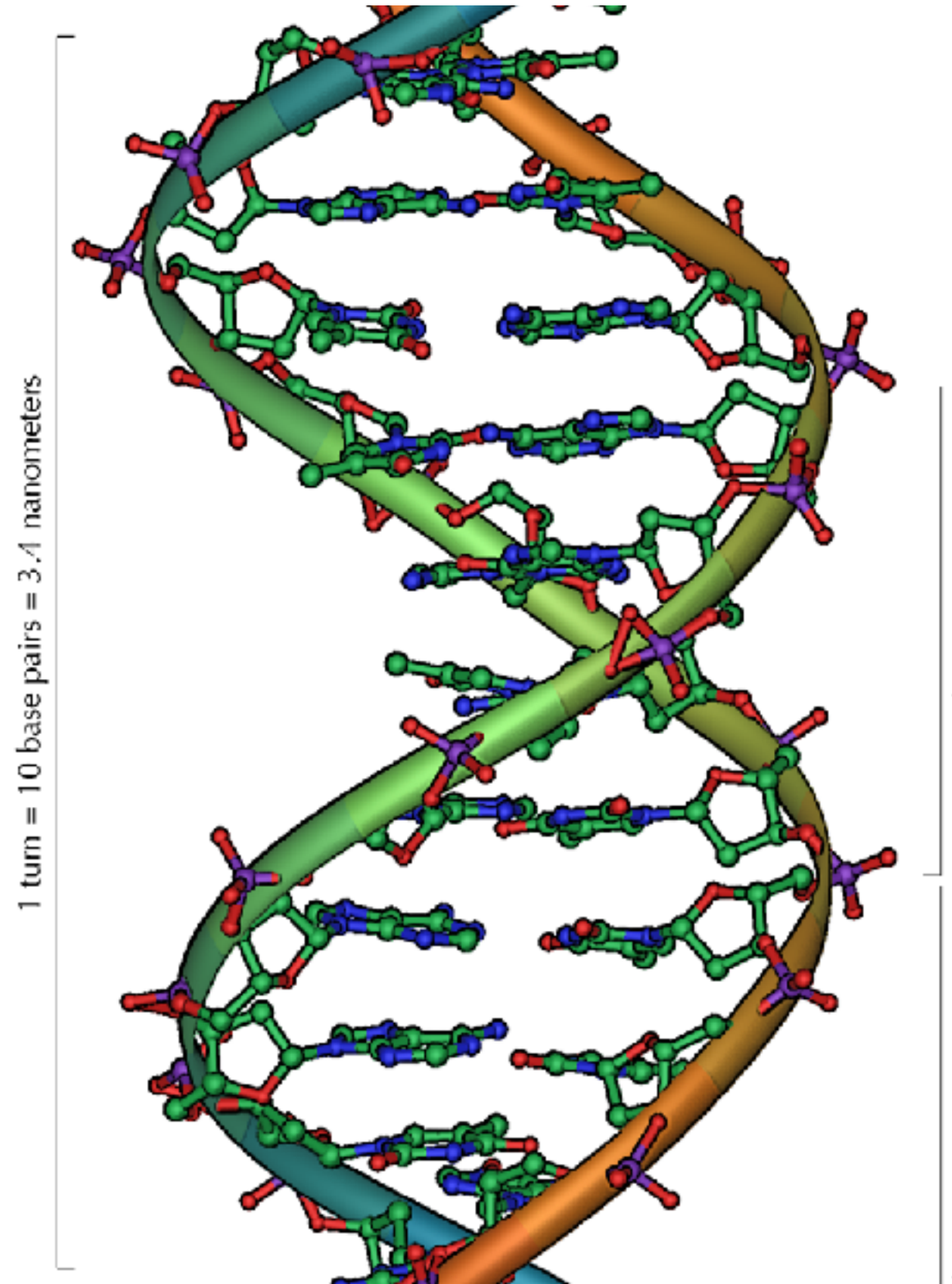
10^{-7} meter



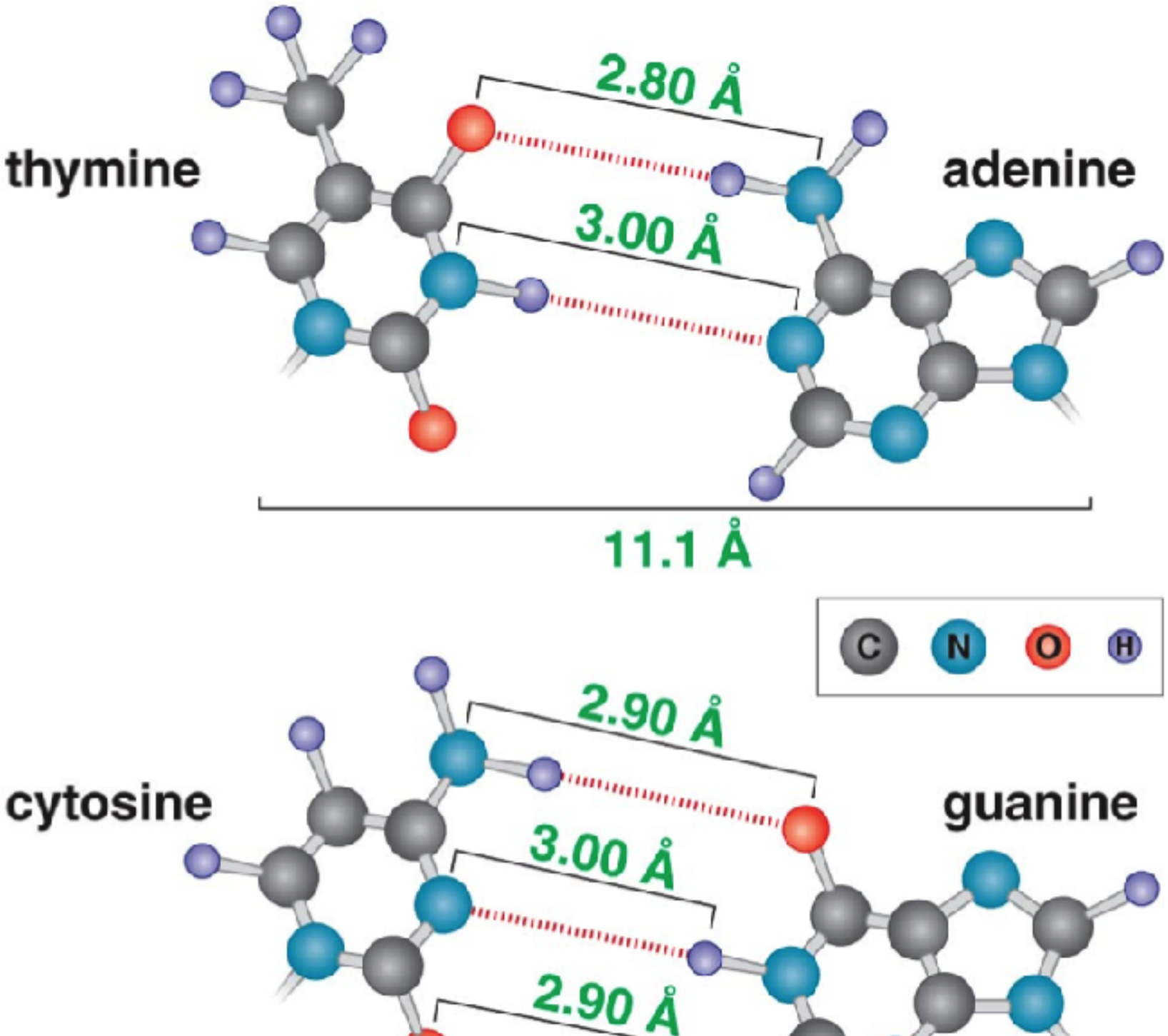
10^{-8} meter



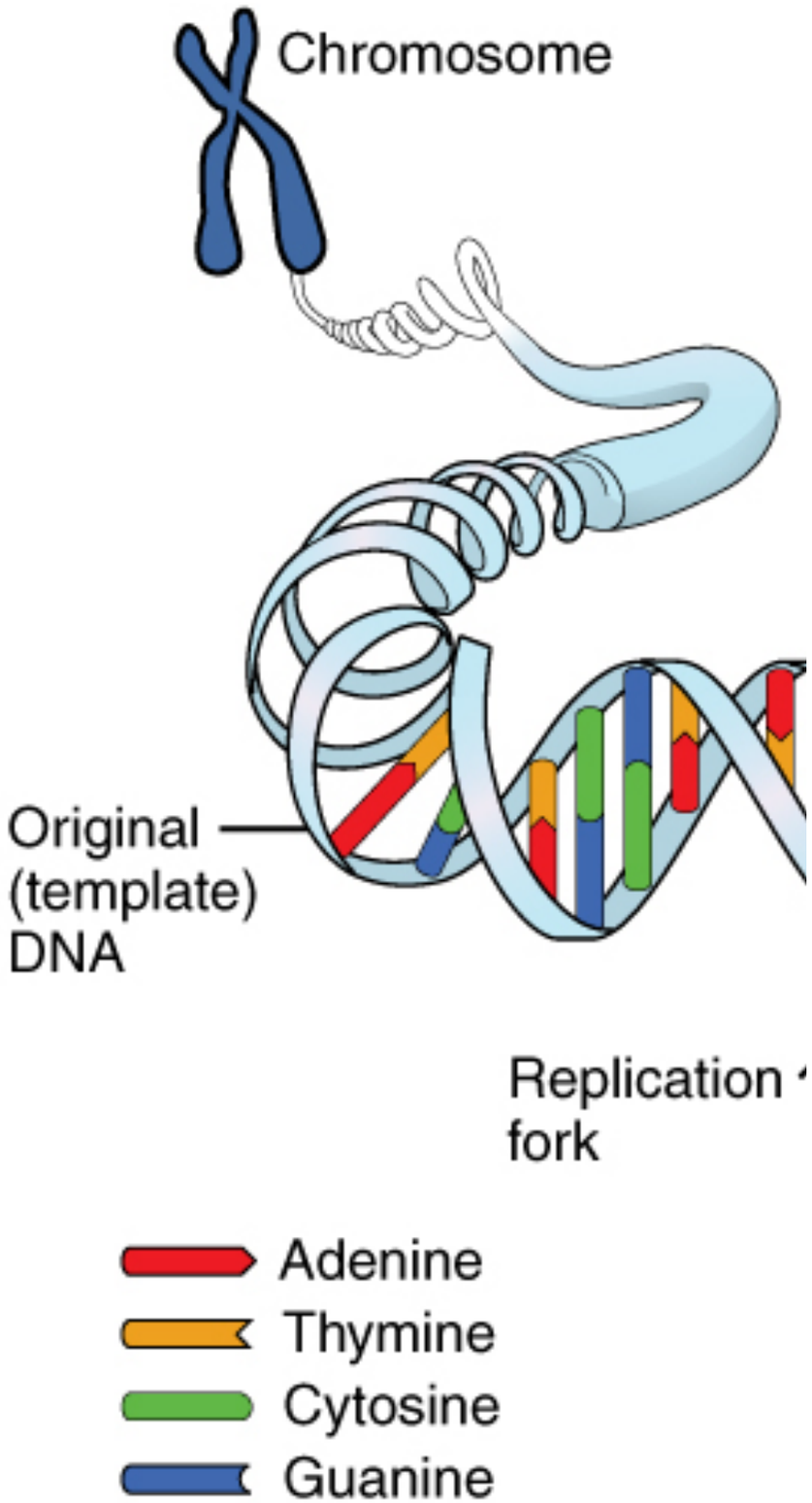
10^{-9} meter



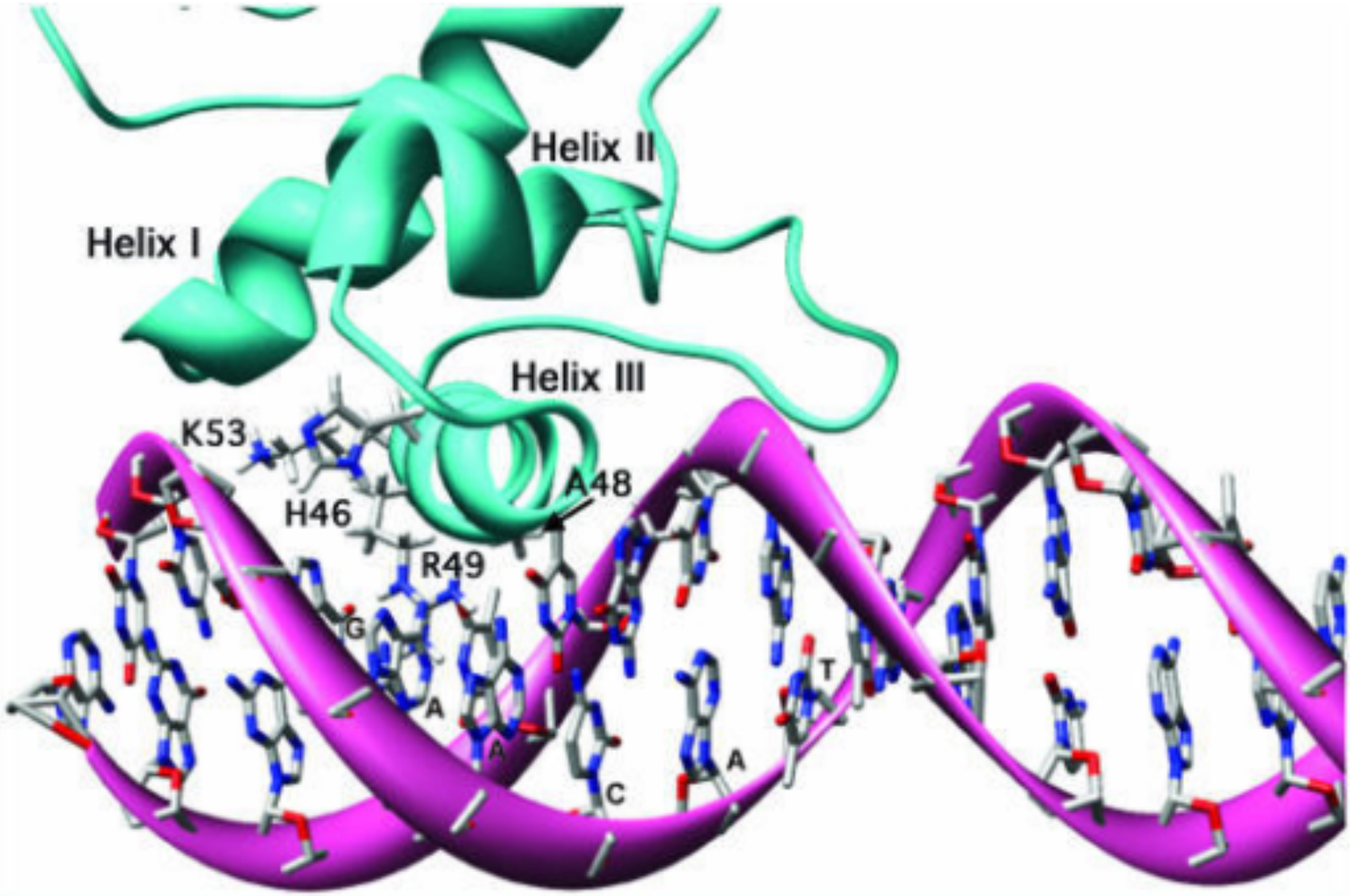
10^{-10} meter


thymine
adenine
2.80 Å
3.00 Å
11.1 Å
C
N
O
H
cytosine
guanine
2.90 Å
3.00 Å
2.90 Å

DNA Replication



DNA docking



DNA probe

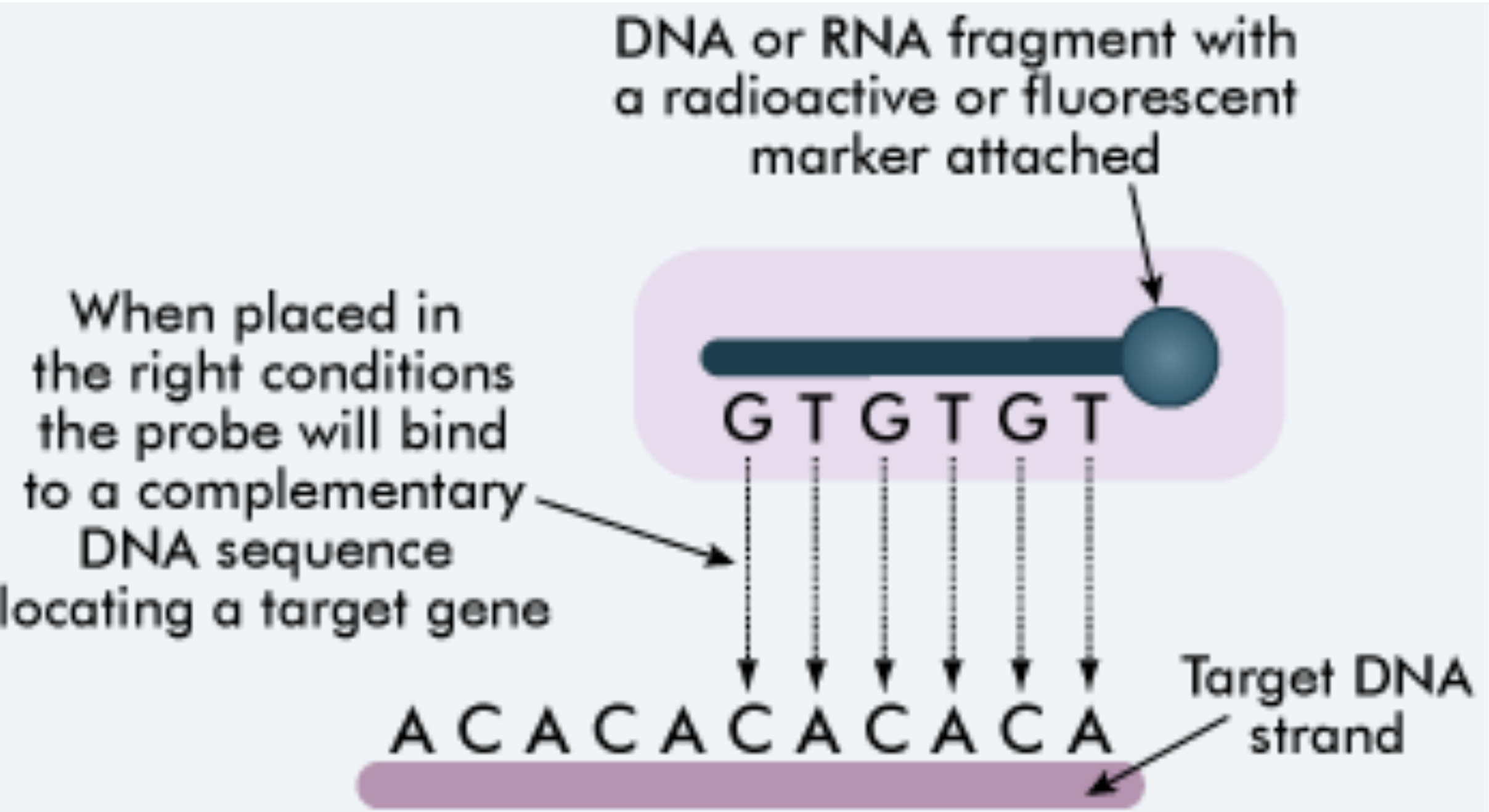
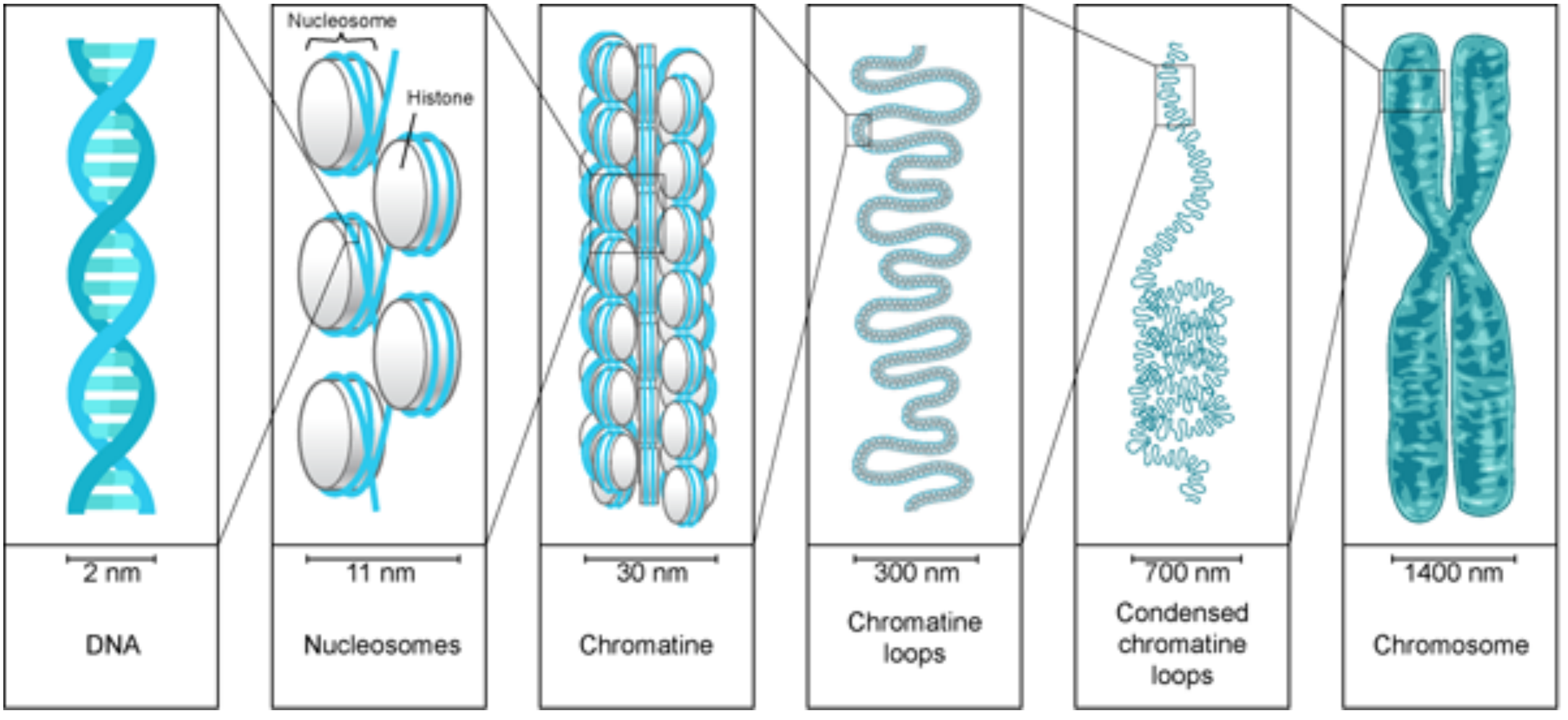
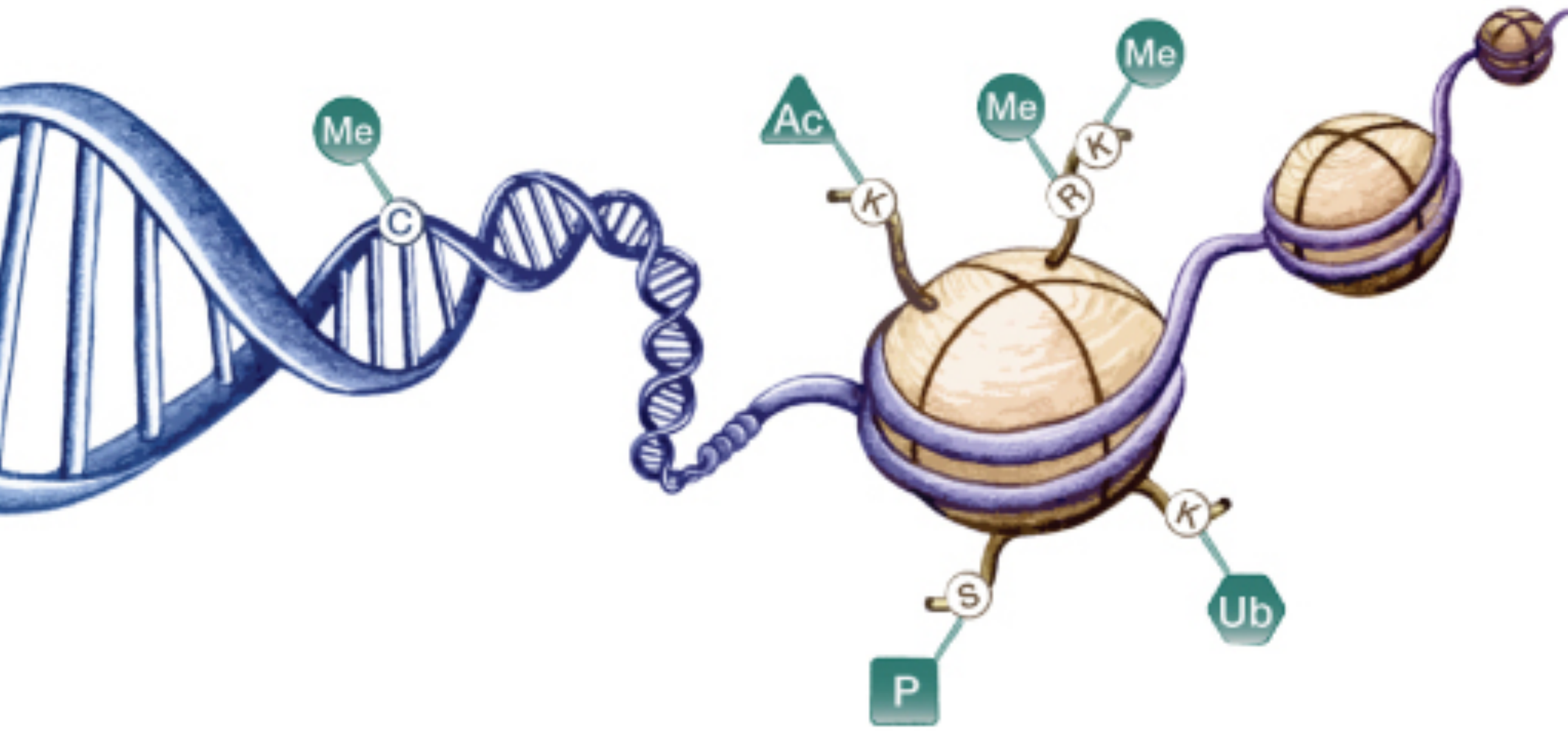


Diagram of a gene probe

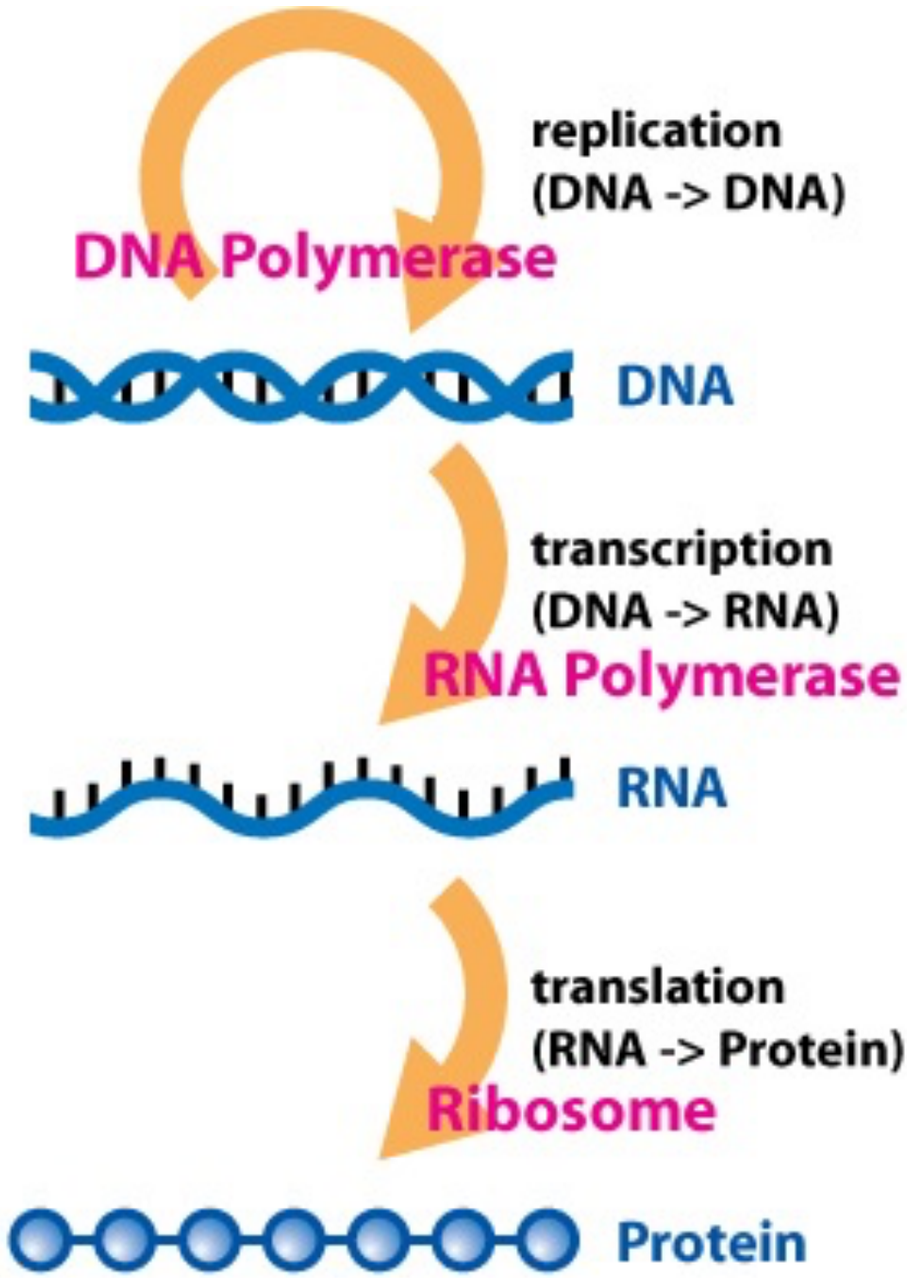
DNA condensation



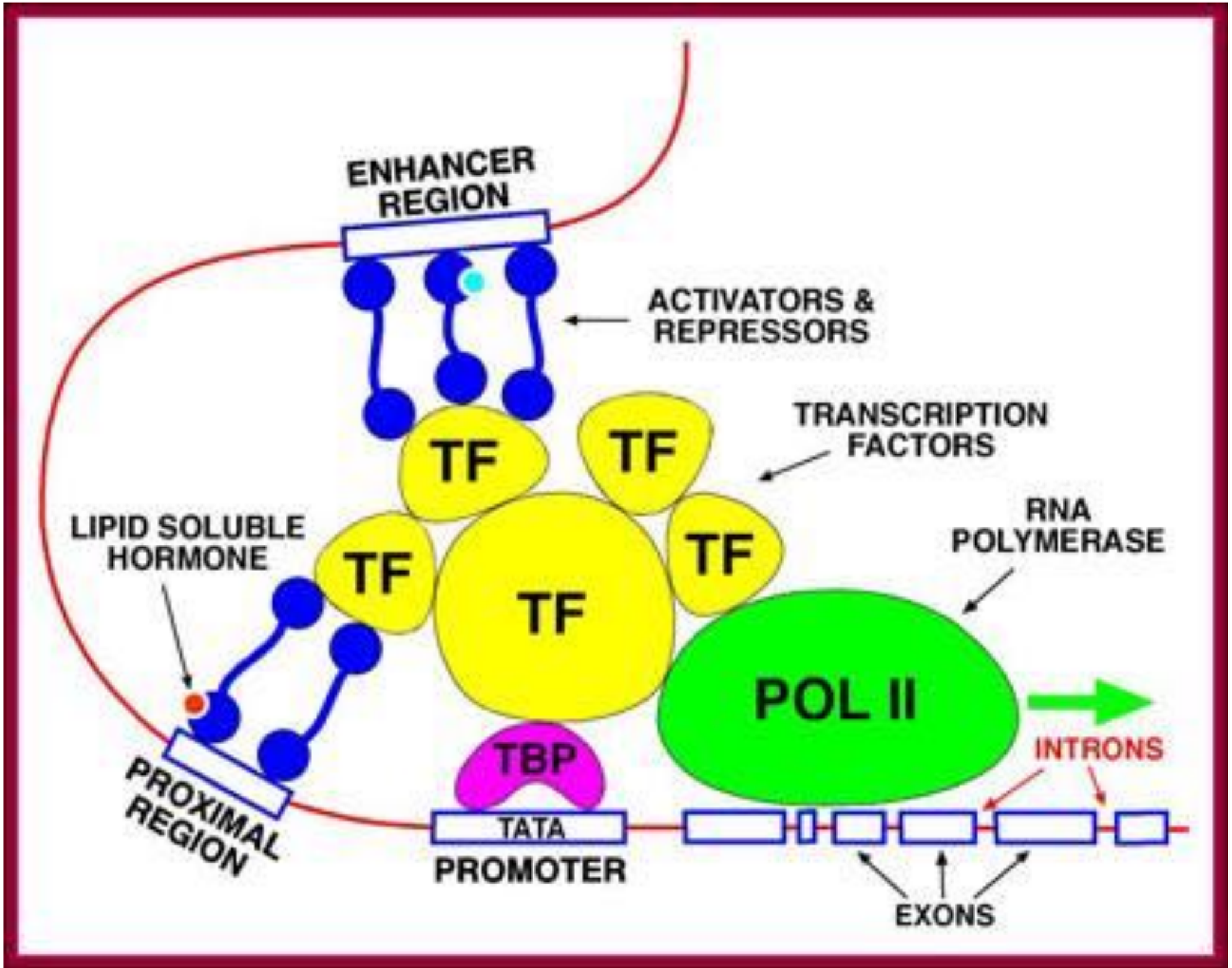
Epigenetics



Central Dogma



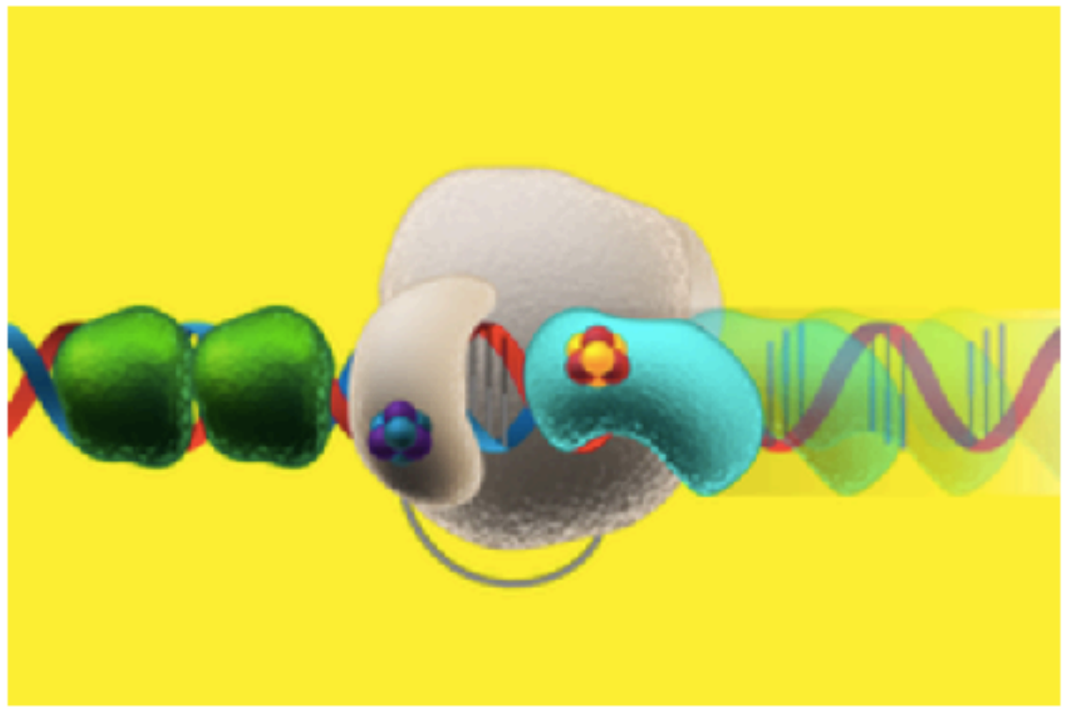
DNA expression - RNA polymerase



DNA wire

Electrons Use DNA Like a Wire for Signaling DNA Replication

Share this:

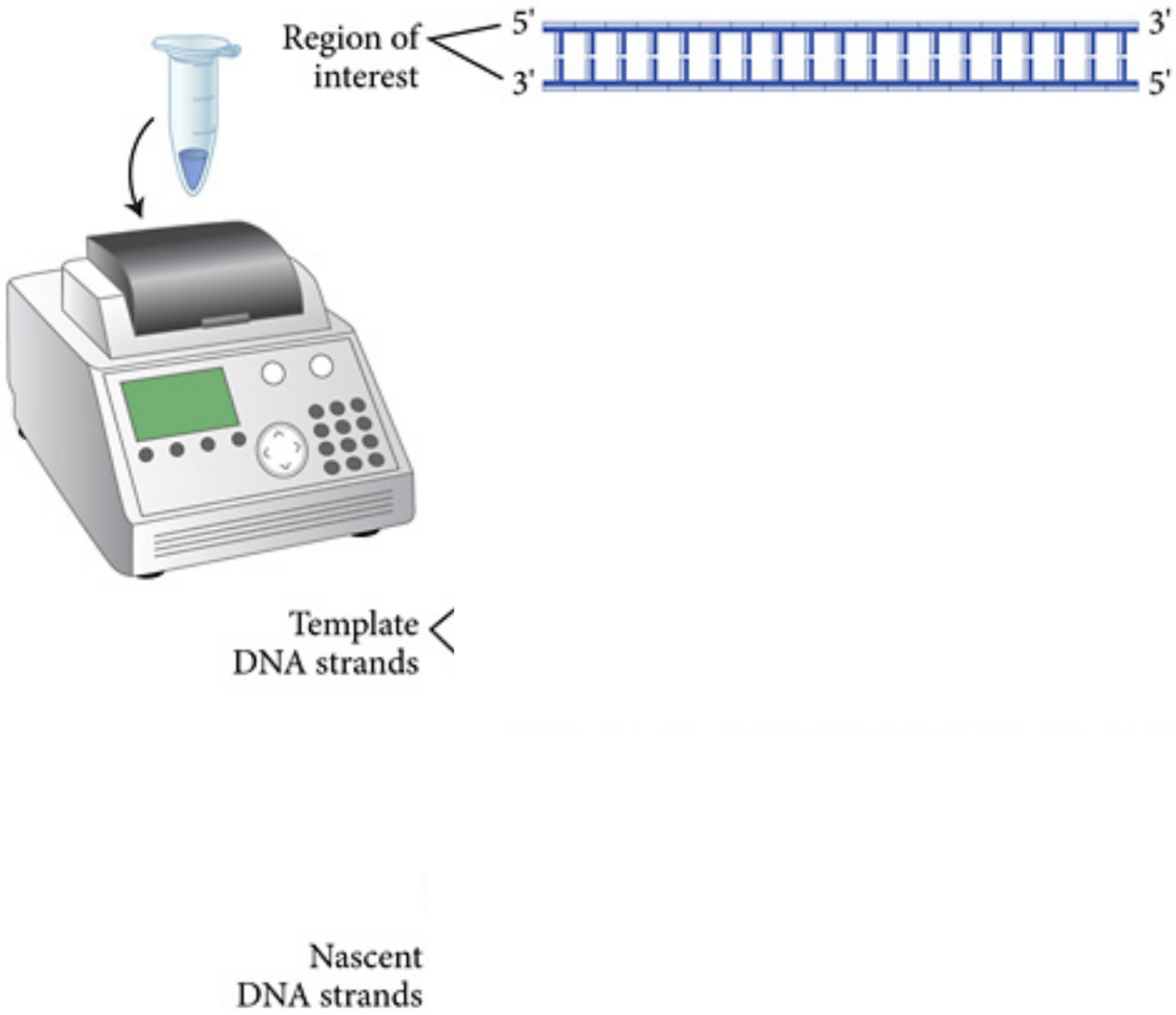


A protein called DNA primase (tan) begins to replicate DNA when an iron-sulfur cluster within it is oxidized, or loses an electron (blue and purple). Once this primase has made an RNA primer, a protein signaling partner, presumably DNA polymerase alpha (blue), sends an electron from its reduced cluster, which has an extra electron (yellow and red). The electron

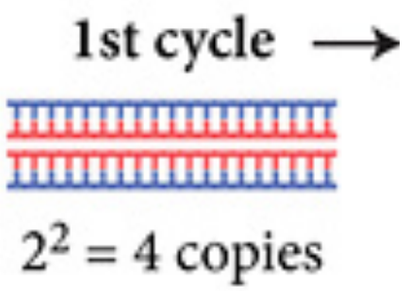
Polymerase Chain Reaction, 1983

Kary Mullis

Polymerase Chain Reaction



Polymerase Chain Reaction



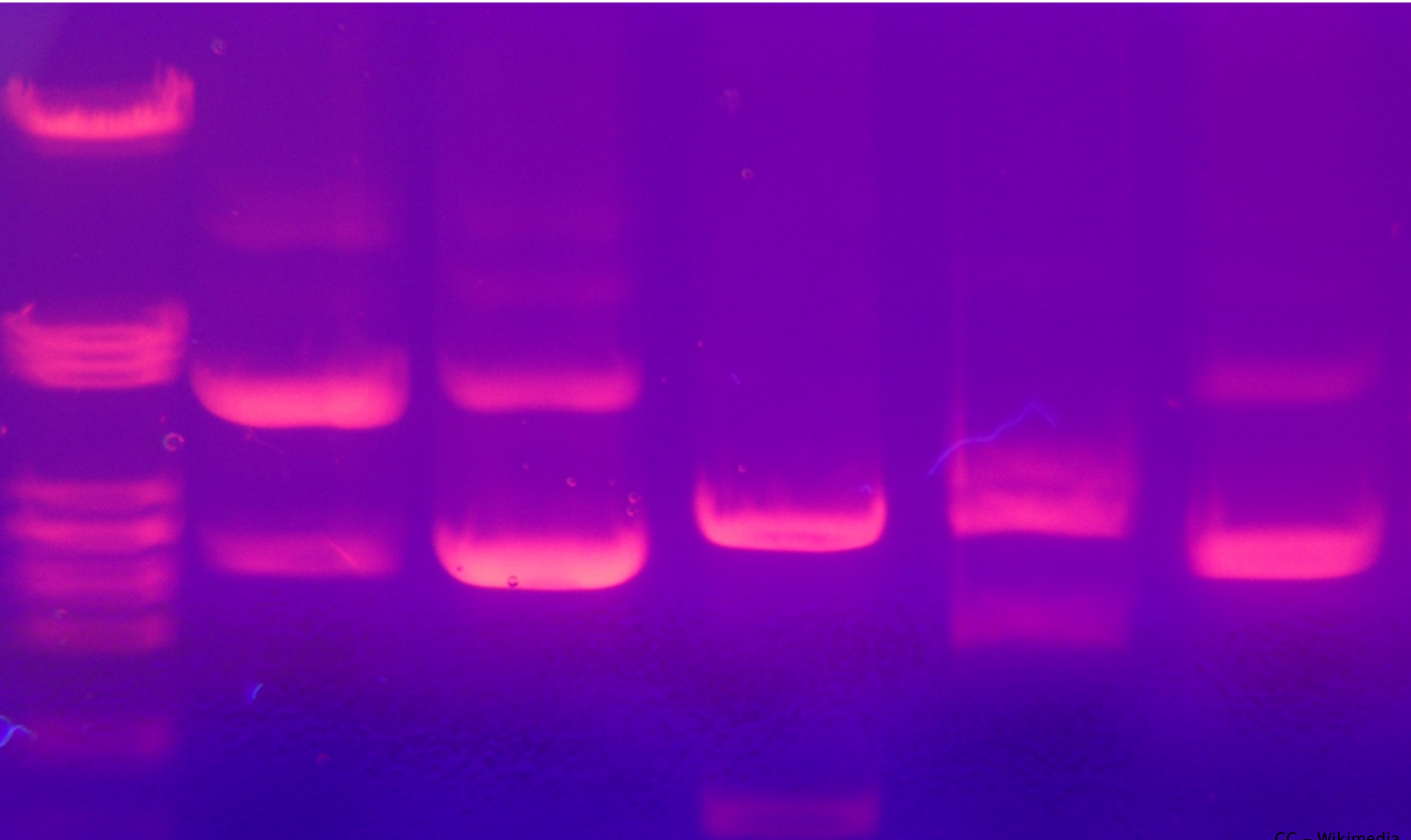
$2^2 = 4$ copies

waag society

institute for art, science and technology

DNA fingerprinting

DNA fingerprint



CC – Wikimedia

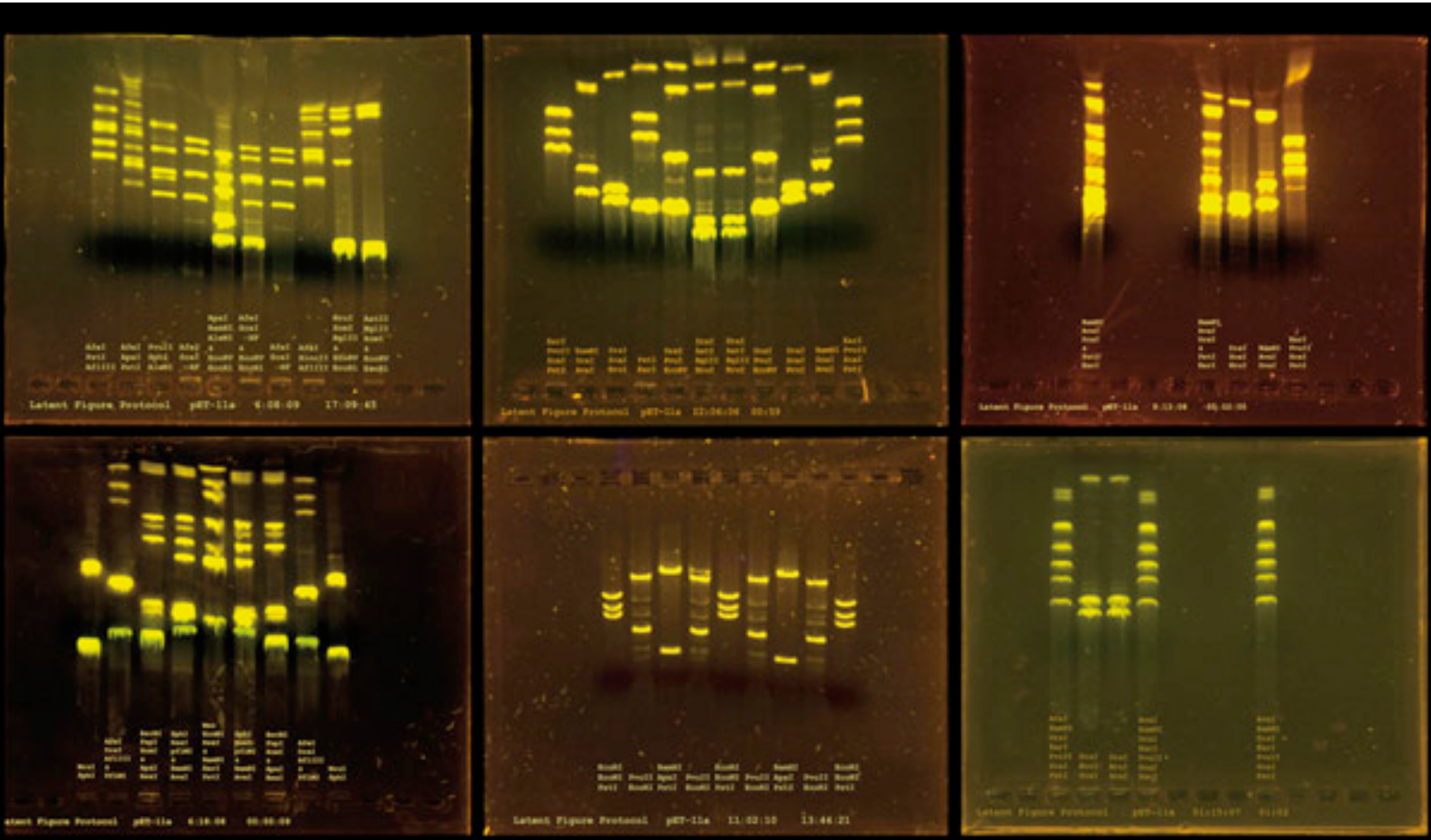
Sushi test

PooPrints

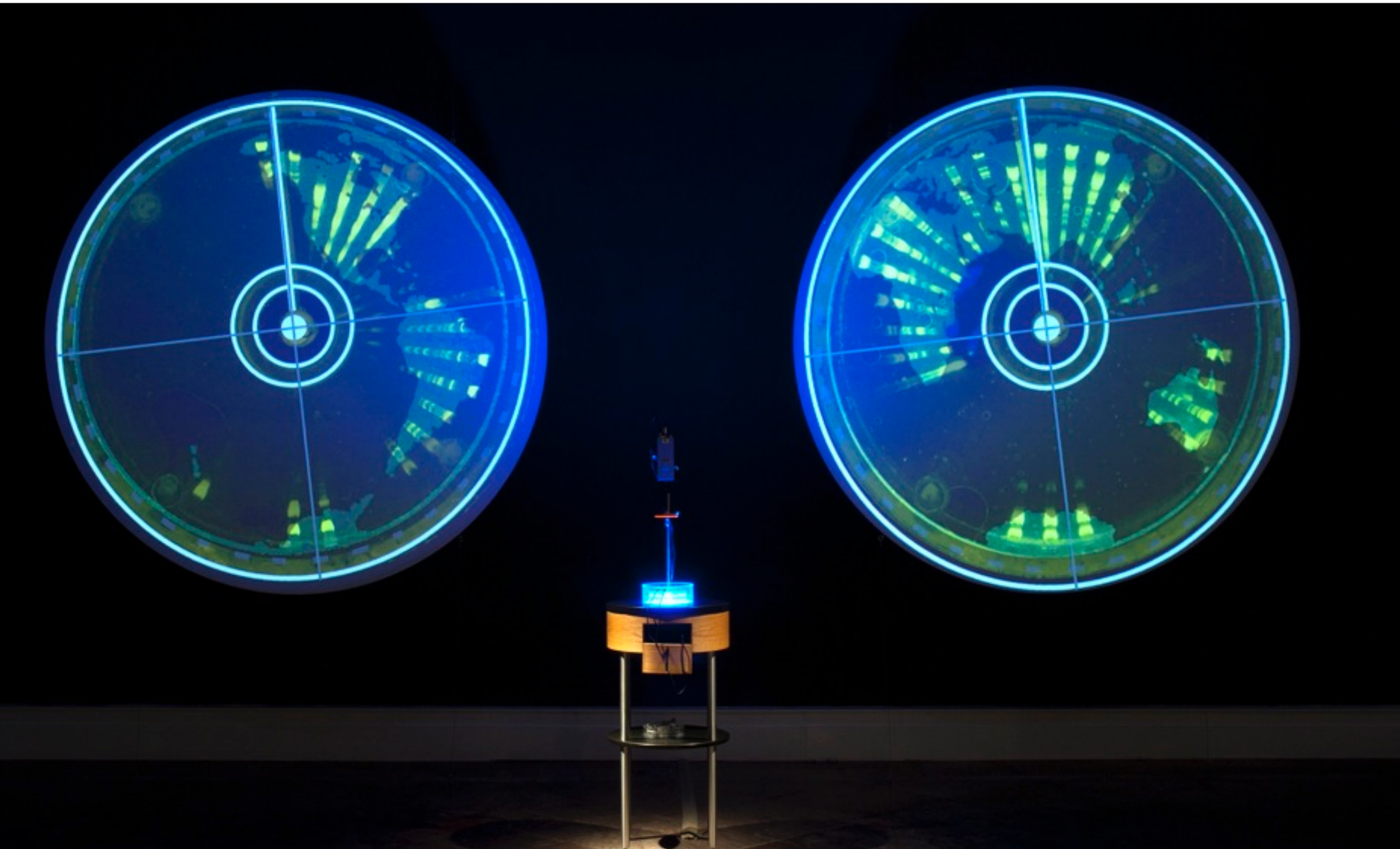

PooPrints™
Match The Mess Through DNA
DNA Collection Kit
Customer Information Card
*Required information
Account Information
*Country:
*Email:
*Your Name:
*Address:
*City, State, Zip
Phone:
Pet Information
Apply Barcode Sticker Here
Pet's Name:
*Pet's Species: Dog Cat
Where did you purchase your DNA Pet ID Kit?
Company:
BioPet Vet Lab
DNA World Pet Registry
PET Identification Card
BioPet Vet Lab
1-866-863-7389
Affix barcode sticker OR write dog's name here
Affix barcode sticker OR write dog's name here
BioPet Vet Lab
BioPet Vet Lab

Barcode

Paul Vanouse



Paul Vanouse



waag society

institute for art, science and technology

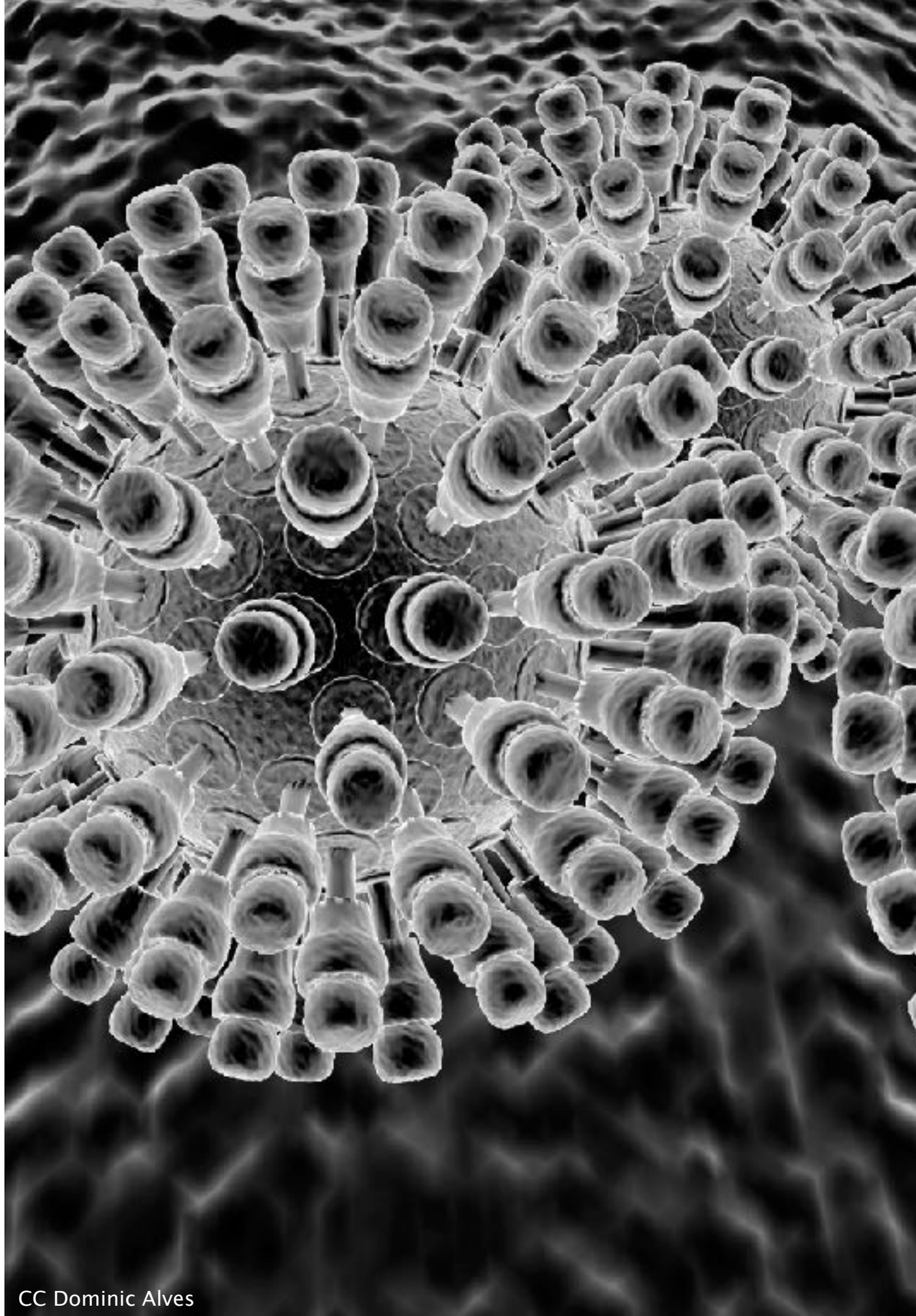
DNA restriction

a.k.a cutting DNA

DNA restriction enzymes

- Protect against viral infections

- Over 3000 types known

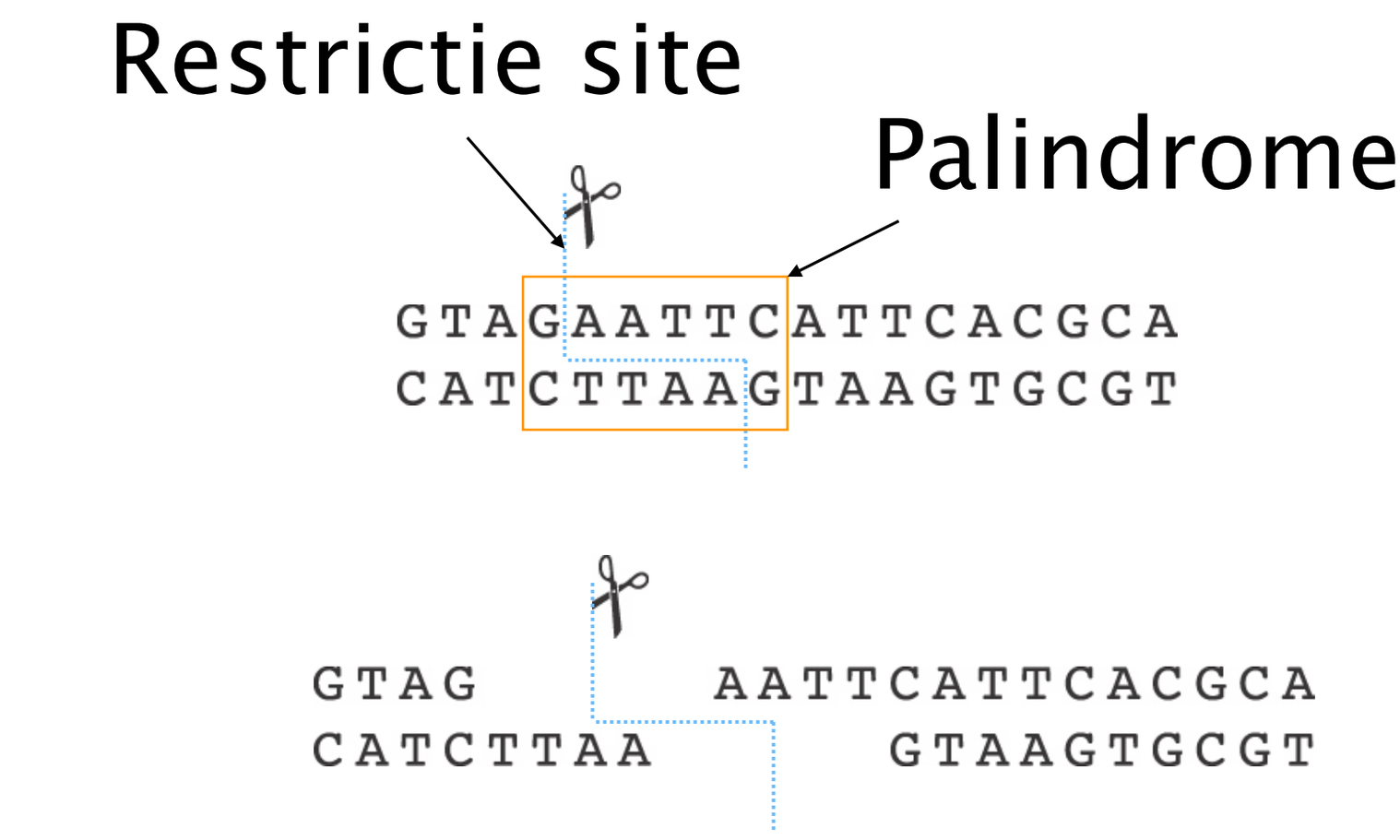


EcoRI en PstI

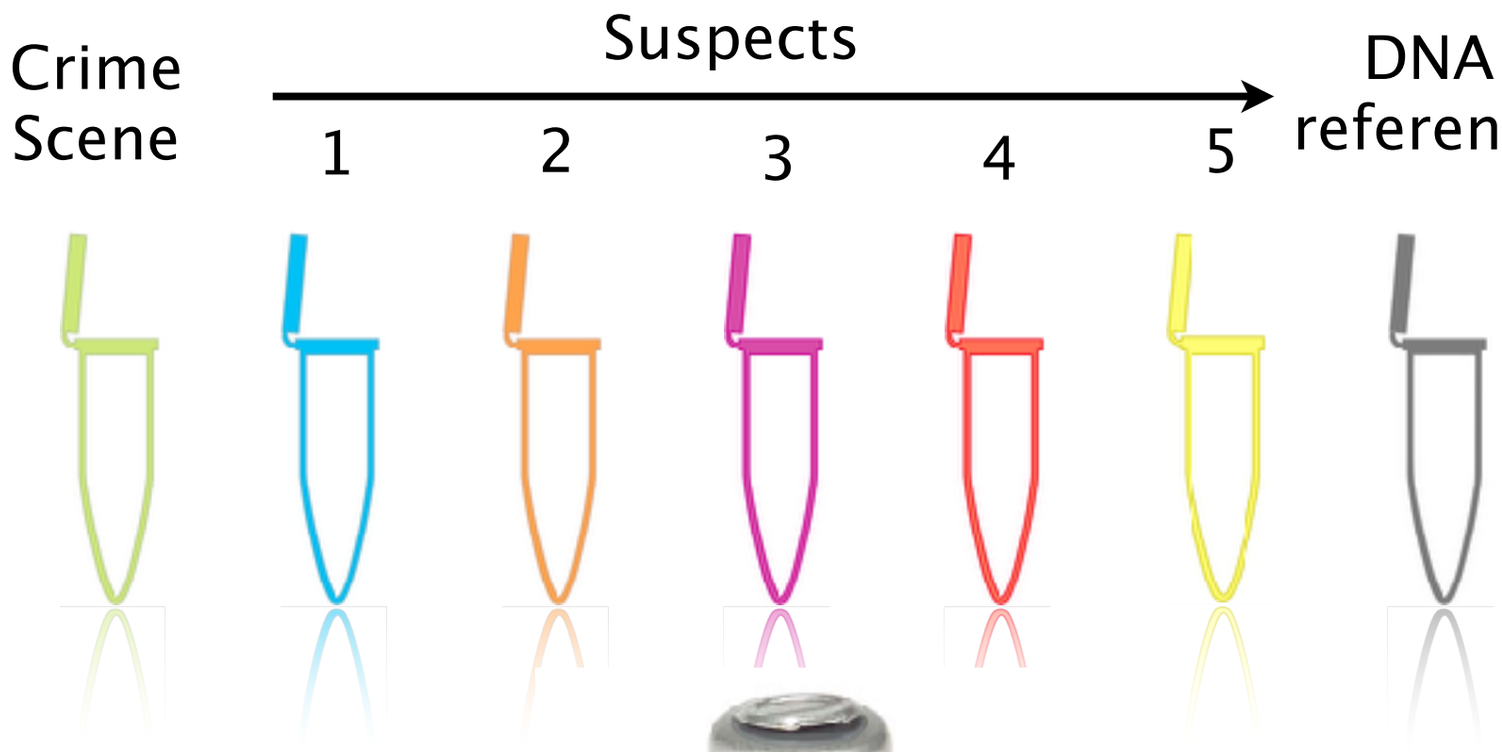
EcoRI
- Eschericha coli
- 5 prime overlap

PstI
- Providencia stuartii
- 3 prime overlap

Sequence specific cuts



Step 1: samples and enzymes



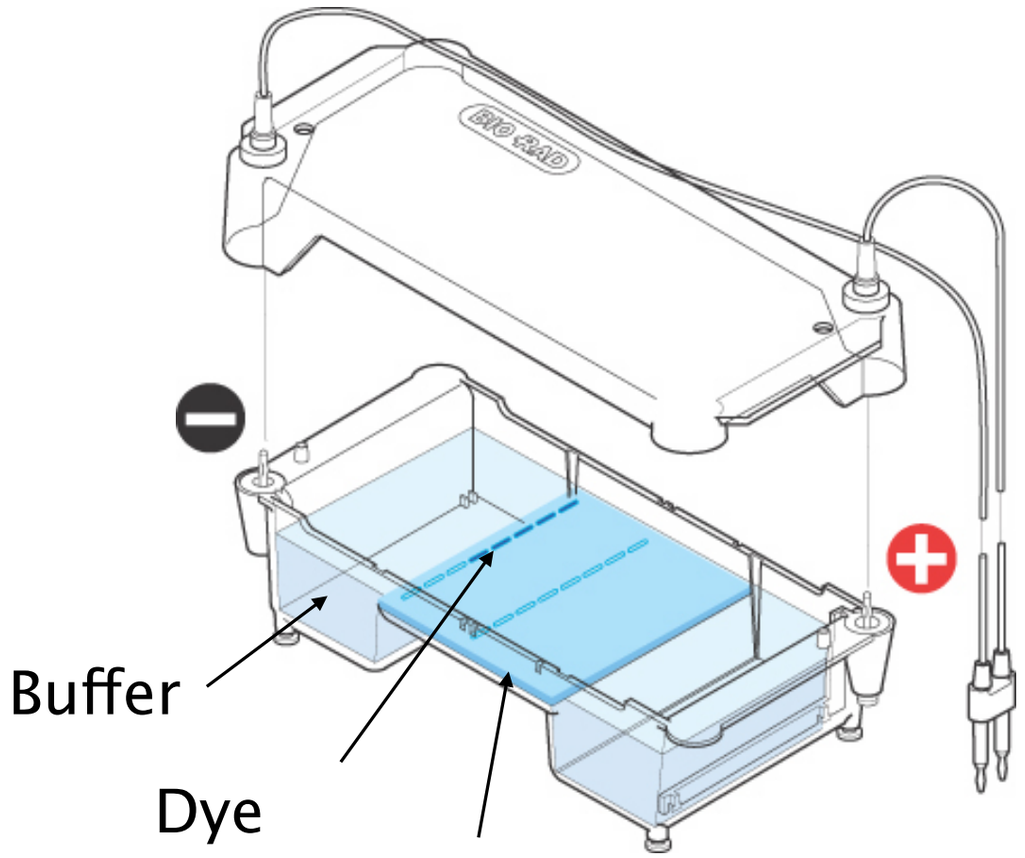
Take the 5 samples

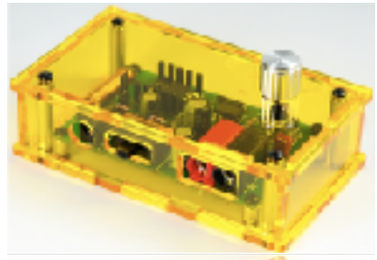
Cut it using a EcoRI/ PstI restriction-enzymmix

Incubate 45 minutes at 37 degrees

Step 2: Gel electrophoreses

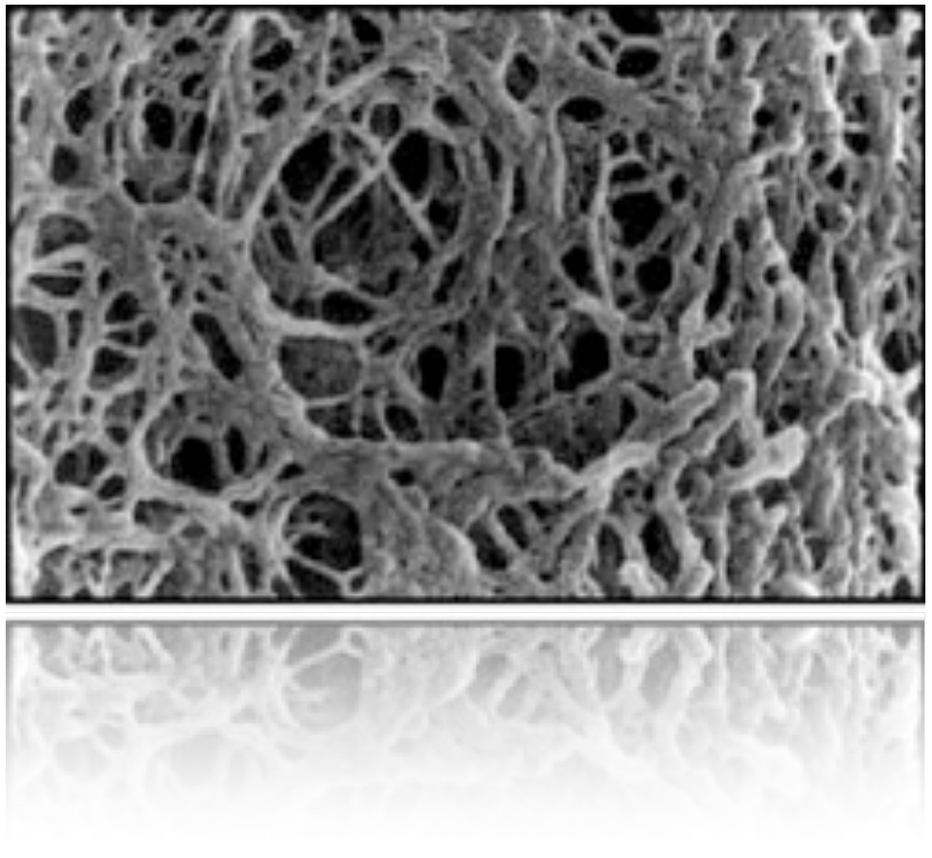
DNA is attracted by the anode

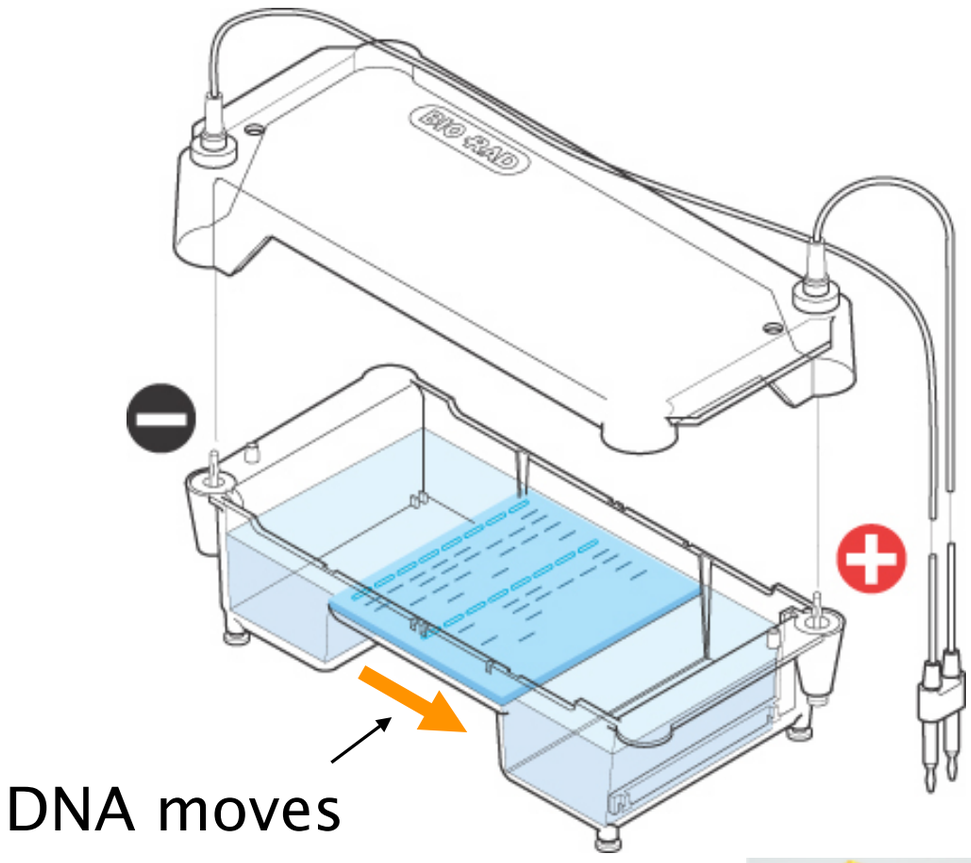


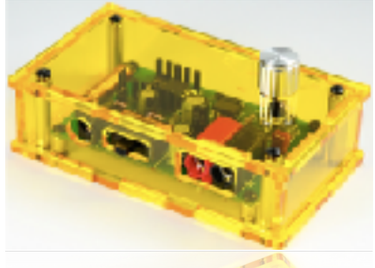


Step 2: Gel electrophoreses

Short pieces move faster
than long pieces





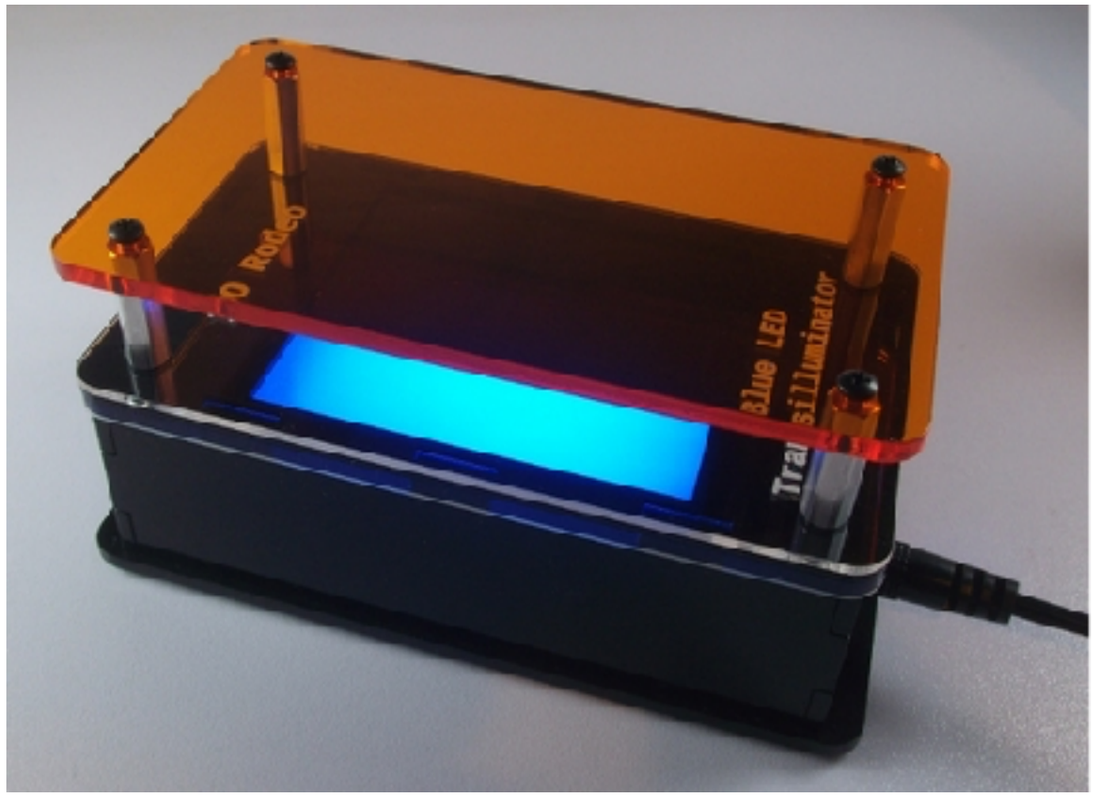


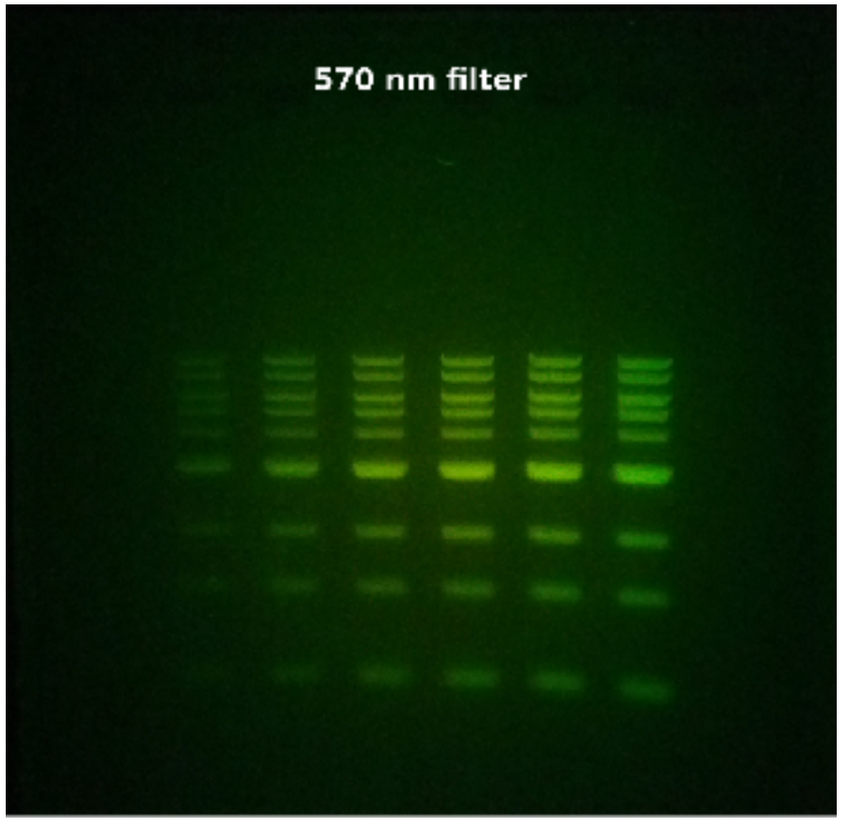
Transillumination

- Fluorescent DNA dye

- Sensitive to blue light
- Emits green light

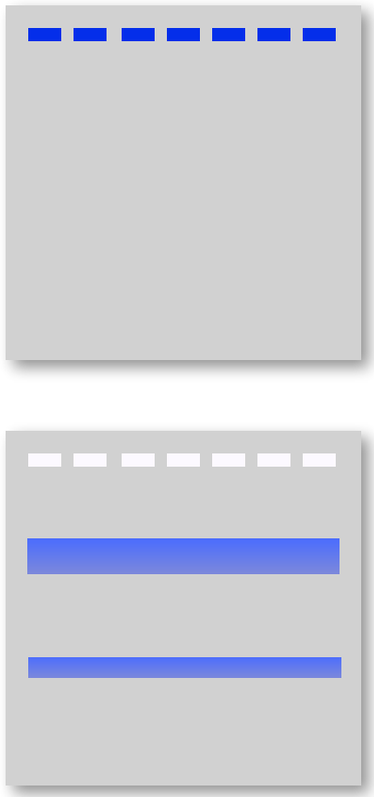
- Orange filter blocks blue light





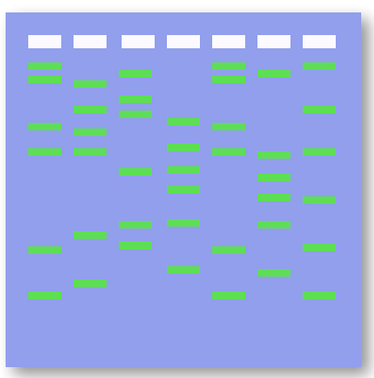
Step 2: Gel electrophoreses

CS 12345 Ref



Load the samples in a gel

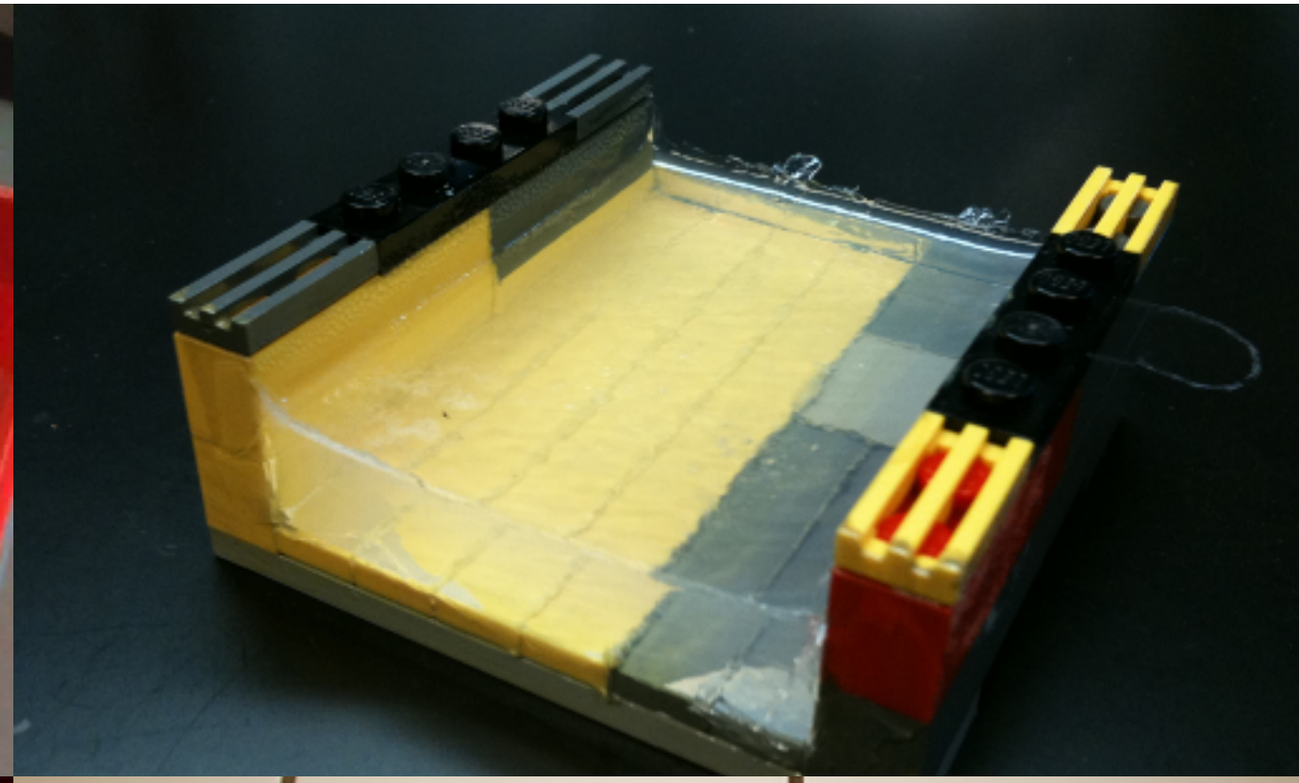
Apply current

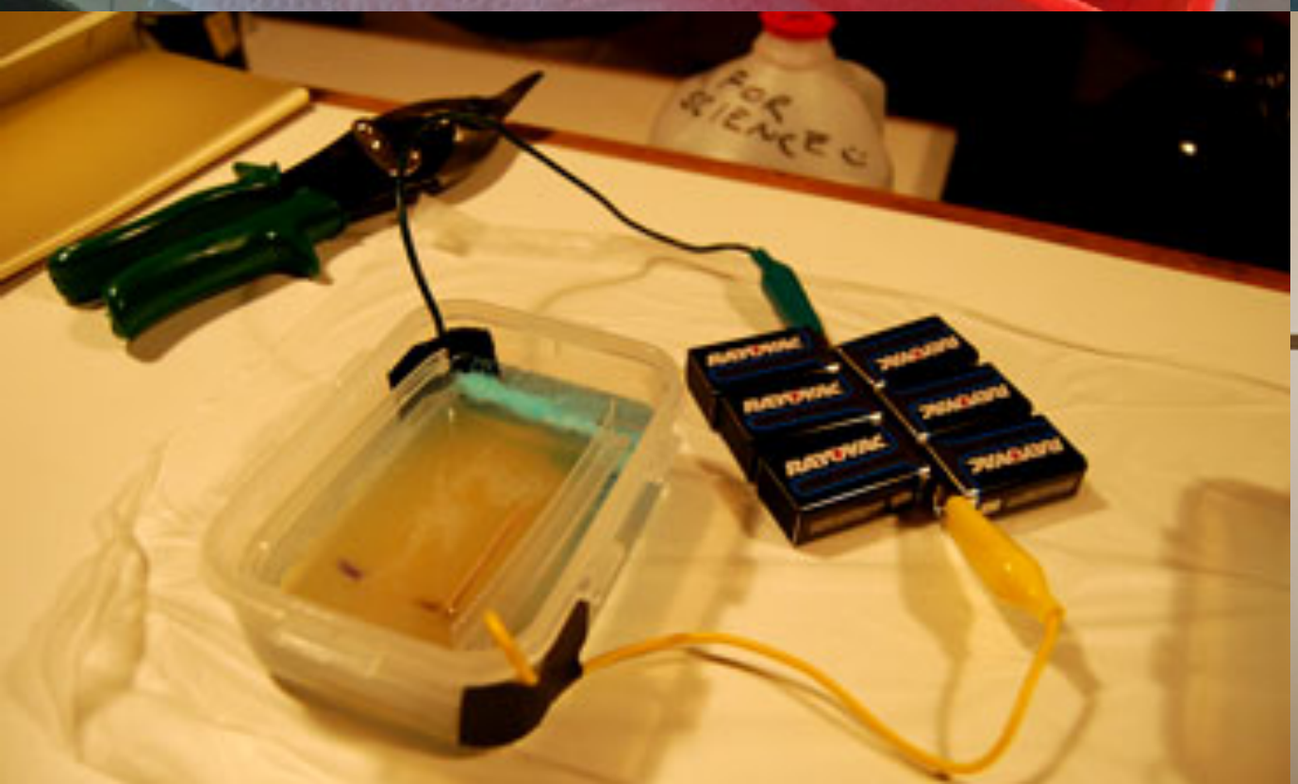


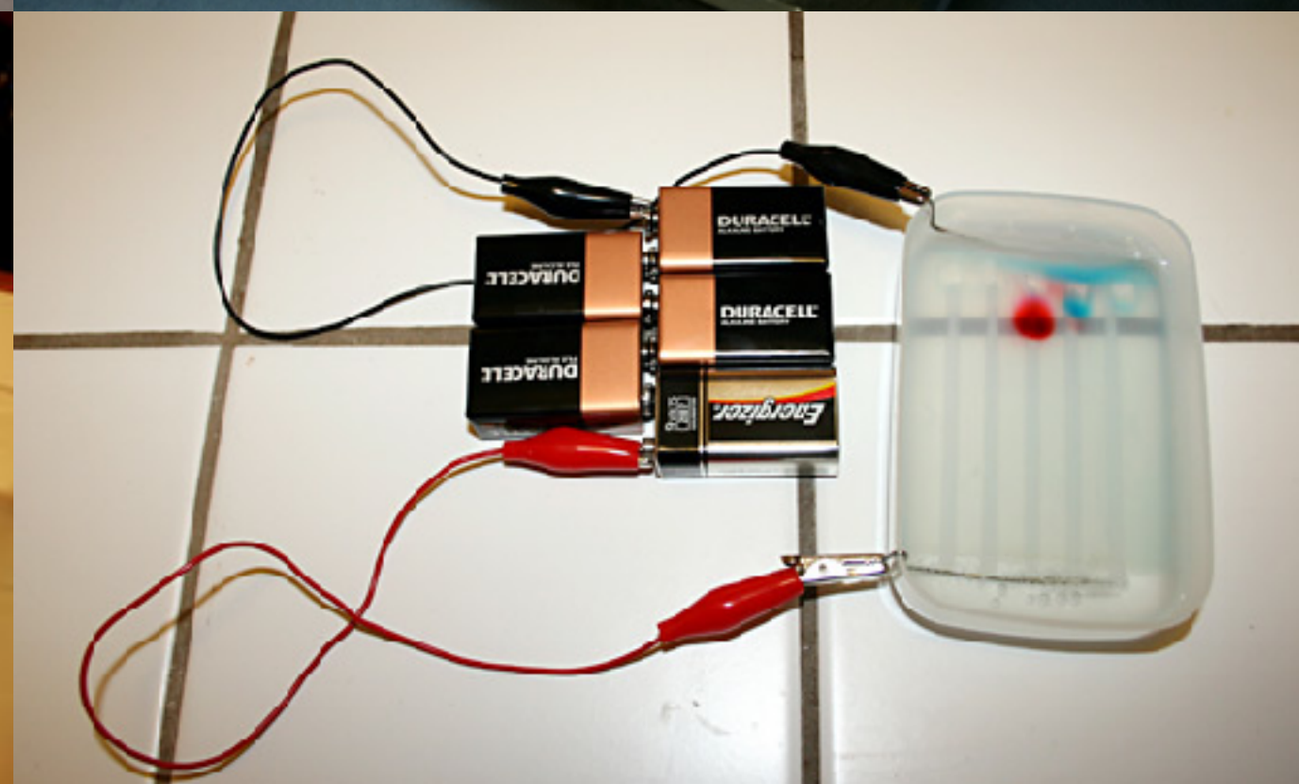
Read the pattern

DIY Electrophoresis

http://fablab.waag.org/project/ow-dna-gel-electrophoresis-box





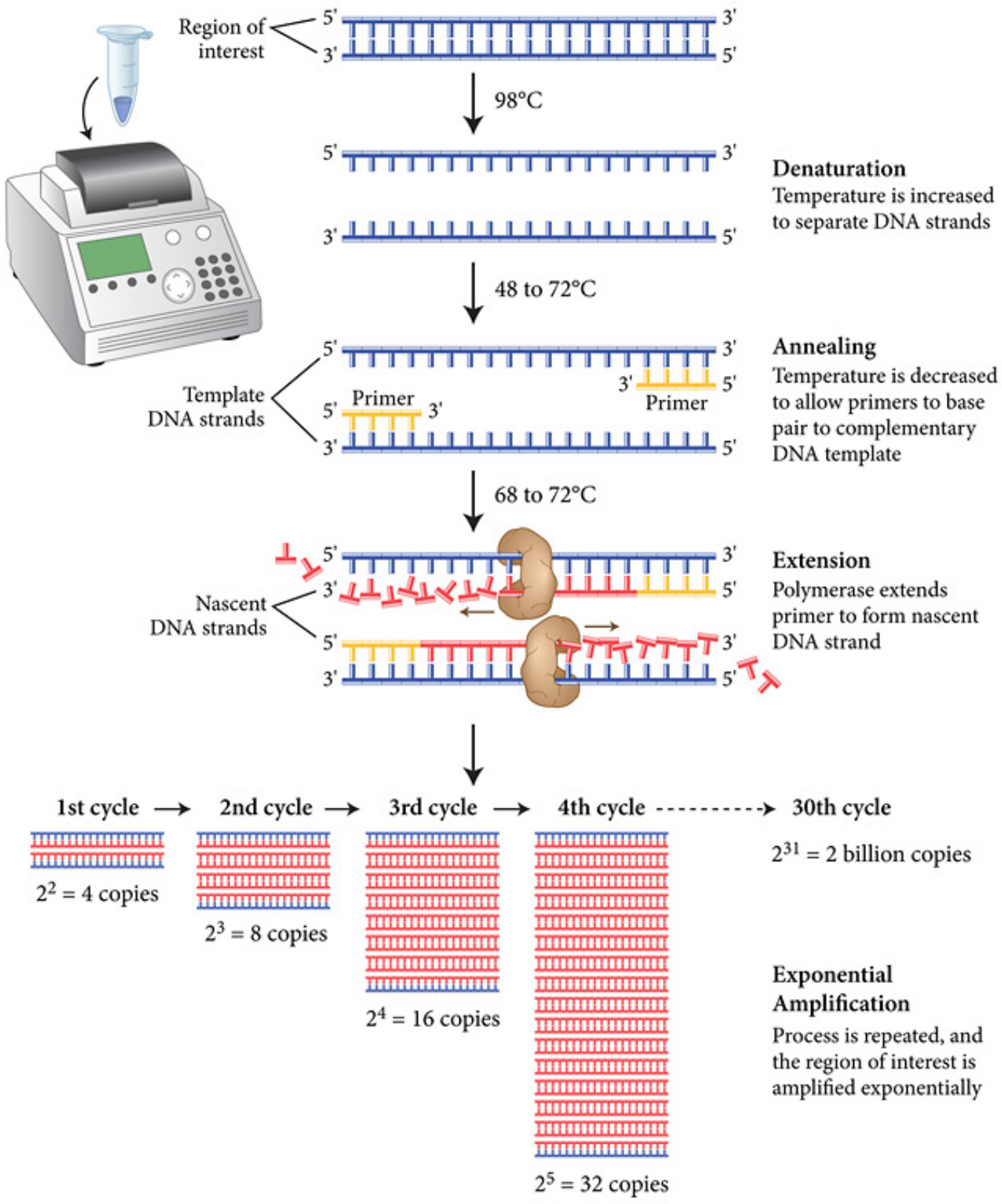


waag society

institute for art, science and technology

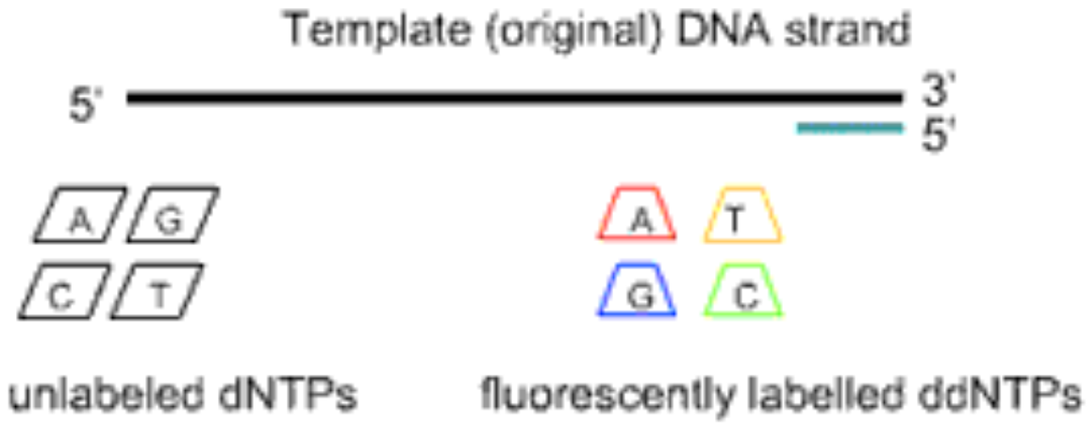
DNA analytics

Polymerase Chain Reaction

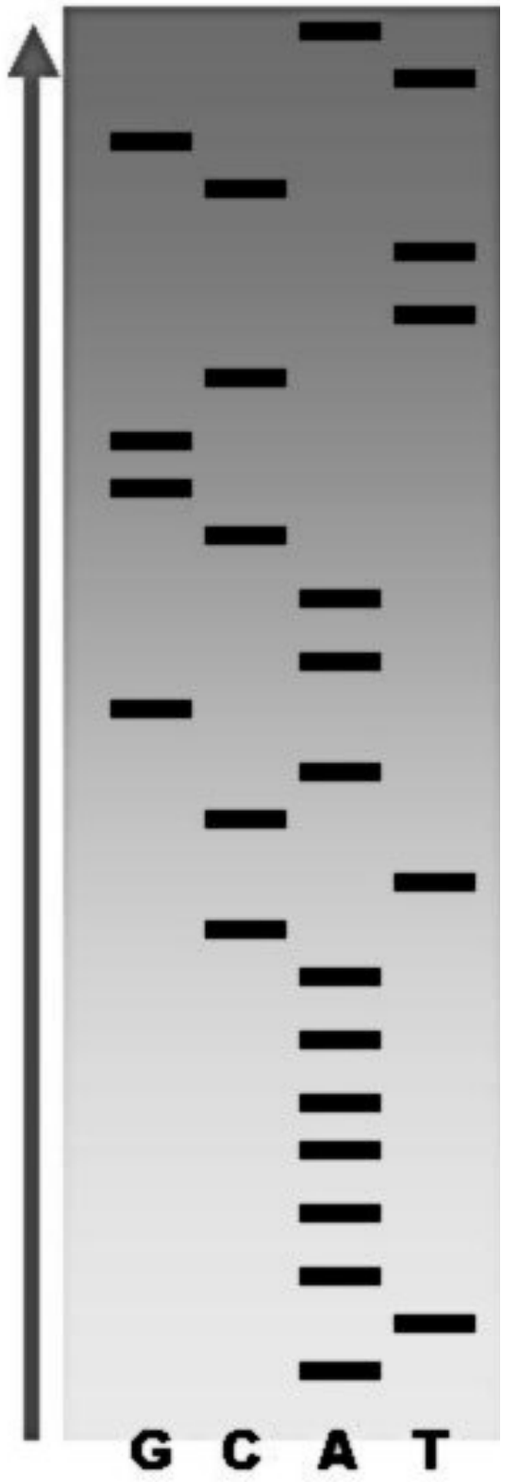


New England Biolabs

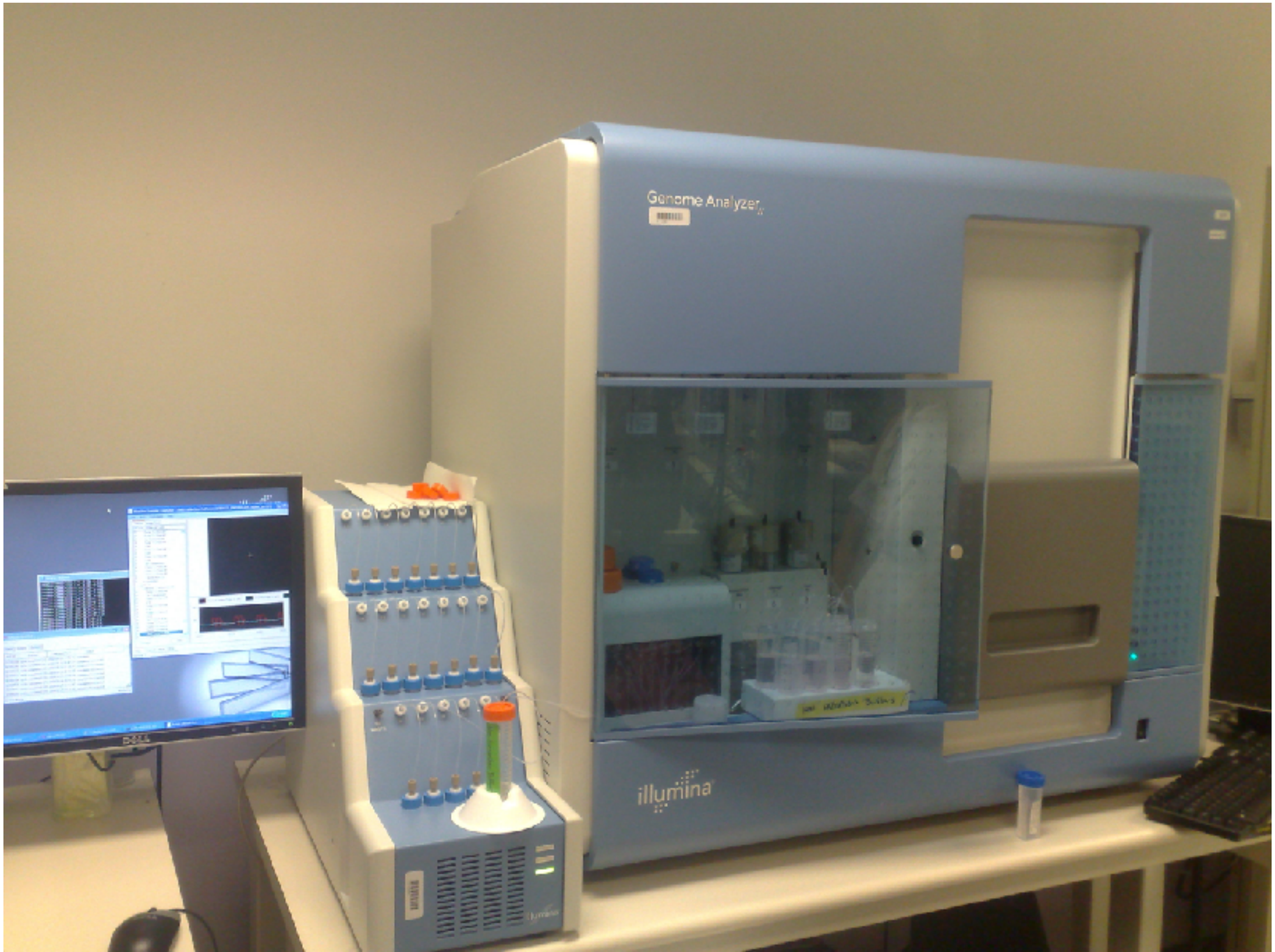
Sanger Sequencing – chain termination



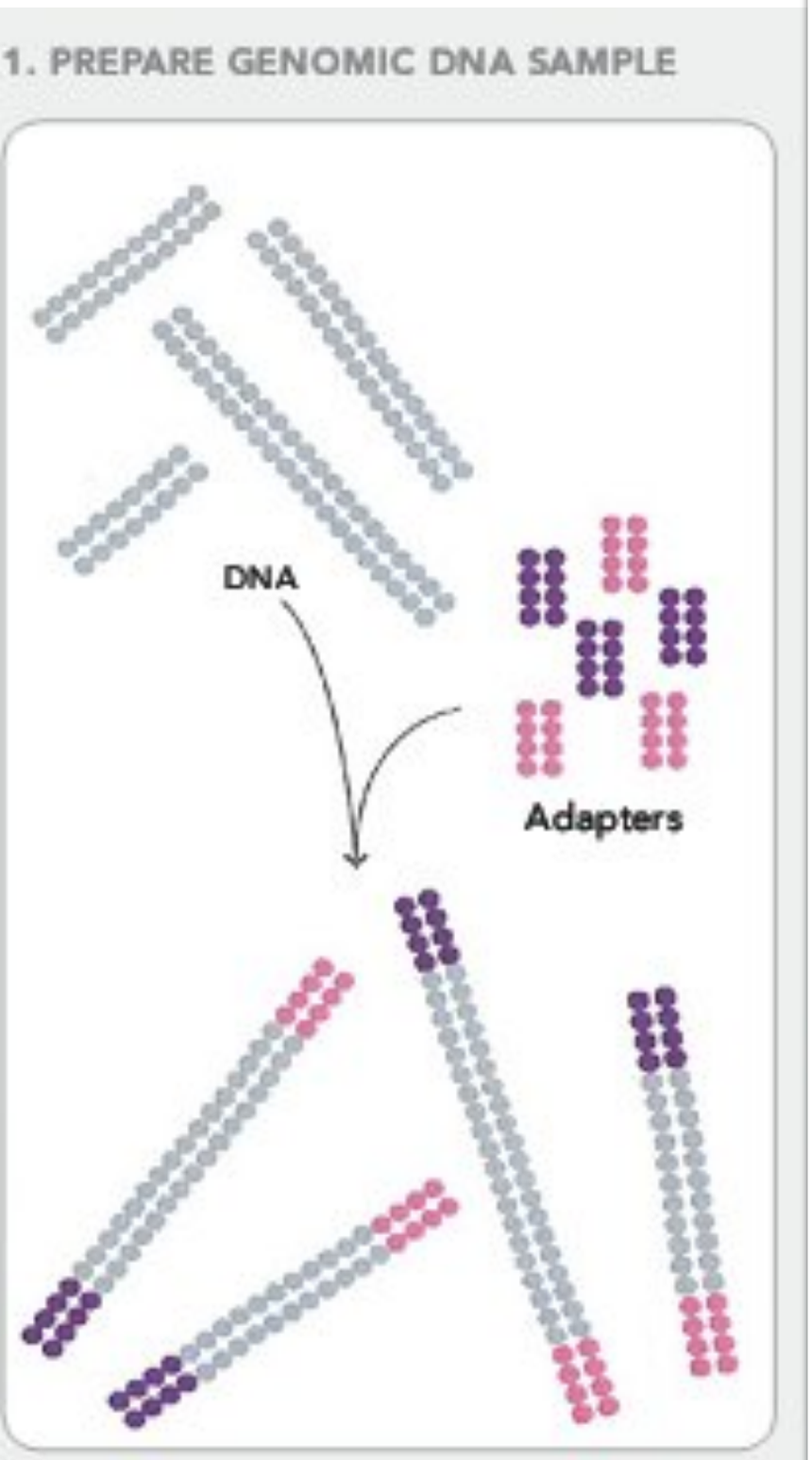
Sanger sequencing



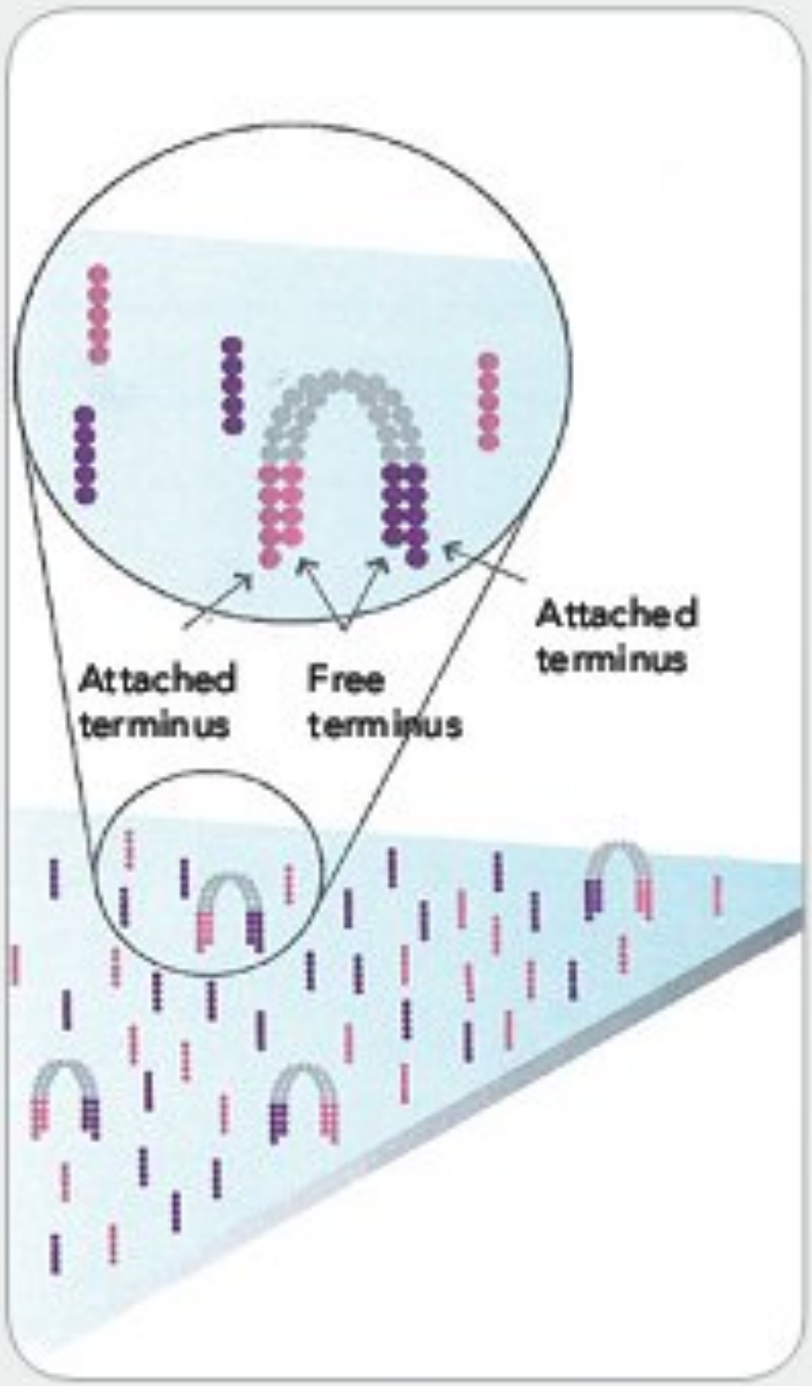
Illumina - Solexa



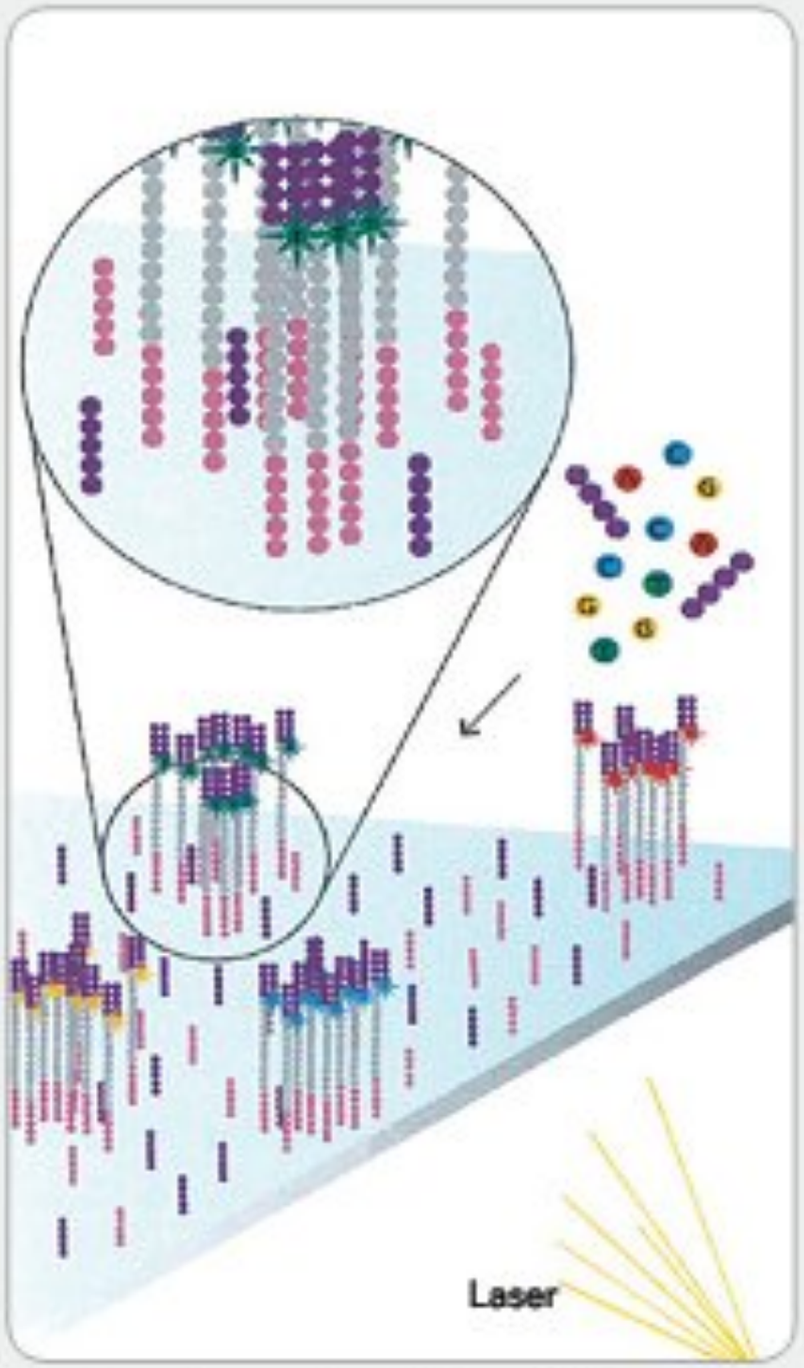
Solexa – Illumina sequencing



4. FRAGMENTS BECOME DOUBLE STRANDED

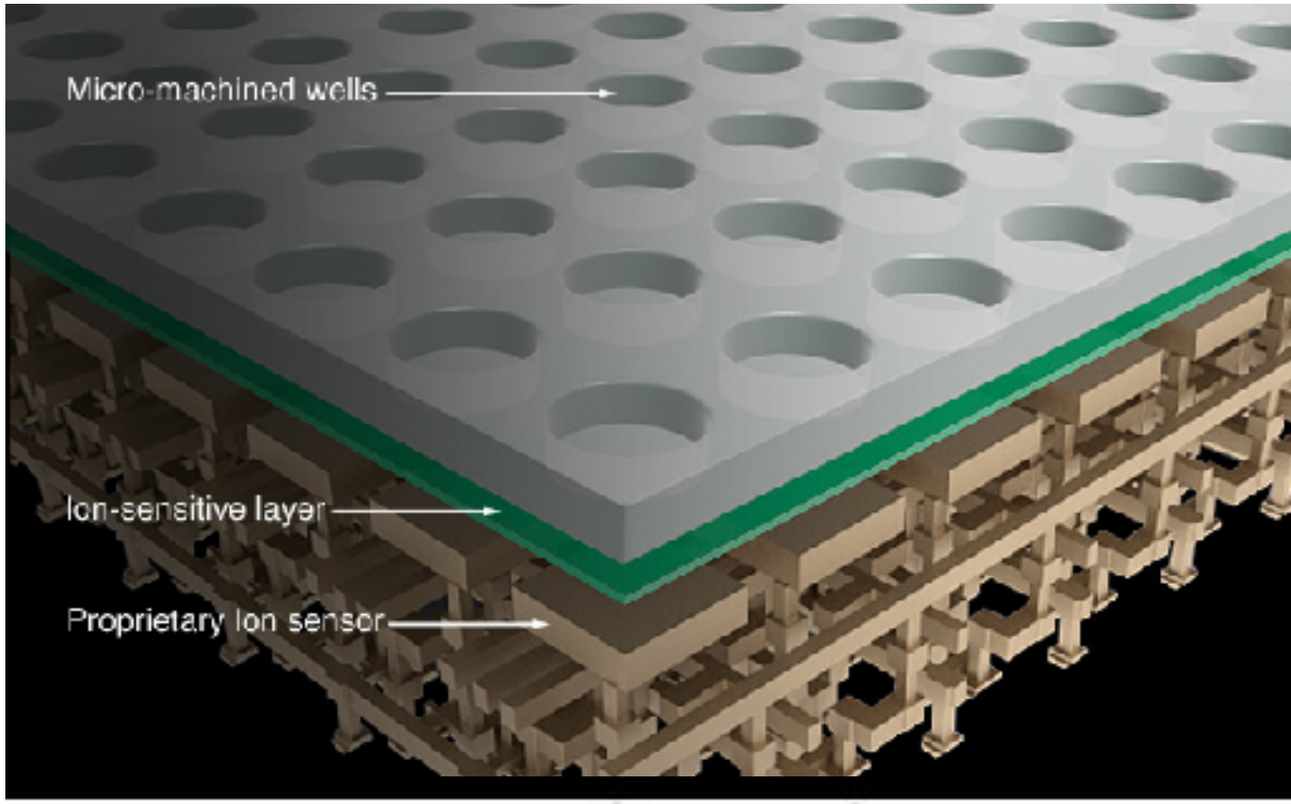


7. DETERMINE FIRST BASE

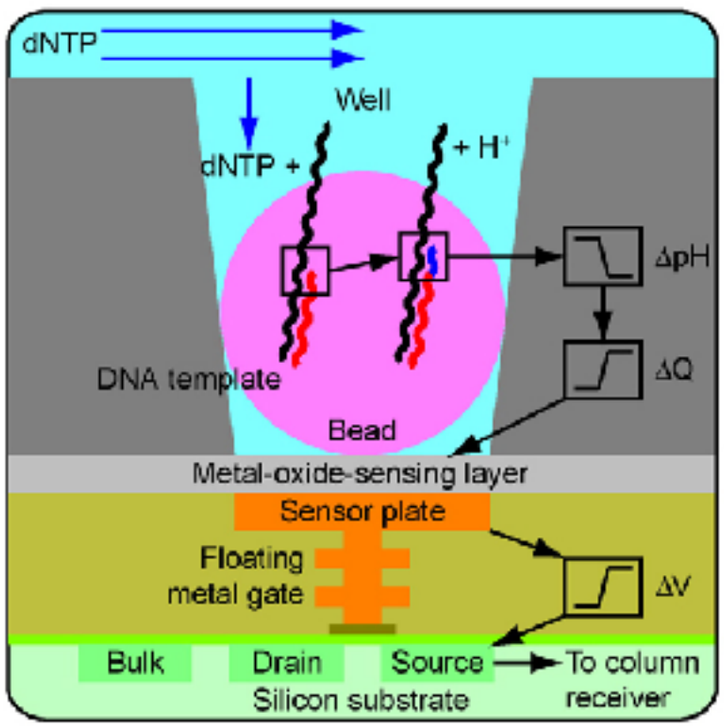


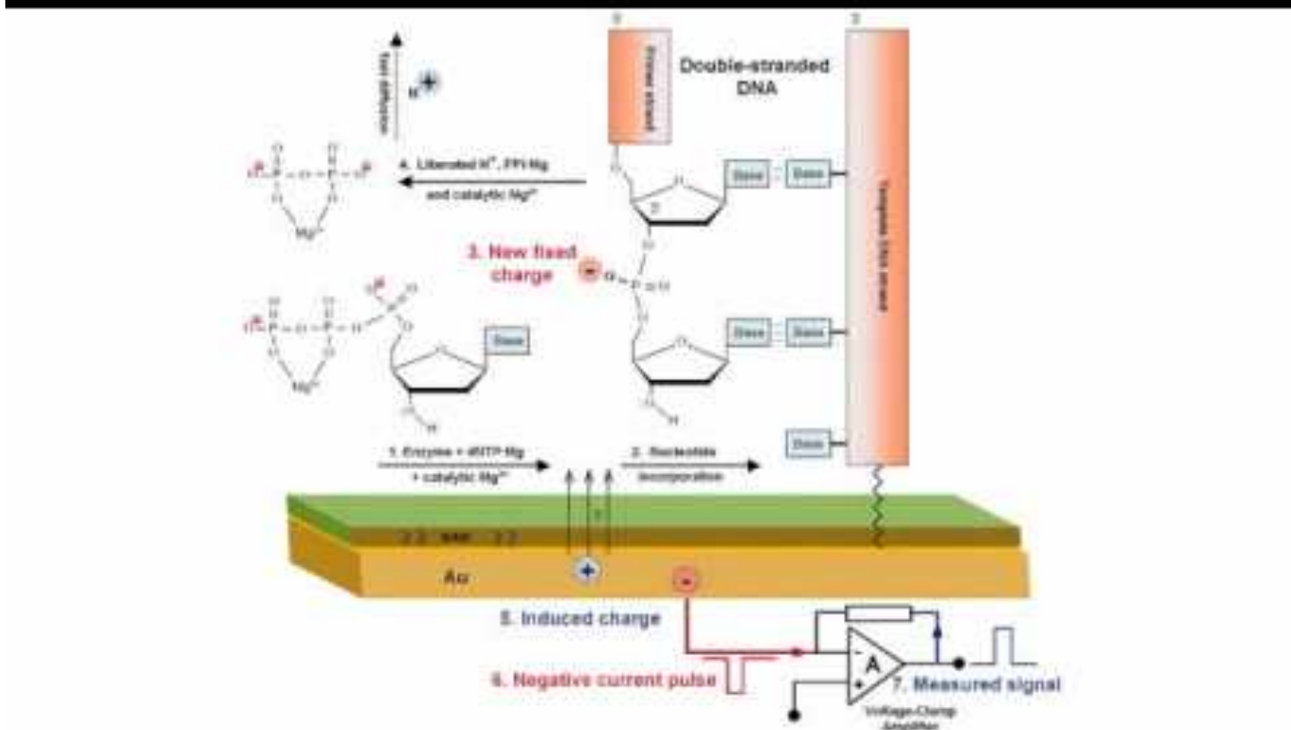
10. IMAGE SECOND CHEMISTRY CYCLE

IonTorrent sequencing

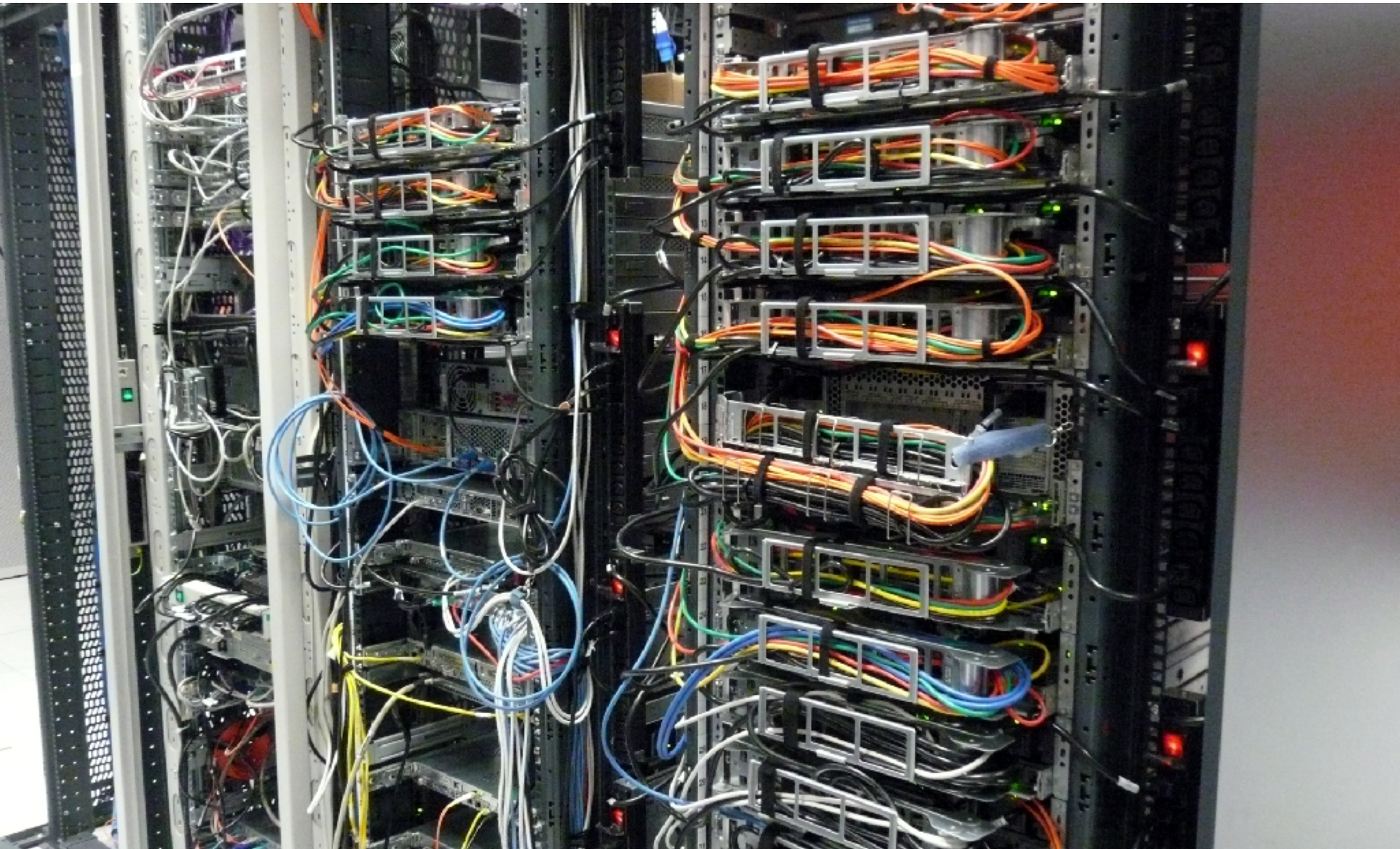


a



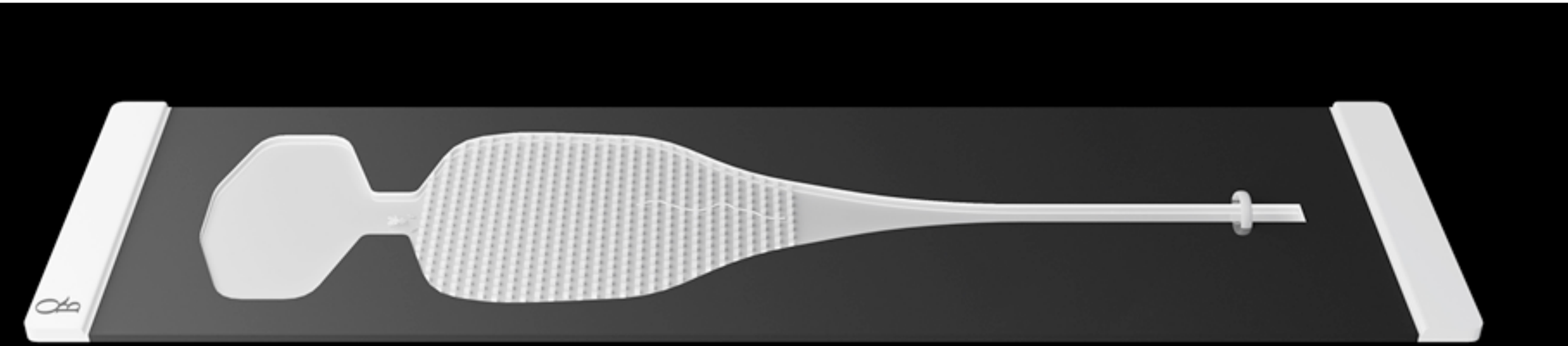


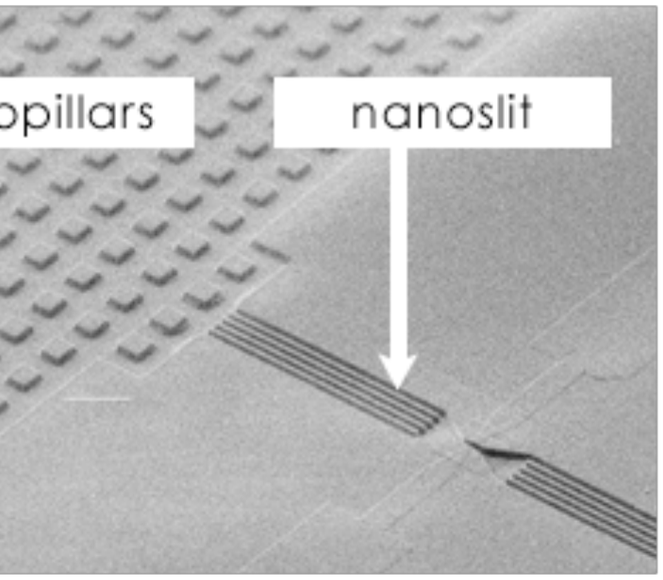
Bioinformatics

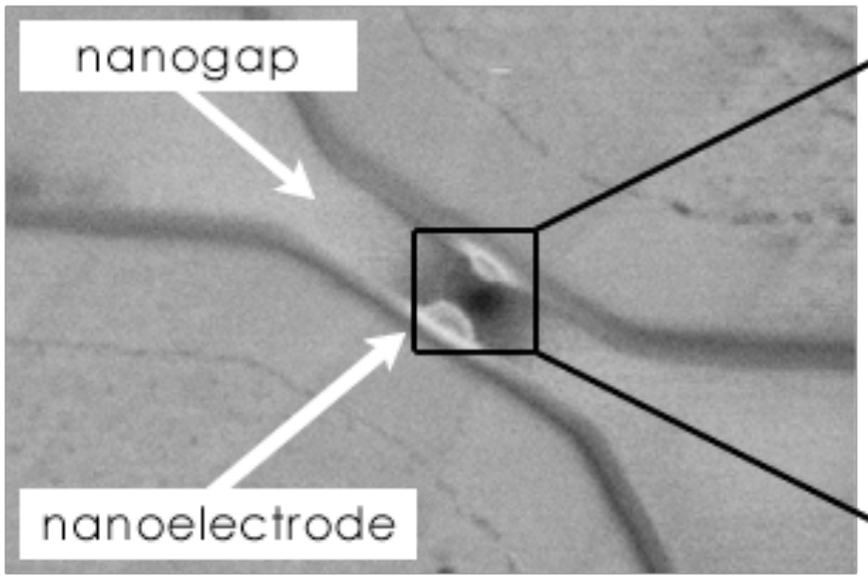


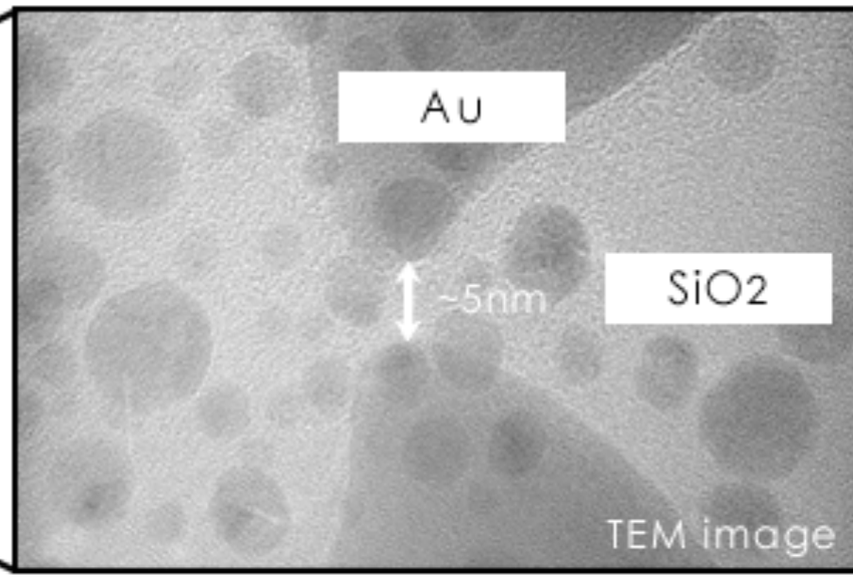
DIY?

Nanopore sequencing









Quantum Biosystems

Oxford Nanopore MinION

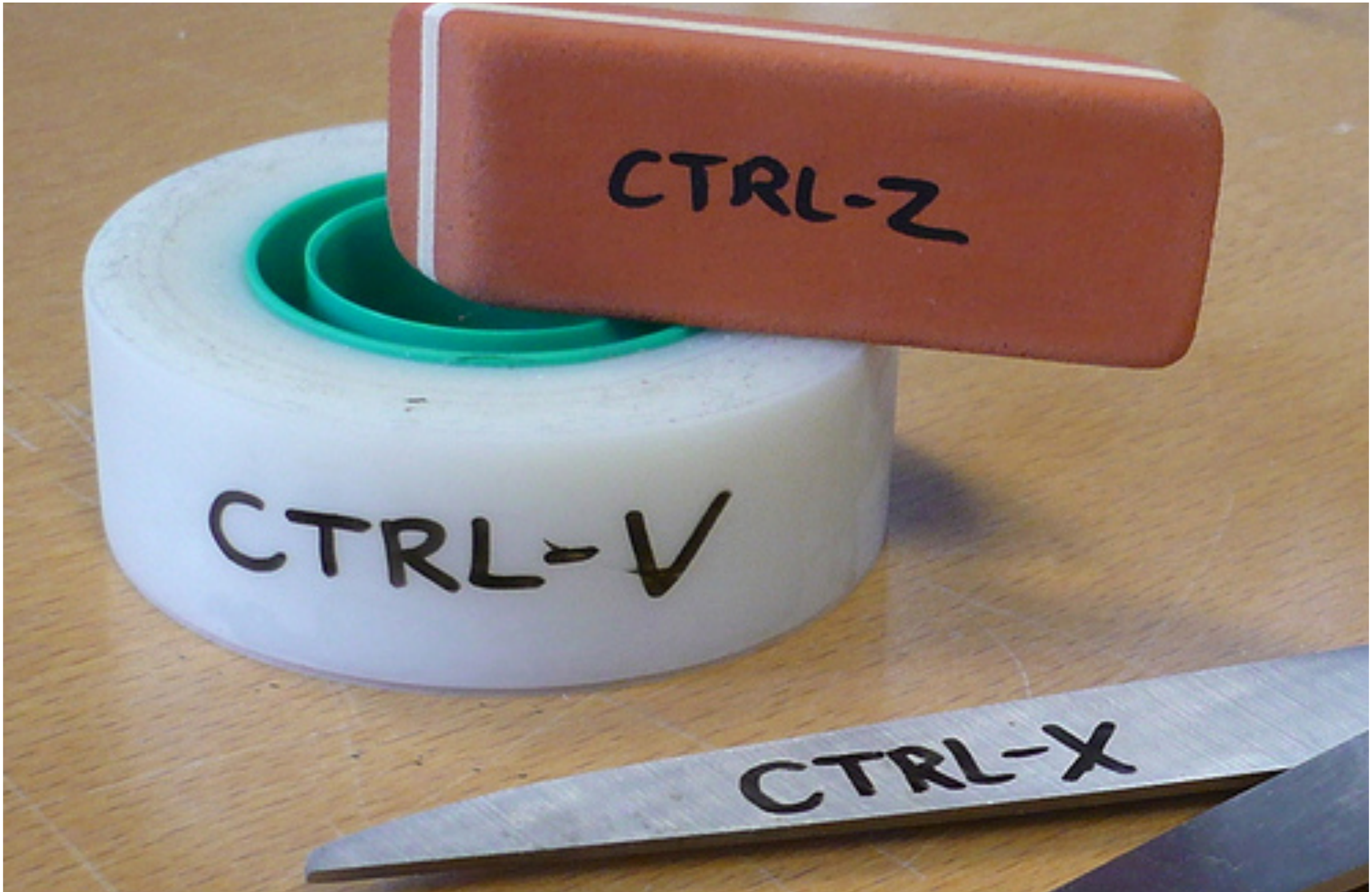
DIY? Oxford nanopore

waag society

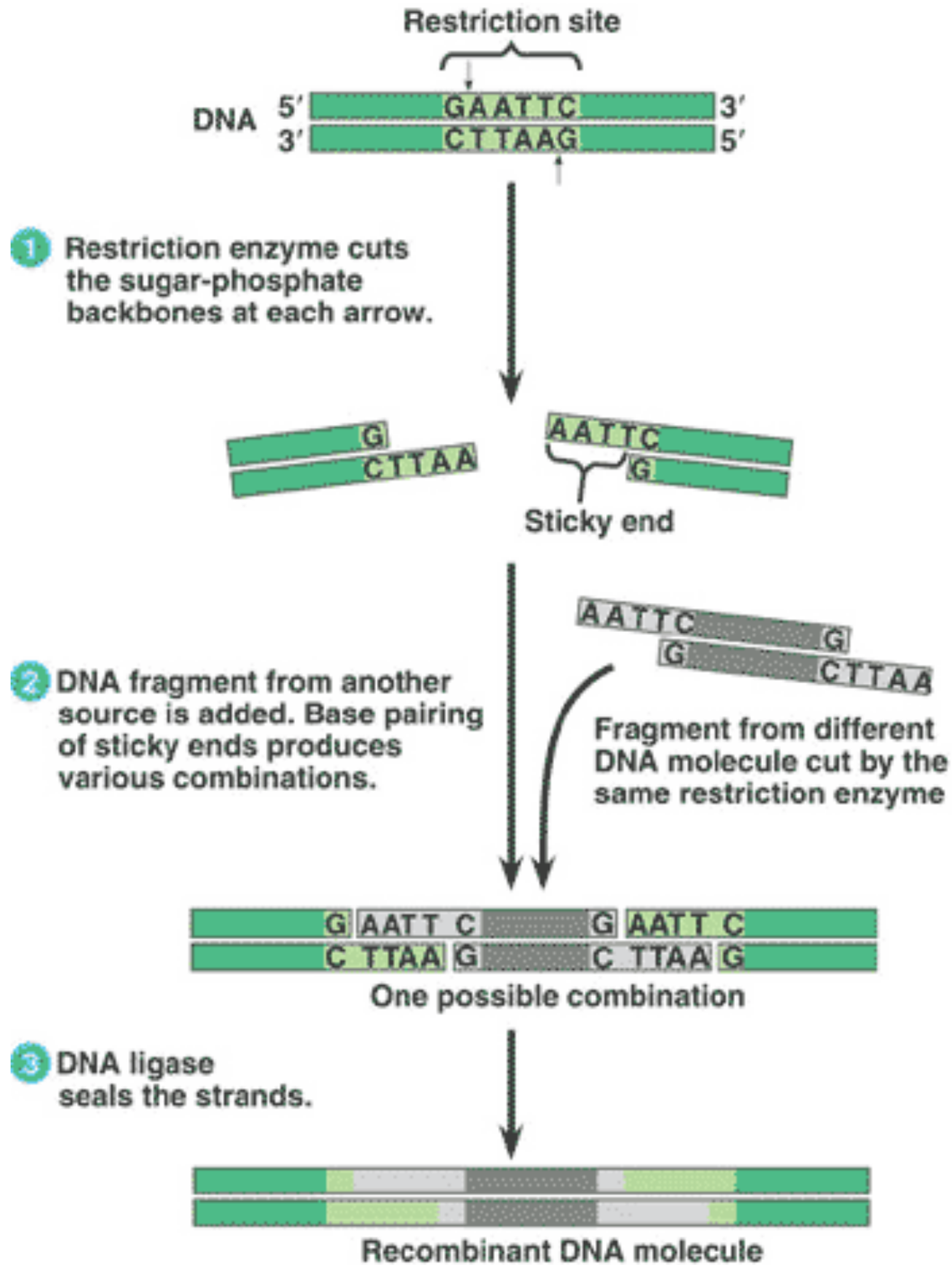
institute for art, science and technology

DNA editing

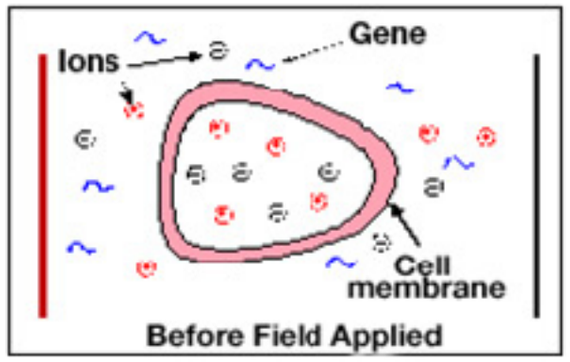
Cutting & Pasting

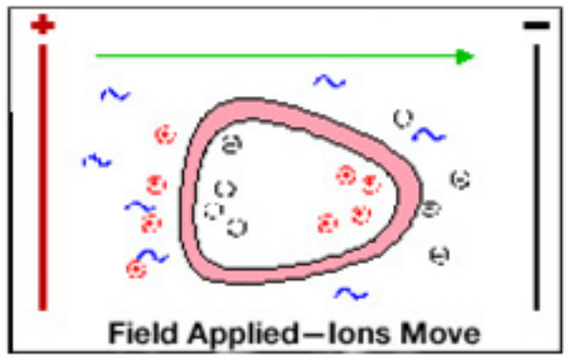


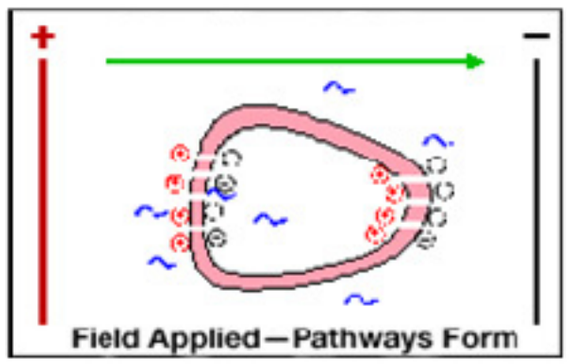
DNA Restriction Ligation



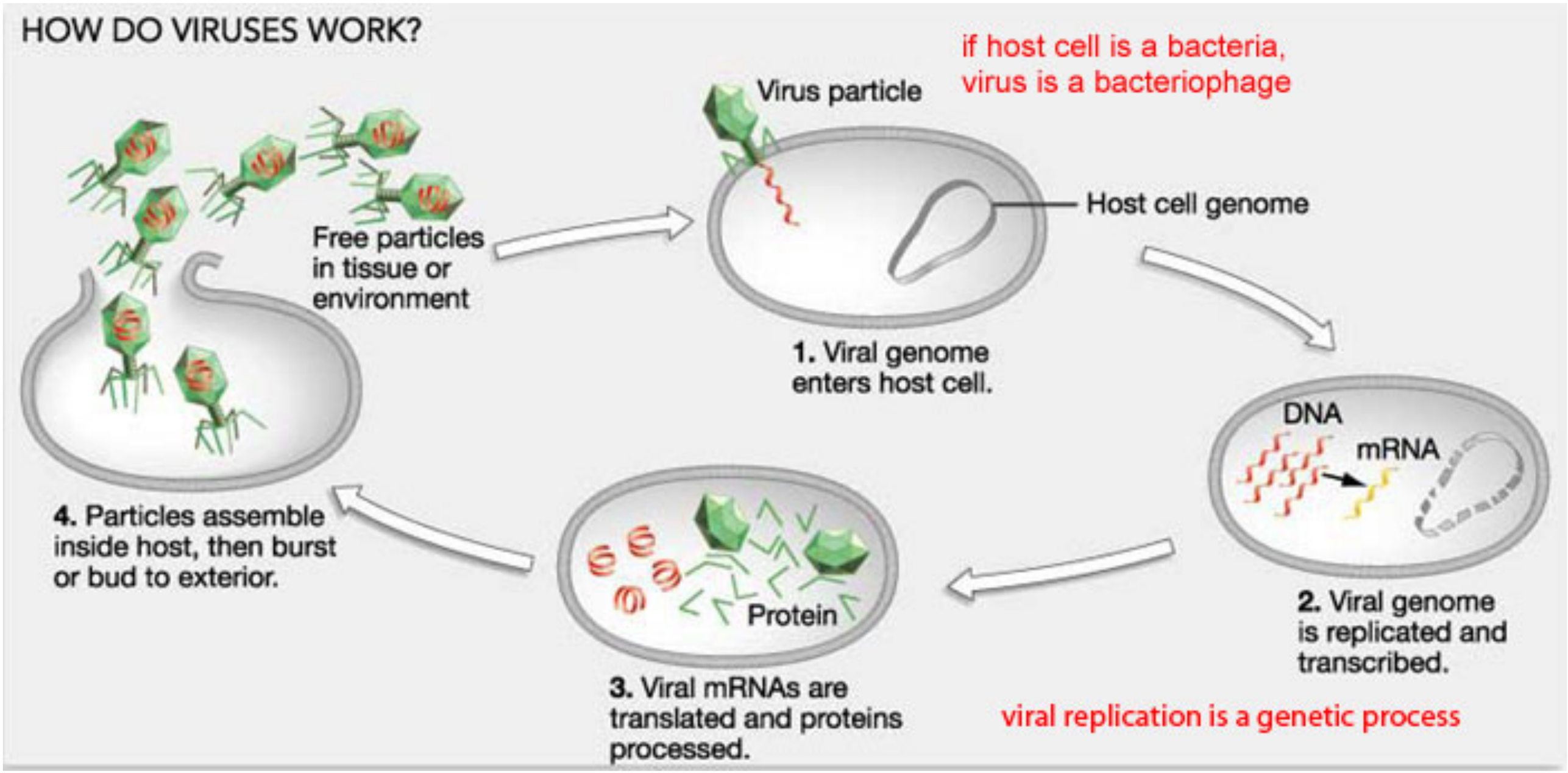
GeneGun – Electroporation



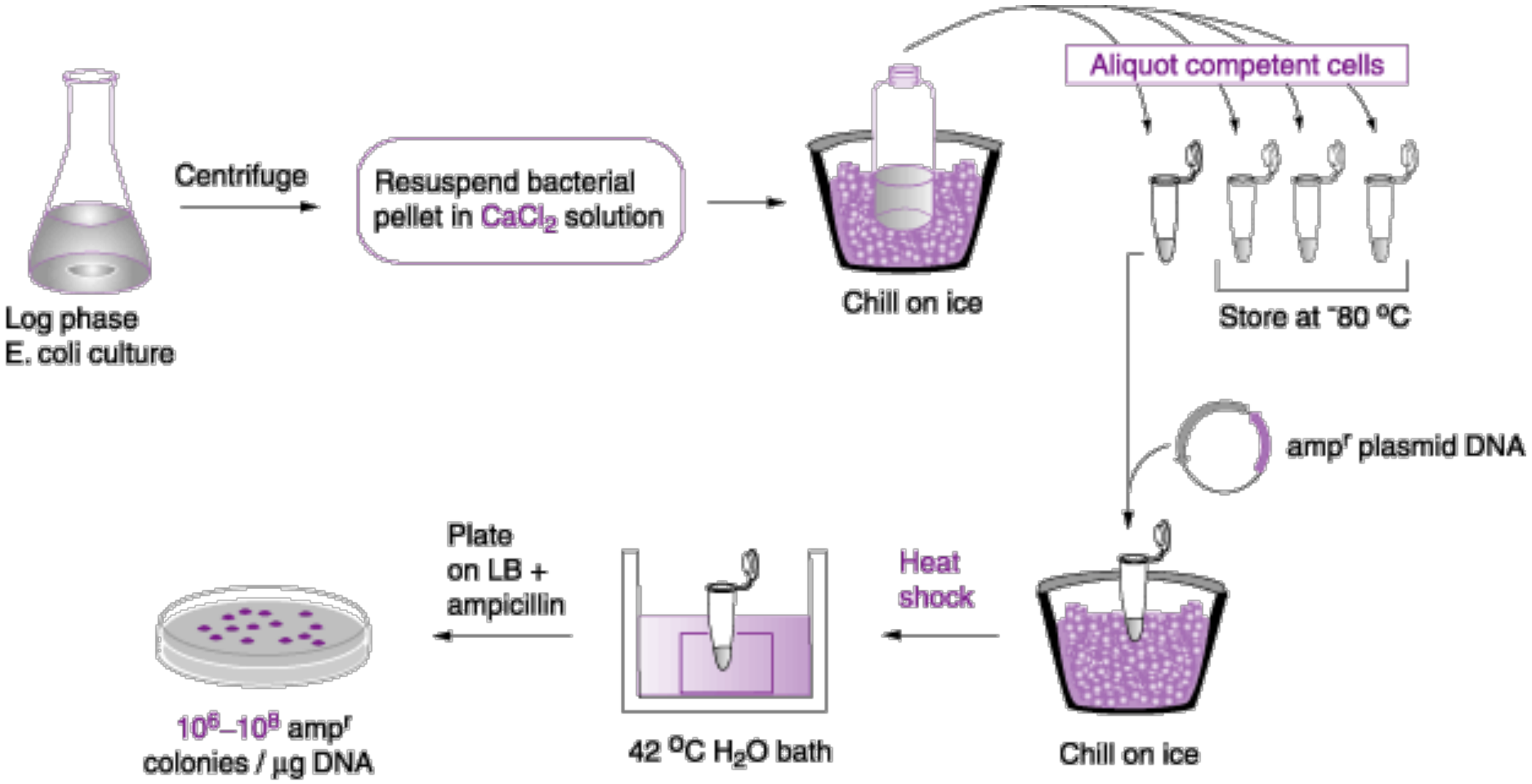




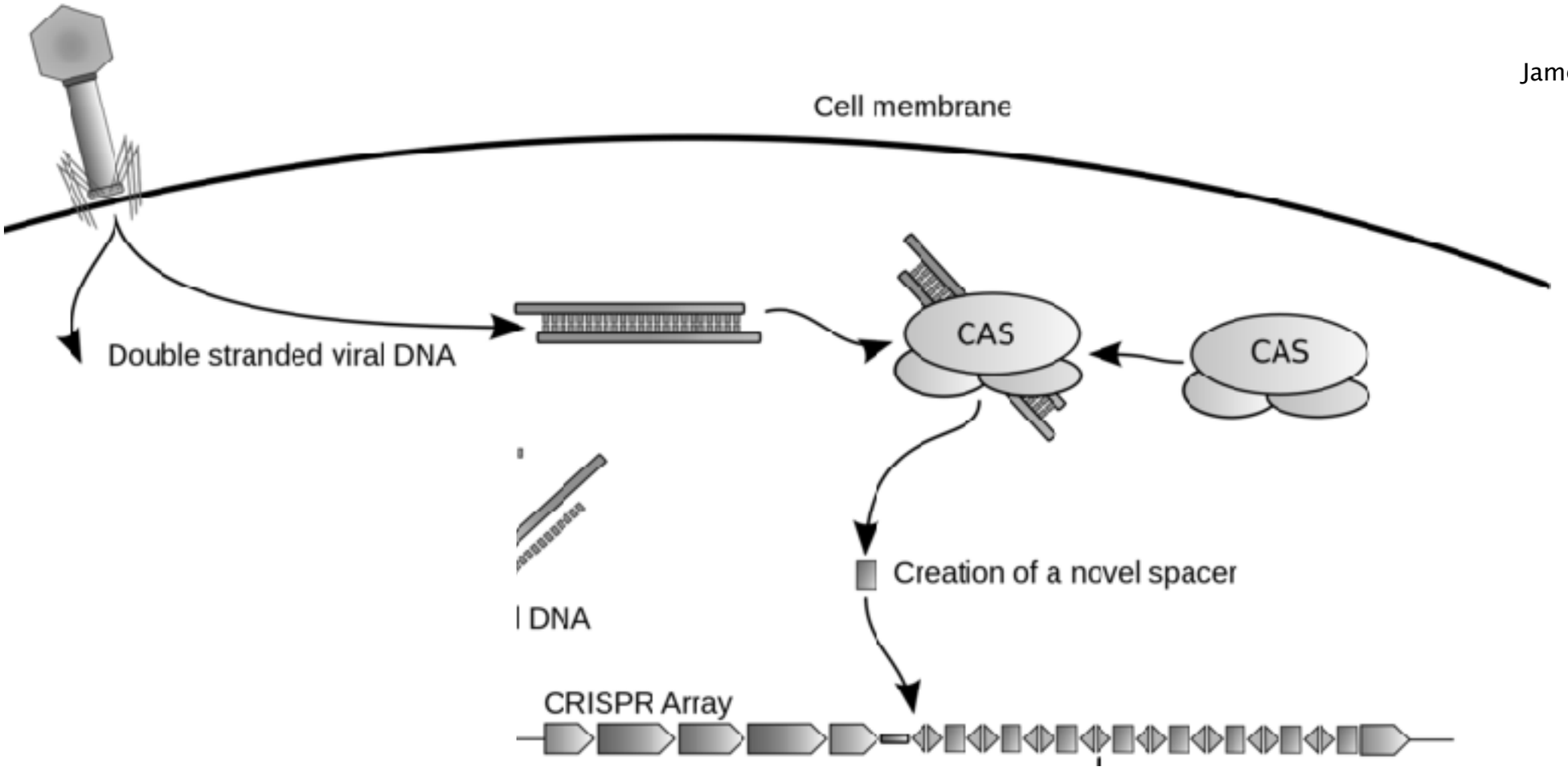
Viral Transformation



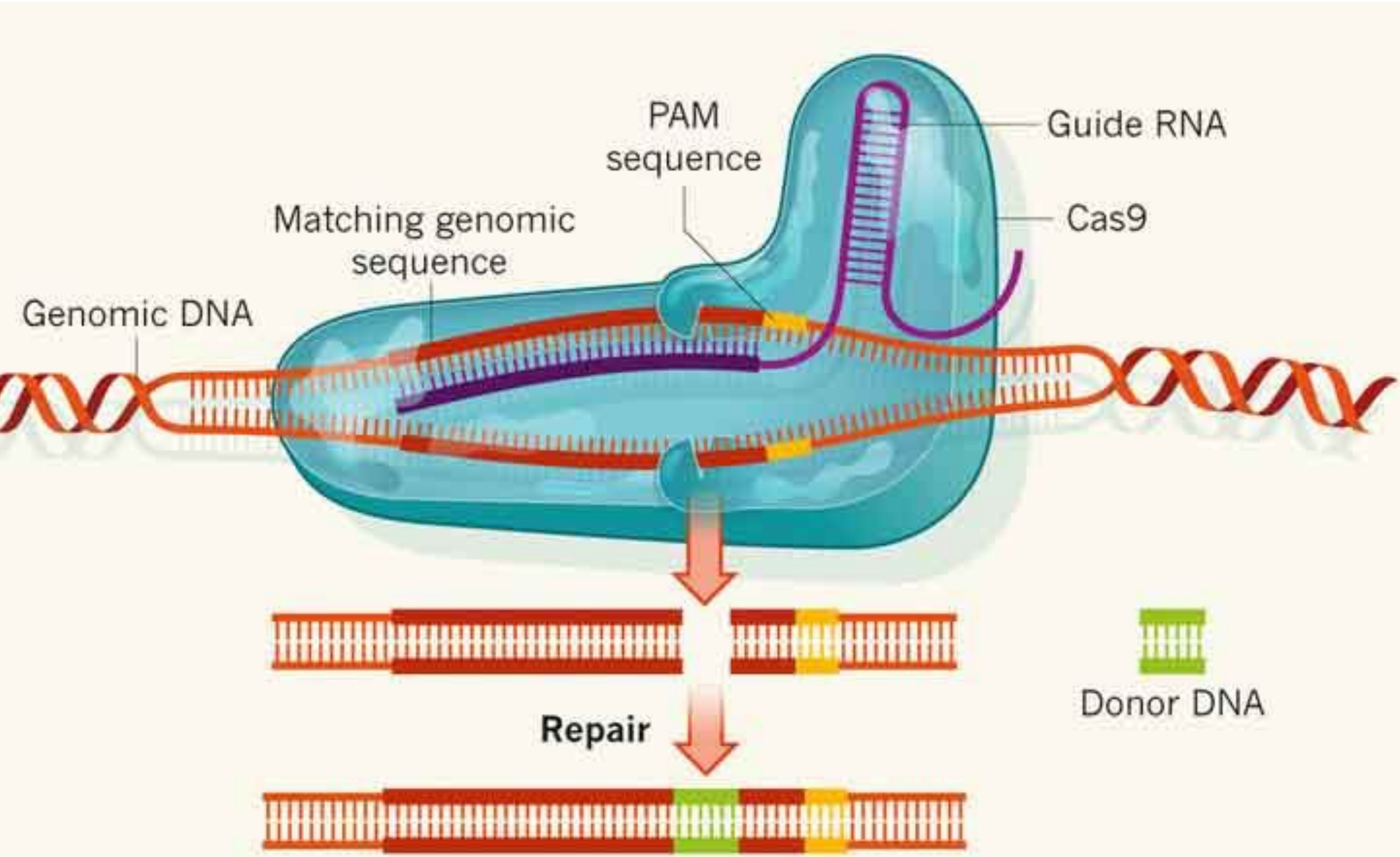
Heat Shock Transformation



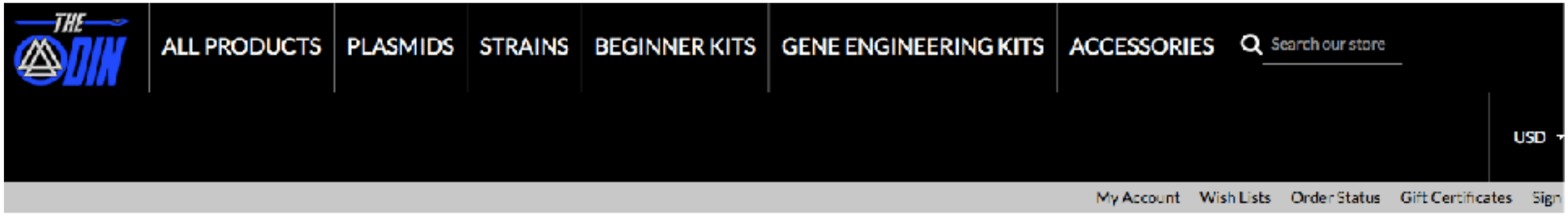
CRISPR - Cas9



CRISPR


PAM
sequence
Guide RNA
Cas9
Matching genomic
sequence
Genomic DNA
Repair
Donor DNA

The ODIN CRISPR kit



$150.00

Shipping: Calculated at checkout

3 product reviews

Quantity:

1

Add To Cart

Add to Wishlist

Product Description

There is currently ~1 week time till shipment.

Due to the overwhelming number of emails we will not respond to emails asking when you

Understand we are doing our best to get it to you.

Comes with an example experiment that teaches you many molecular biology and gene en

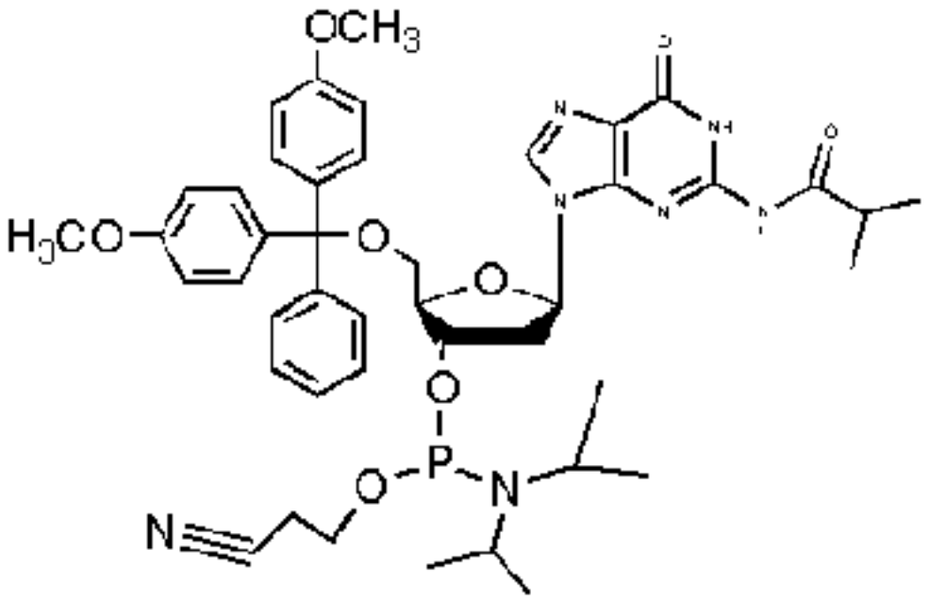
waag society

institute for art, science and technology

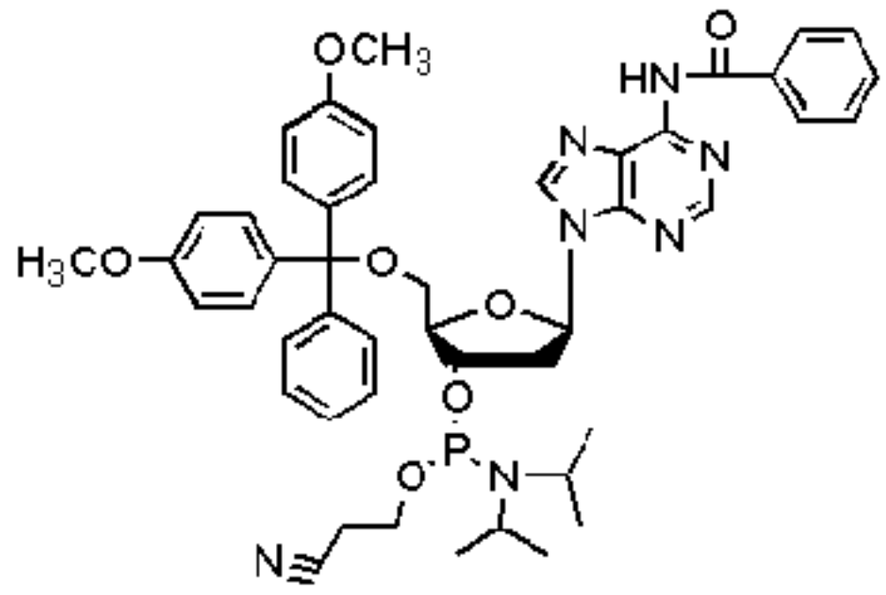
DNA synthesis

in 4 easy steps

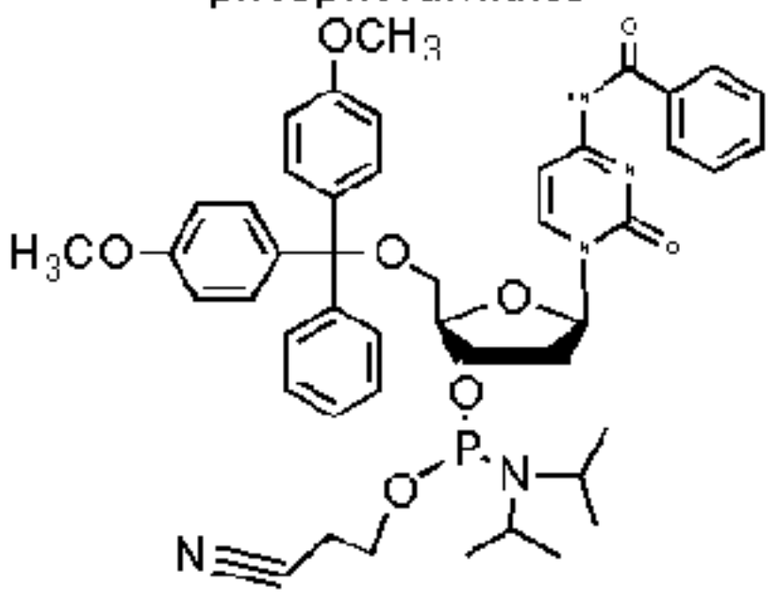
Deblocking



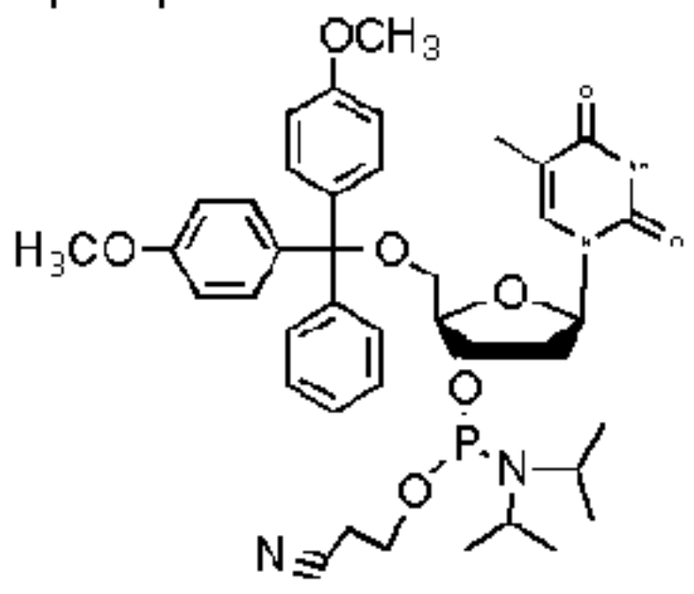
N-2-isobutryl deoxyguanosine phosphoramidite



N-6-benzoyl-deoxyadenosine phosphoramidite

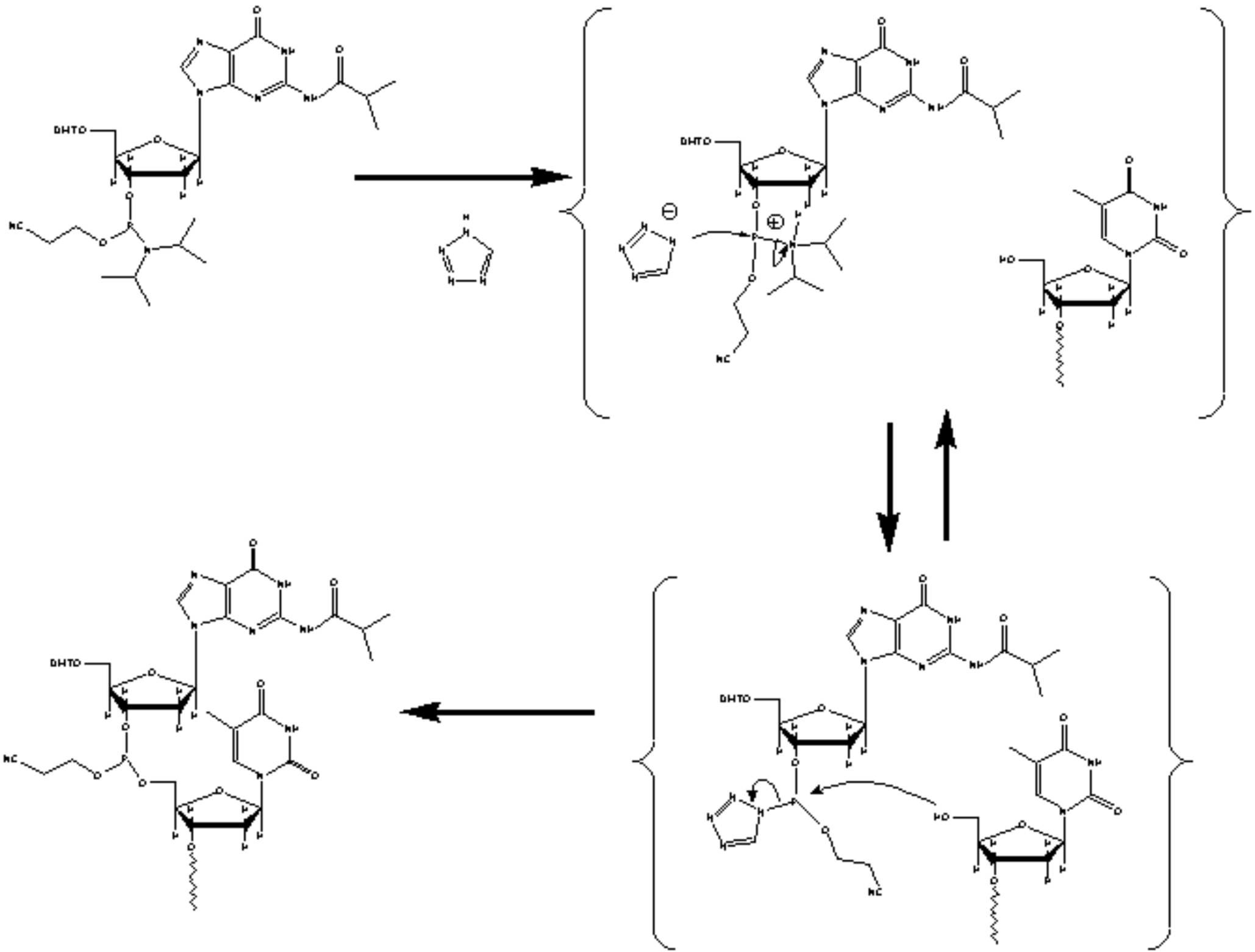


N-4-benzoyl-deoxycytidine phosphoramidite

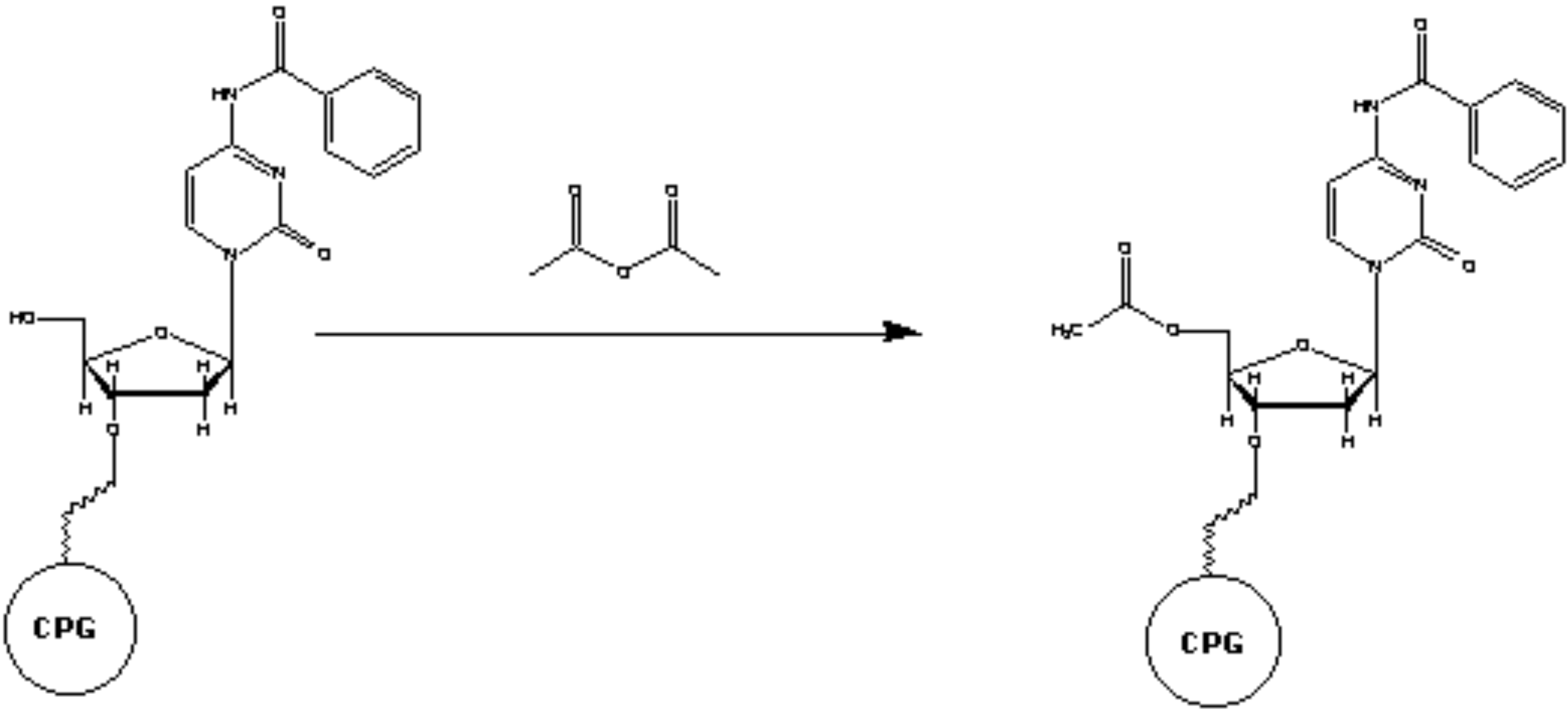


deoxythymidine phophoramidite

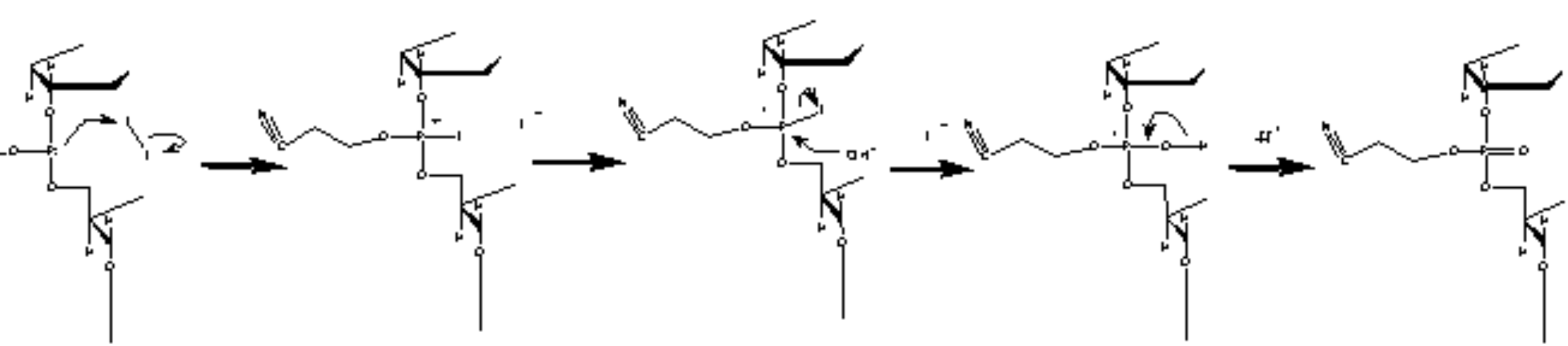
Condensation



Capping



Oxidating



Repeat