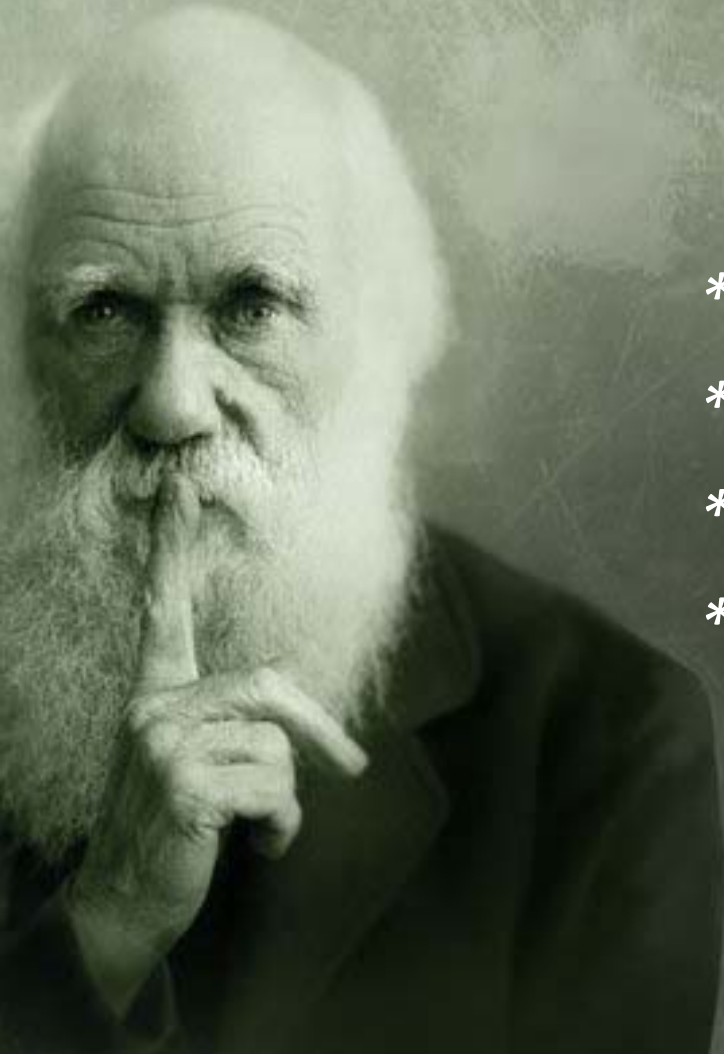


Some (fun) DNA Facts

By Rafael Navajas Pérez

- * *Who discovered DNA?*
- * *DNA Structure and its implications*
- * *PCR, What a discovery!*
- * *Chaperones and Pools*



Who discovered DNA?

Friedrich Miescher, 1869.- Swiss physician and biologist



DNA STANDS FOR **D**Eoxyribo**N**ucleic **A**cid.

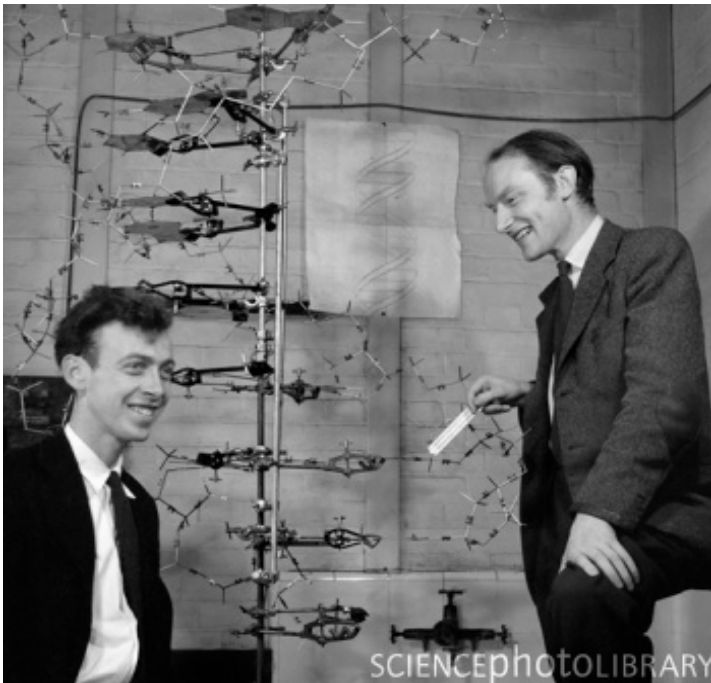


DNA was first isolated by Friedrich Miescher, who in 1869, discovered a microscopic substance in the pus of discarded surgical bandages that he called "**NUCLEIN.**"



DNA Structure?

James Watson (1928--).- American biologist
Francis Crick (1916-2004).- English biologist



DNA has a double-helix structure like a twisted ladder. The steps of the ladder are bases...

ADENINE (A) IS A BASE.

THYMINE (T) IS A BASE.

CYTOSINE (C) IS A BASE.

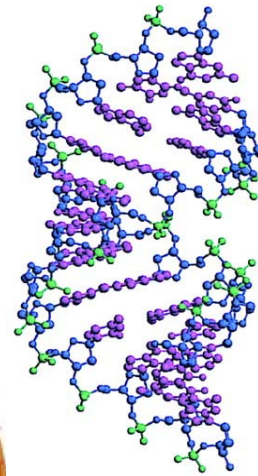
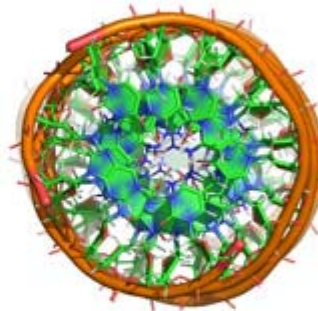
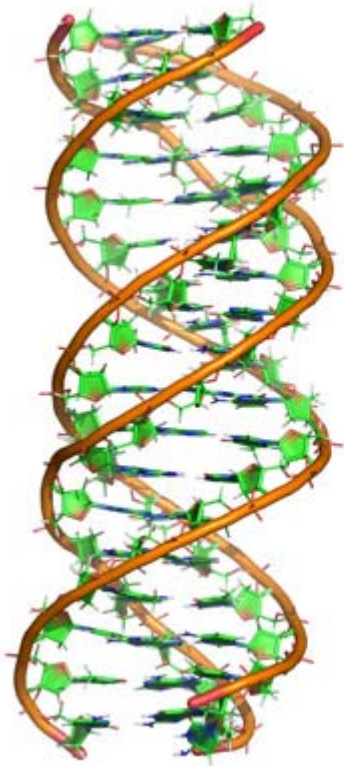
GUANINE (G) IS A BASE.



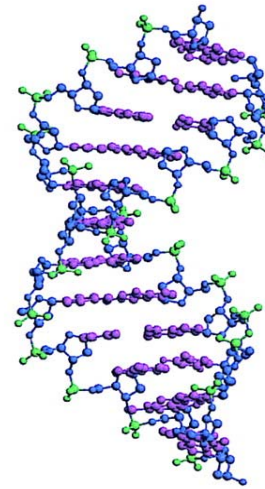
DNA Structure?

James Watson (1928--).- American biologist

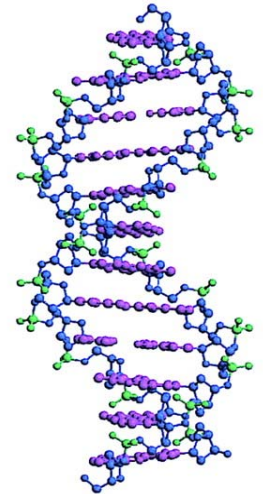
Francis Crick (1916-2004).- English biologist



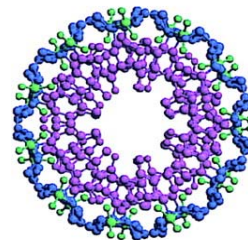
(a)



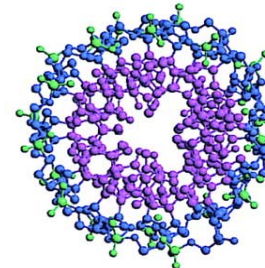
(b)



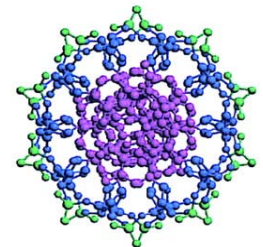
(c)



(d)



(e)

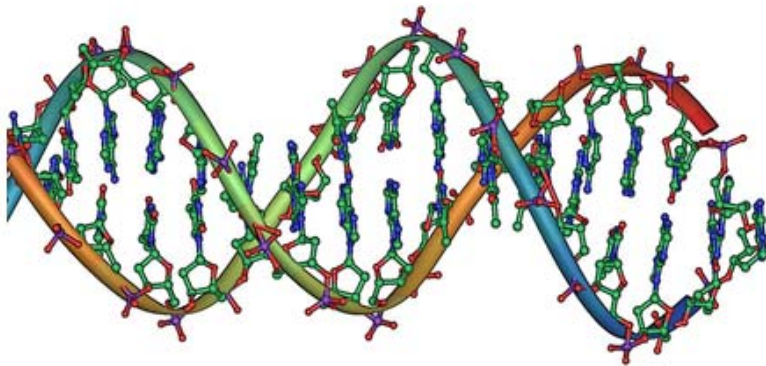


(f)

DNA Structure?

James Watson (1928--).- American biologist

Francis Crick (1916-2004).- English biologist



Cambridge, 1953. Shortly before discovering the structure of DNA, Watson and Crick, depressed by their lack of progress, visit the local pub.

DNA Structure?

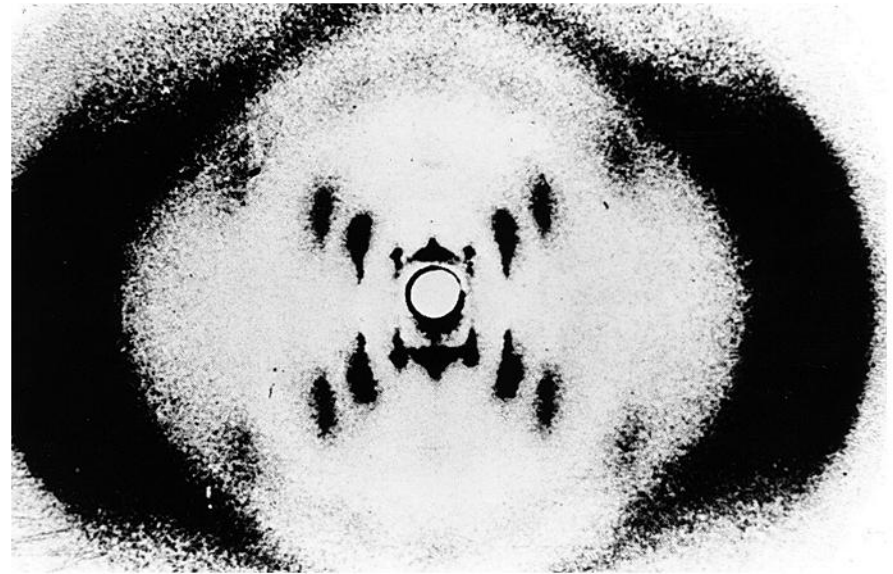
James Watson (1928--).- American biologist
Francis Crick (1916-2004).- English biologist



Nobel Prize in Physiology or Medicine 1962

DNA Structure?

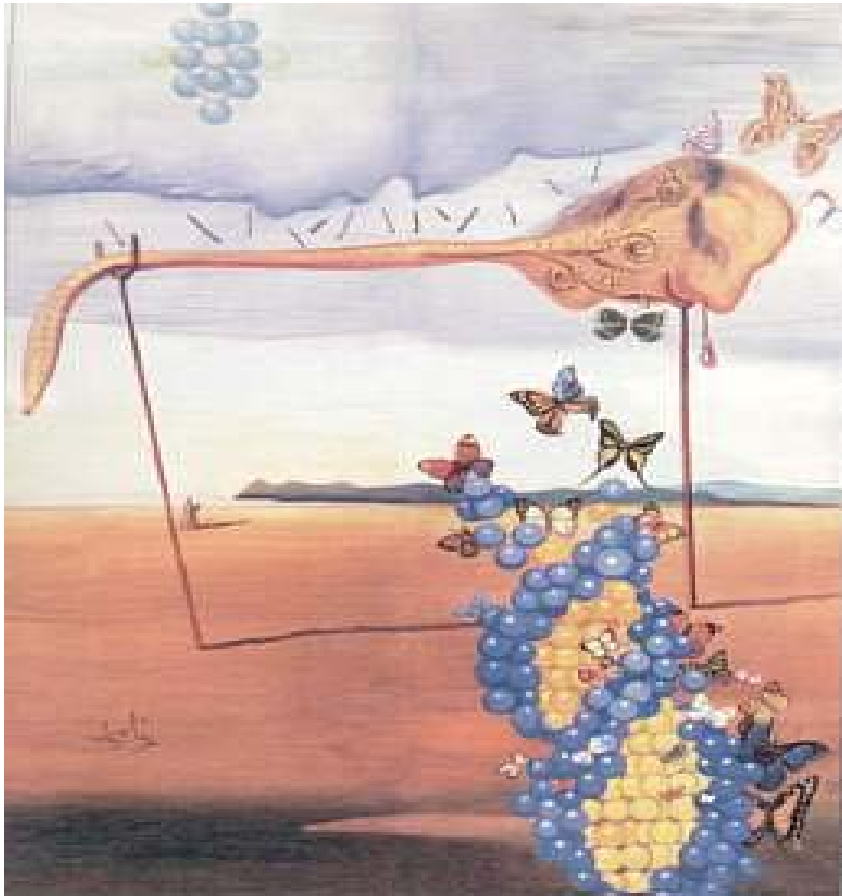
Rosalind Franklin (1920-1958).- British crystallographer



DNA X-Ray Image

DNA Structure?

Salvador Dalí (1904-1989).- Spanish artist



Butterfly Landscape
(The Great Masturbator in a Surrealist Landscape with DNA)



Galacidalacidesoxyribonucleicacid

PCR, What a discovery!

Kary Mullis (1944--).- American biologist

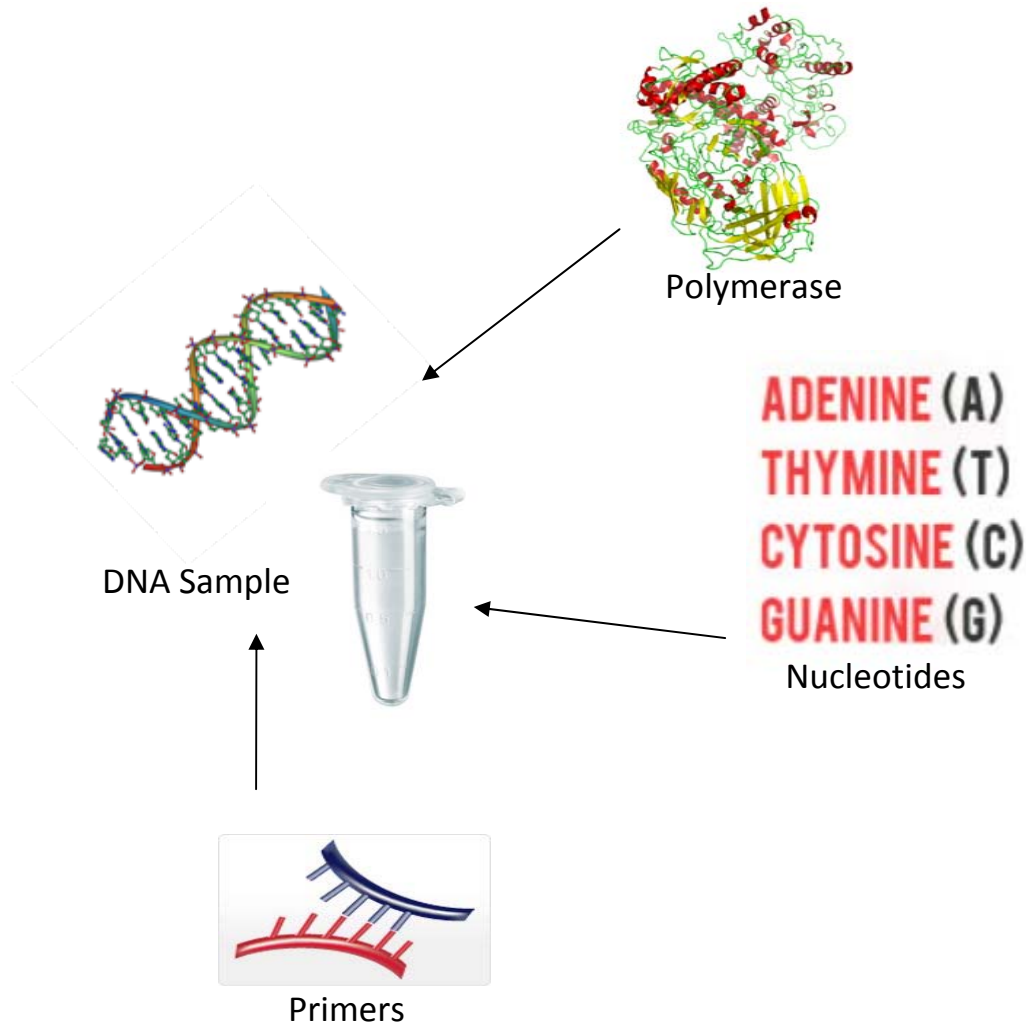


Nobel Prize in Chemistry (1993).-
PCR (Polymerase Chain Reaction)

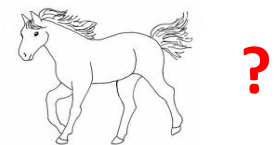


PCR, What a discovery!

Kary Mullis (1944--).- American biologist



Amplification of
horse-specific DNA



PCR, What a discovery!

PCR is nowadays used for:

- Foreign-DNA contamination detection
 - Paternity Tests
 - Forensic Investigations
 - Genetically inherited disorders diagnosis
 - Sequencing Genomes
- (...)

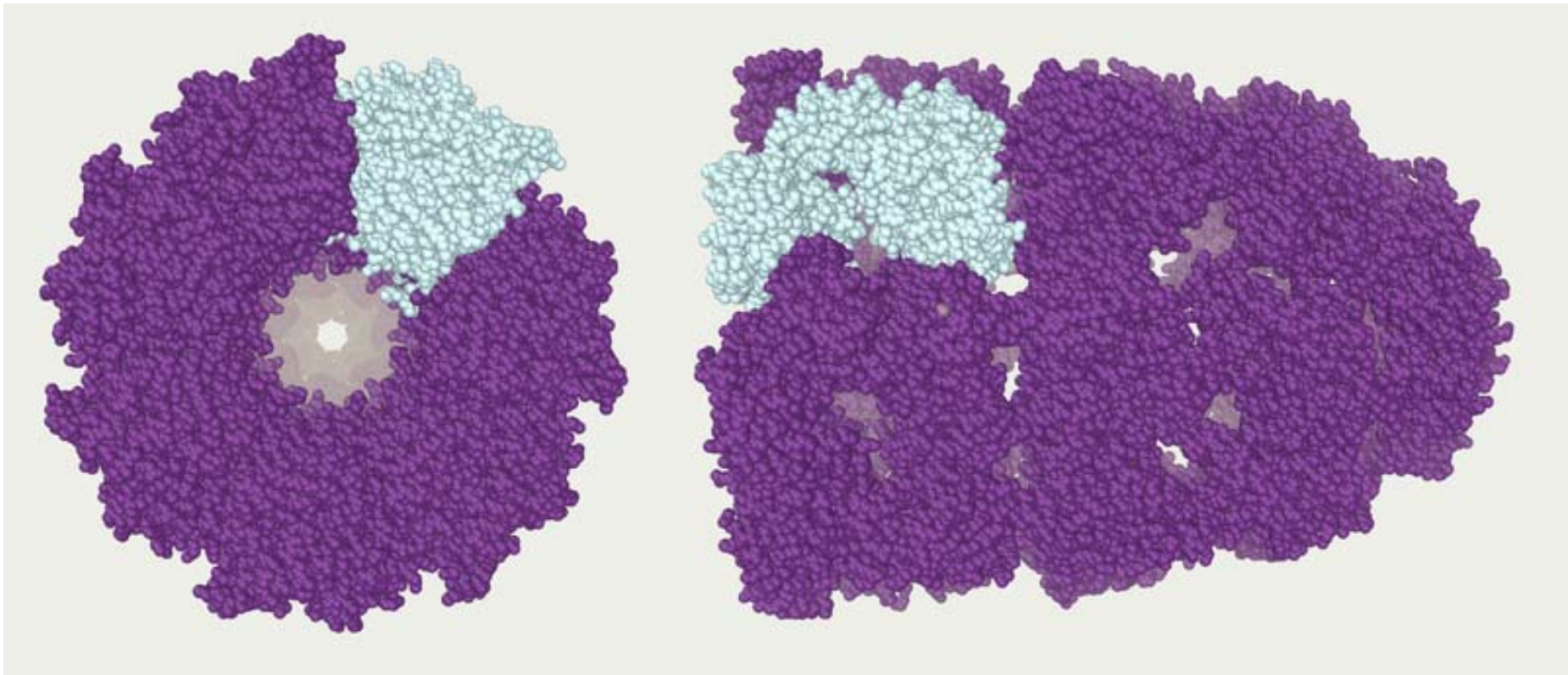
Chaperones and Pools

Chaperones and Pools?



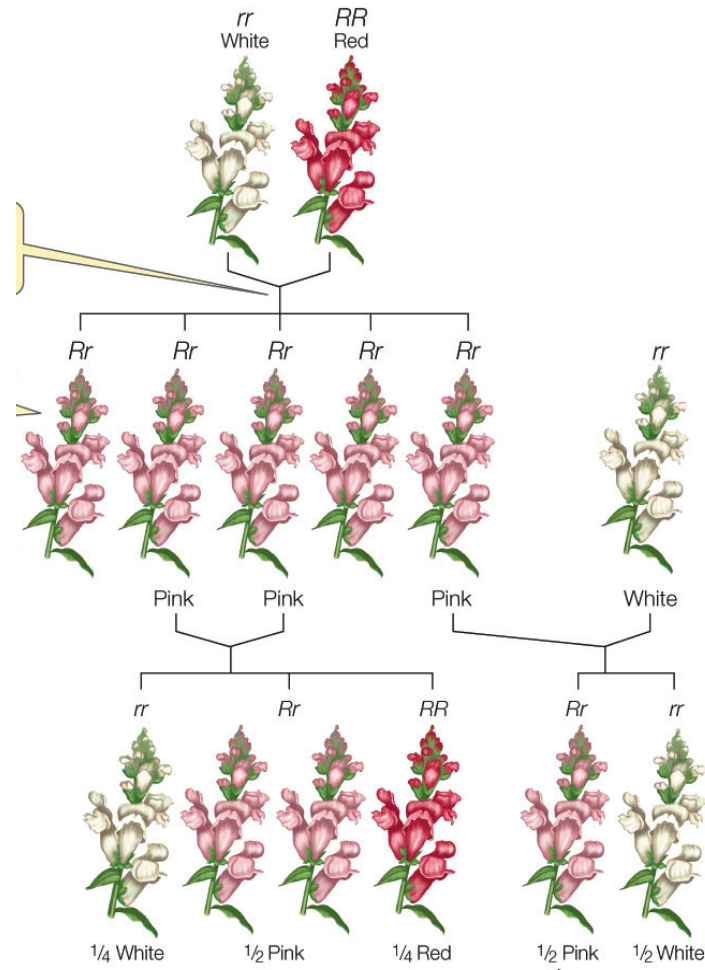
Chaperones (proteins)

Chaperone.- a protein able to bind another protein, fold/unfold and transport it

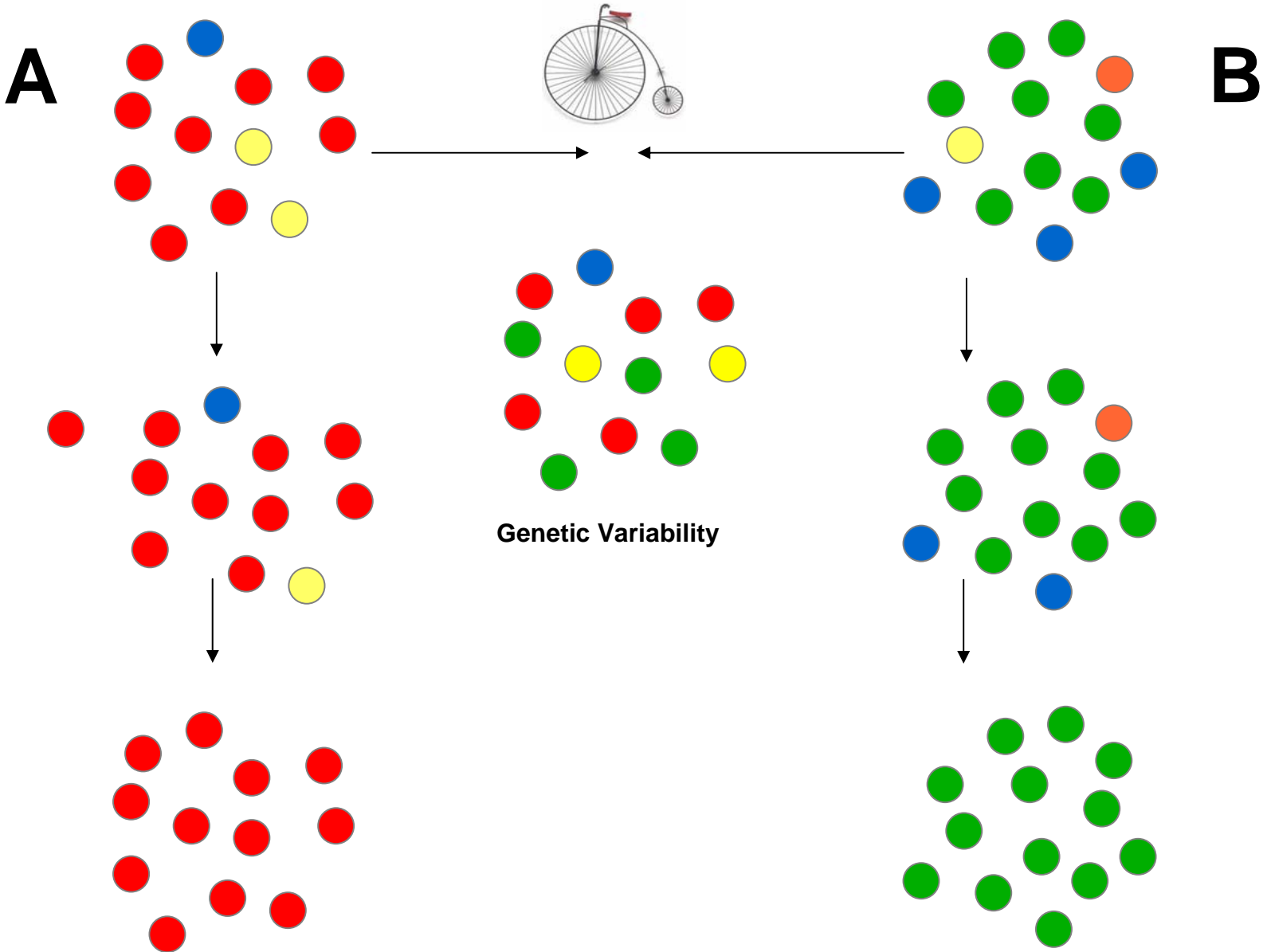


(Genetic) pool

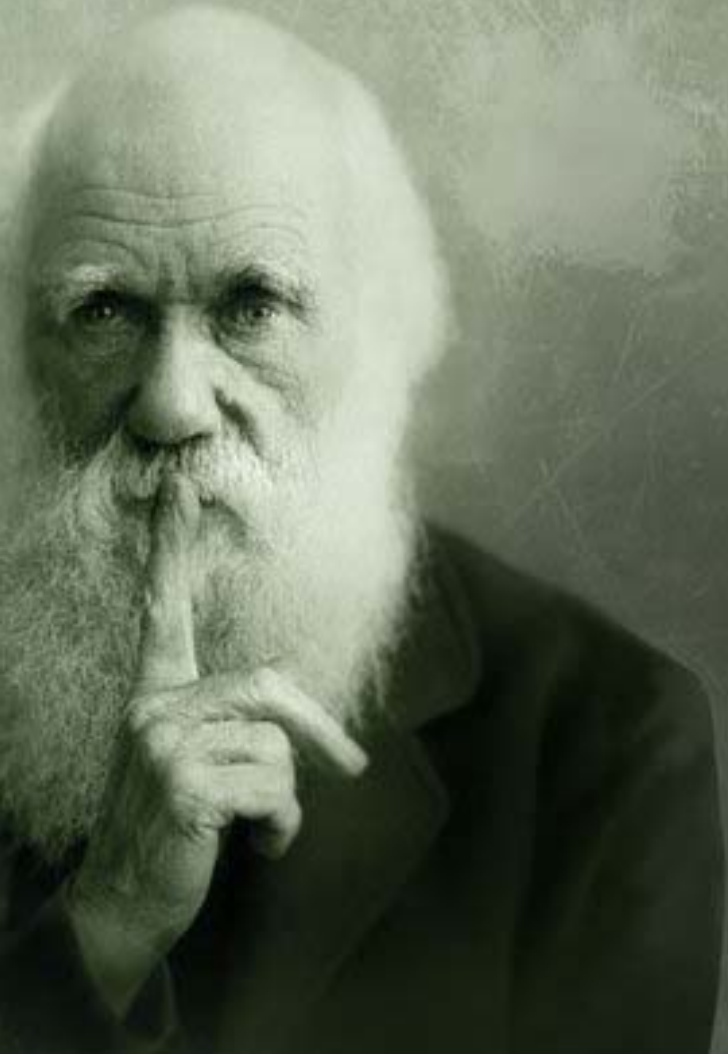
Genetic Pool.- set of all different alleles in a population



(Genetic) pool



Thanks for listening!



Exercise 1 Keys

Laws of Mendelian inheritance formulated **1865**

DNA is discovered **1869**

Structure of DNA deciphered **1953**

PCR invented **1983**

Dolly the sheep is cloned **1996**

Human Genome sequenced **2003**

Exercise 2 Keys

“I was driving up a long and winding road between Cloverdale and Booneville in Mendocino County, heading for my weekend cabin. My girlfriend was asleep and I was functionally sober (or the road would have proven my undoing) but it was late at night and I was feeling weird. [...] but tonight, in the middle of that stretch at mileage marker 46.58, the rest of my life was going to undergo a massive shift in just a few minutes”.

Kary Mullis

“This evening is certainly the second most wonderful moment in my life. The first was our discovery of [...]. At that time we knew that a new world had been opened and that an old world which seemed rather mystical was gone. Our discovery was done using the methods of physics and chemistry to understand biology. [...] At that time some biologists were not very sympathetic with us because we wanted to solve a biological truth by physical means”.

James Watson

“When I was here 22 years ago I addressed the students of 1958 as “fellow students” because although I was 40 years old I still felt that I was one of them, and I still feel the same today. I and my colleagues here have been engaged in the pursuit of knowledge. We have been learning, are still learning and I hope will continue to learn”.

Frederick Sanger

“For my part I have worked all my life with eggs and embryos of frogs. Compared to other small animals, these have figured prominently in the world of literature. They served as a chorus in a play by Aristophanes”.

John Gurdon

Exercise 3 Keys

There was a time when to **amplify** DNA,
You had to grow tons and tons of tiny cells.
Then along came a guy named Dr. Kary Mullis,
Said you can amplify in vitro just as well.
Just mix your template with a buffer and some primers,
Nucleotides and **polymerases**, too.
Denaturing, annealing, and extending.
Well it's amazing what heating and cooling and heating will do.
PCR, when you need to detect **mutations**.
PCR, when you need to **recombine**.
PCR, when you need to find out who the **daddy** is.
PCR, when you need to solve a **crime**.