

General introduction

LAB 1

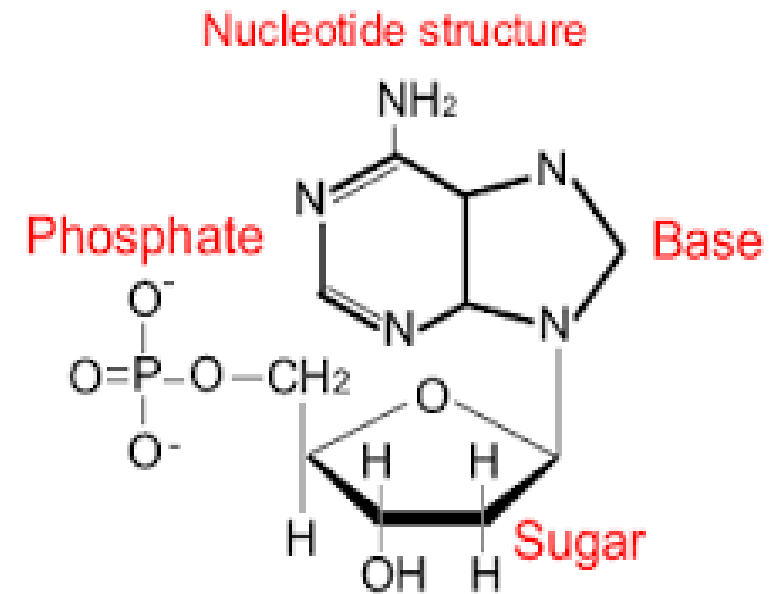
Safety issues

Major points:

- lab coat & gloves at all times, change when contaminated
(for PCR fresh gloves/step)
- be familiar with eyewash station
- Dispose of everything as suggested
- Label clearly
- physical, biological & chemical hazards ?

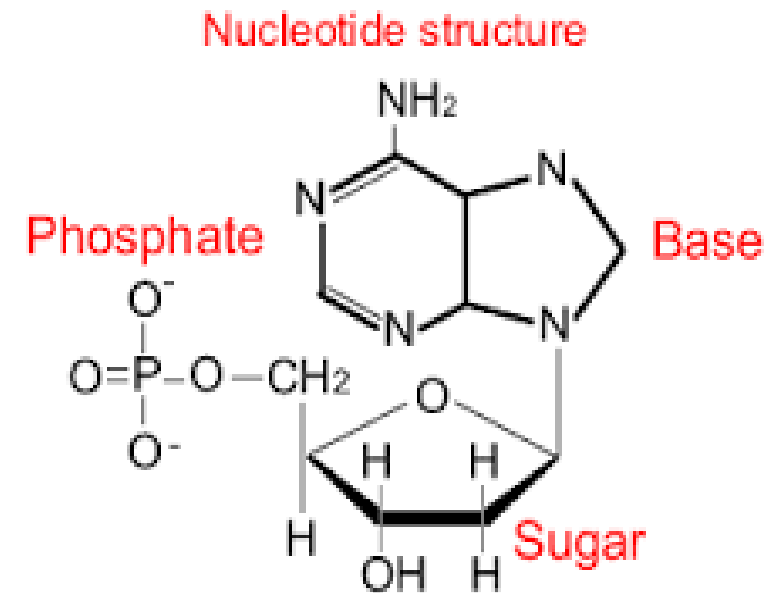
Nucleic acid

- macromolecule (monomeric nucleotides)
- carry genetic inf
- form structure
- all cells & viruses
- eg; DNA; RNA

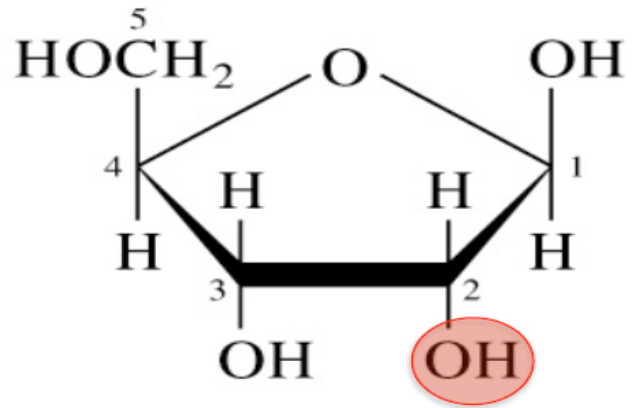


Nucleic acid (chemical structure)

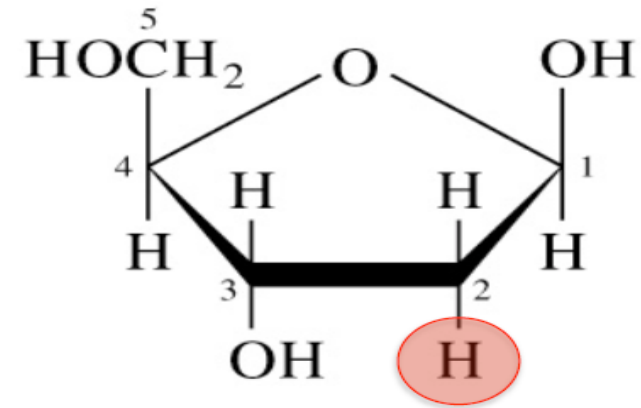
- linear (eukaryotes), unbranched
- 3 components;
 1. phosphate backbone (PO₄)⁻³
 2. pentose sugar
 3. nitrogenous base (purine or pyrimidine)



Ribose and Deoxyribose sugars



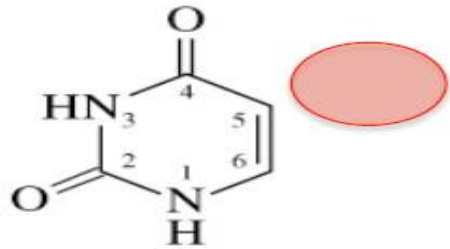
Ribose
(β-D-Ribofuranose)



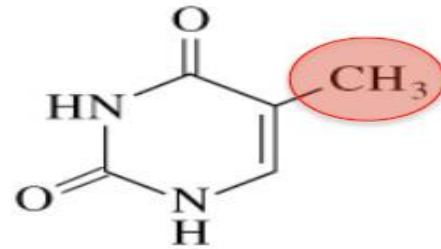
Deoxyribose
(2-Deoxy-β-D-ribofuranose)

Nitrogenous base (nucleobases)

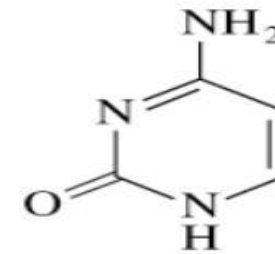
PYRIMIDINES



Uracil
(2,4-Dioxypyrimidine)

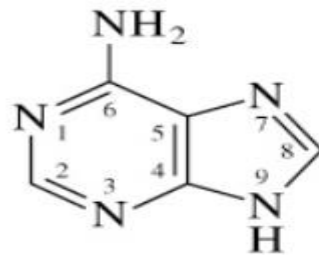


Thymine
(2,4-Dioxo-5-methylpyrimidine)

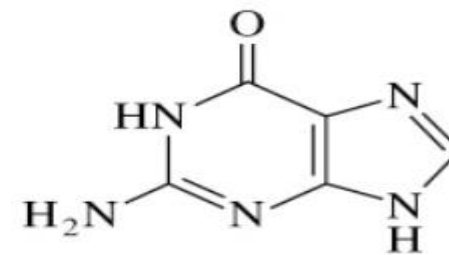


Cytosine
(2-Oxo-4-aminopyrimidine)

PURINES



Adenine
(6-Aminopurine)



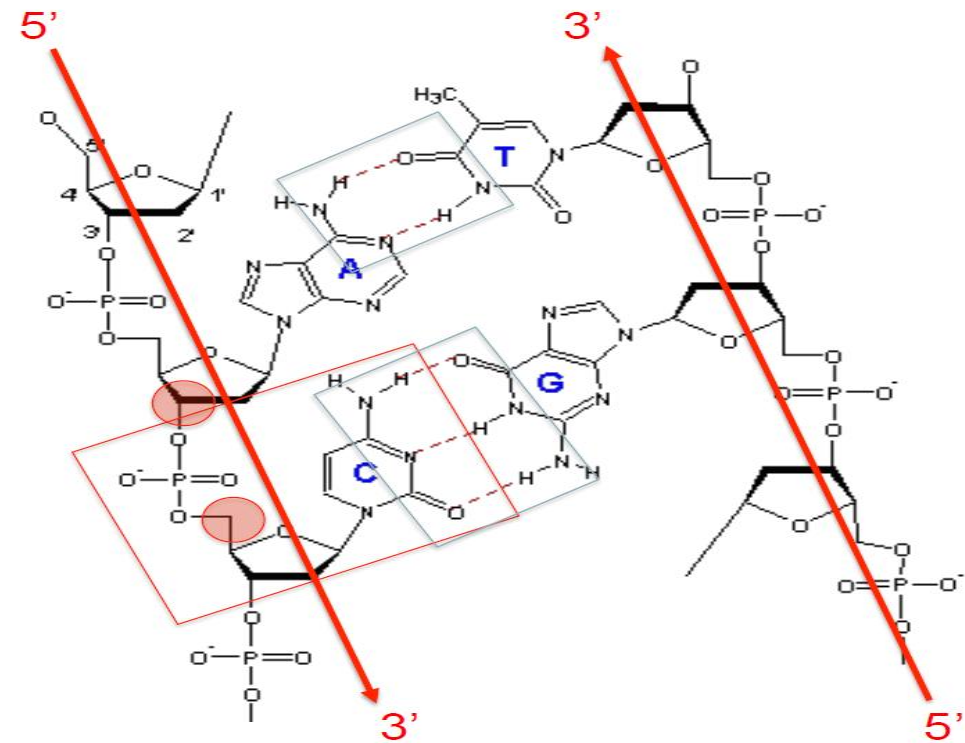
Guanine
(2-Amino-6-oxopurine)

Nucleic acid components

- Nucleobases : C,G,T,A,U
- Nucleosides (sugar + base)
- Nucleotides (sugar + base + phosphate group)
monomers of DNA, RNA

Base pairing

- 3'-5' phosphodiester link
- 2 strands linked by hydrogen bond
- A – T C – G
- strands run in opposite direction



Types of nucleic acids

DNA

Double stranded

Ribose

Thymine

Carry genetic information

RNA

Single stranded

Deoxyribose (lack one O2 atom)

Uracil

Protein synthesis

tRNA, mRNA, rRNA

DNA storage

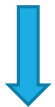
Genes - DNA – chromatin – chromosomes

DNA make up of genes

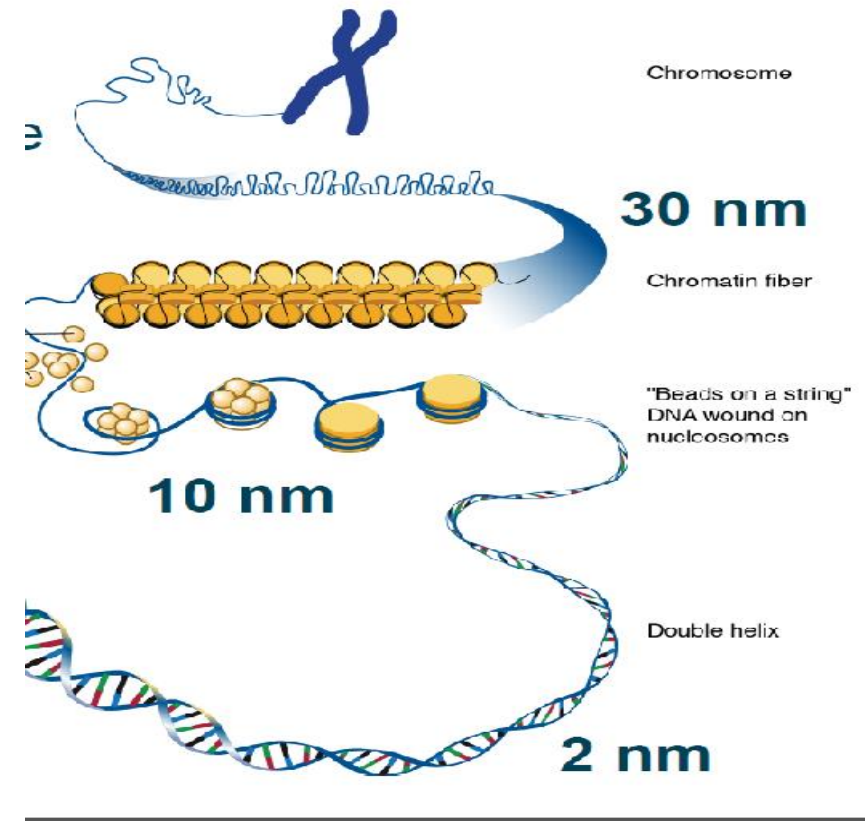


DNA + protein = chromatin

to maintain chromosome structure

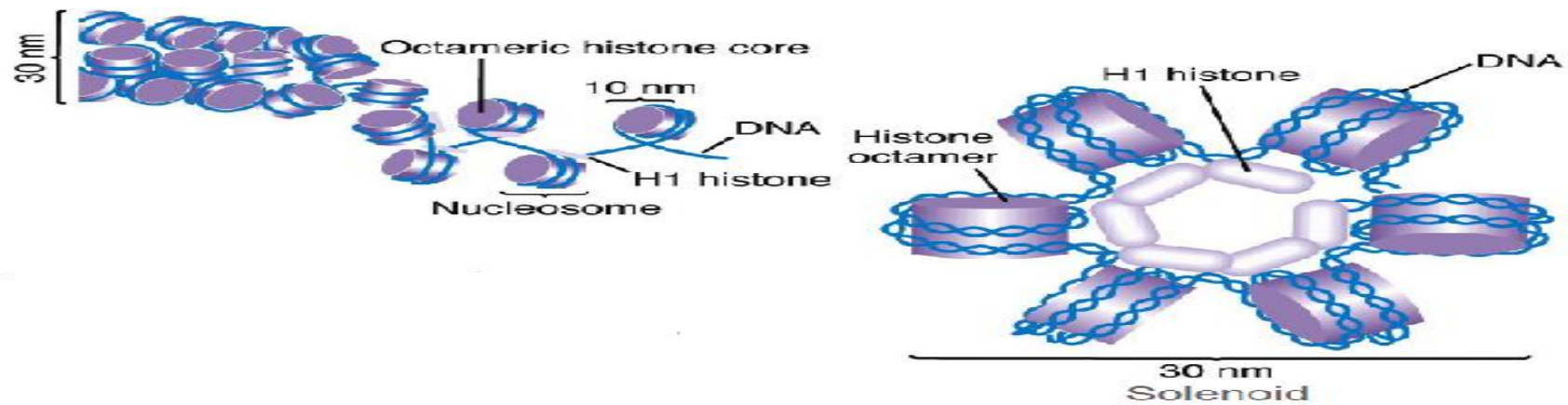


Chromosomes are made up of DNA



Histones

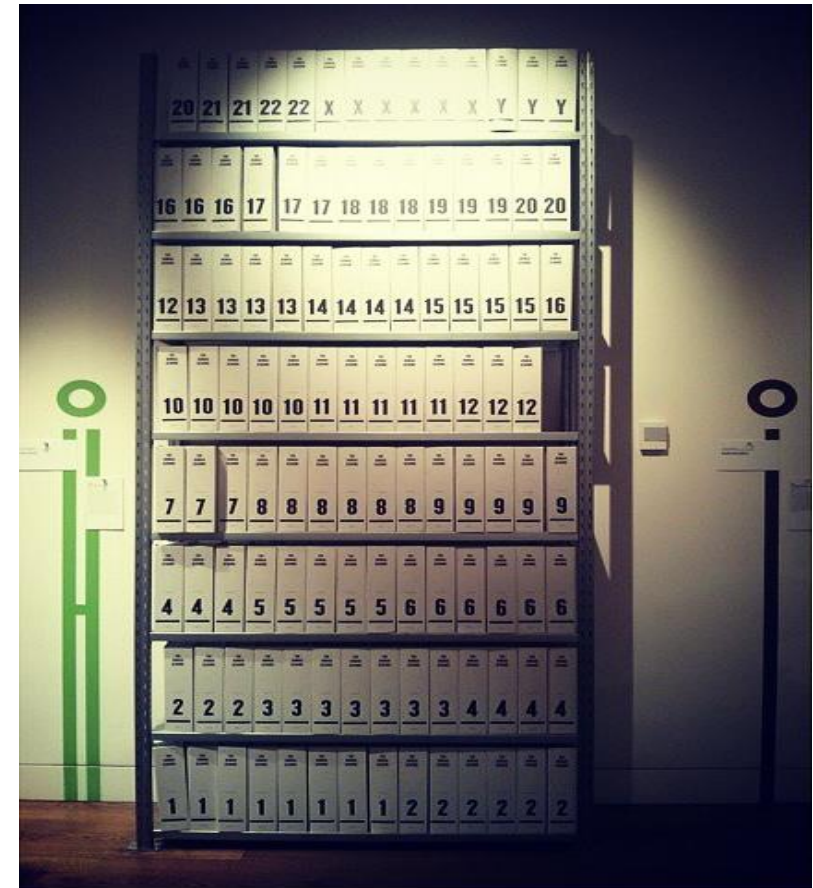
- +ve charged
- Compact & organize
- Control which part of DNA are transcribed



The human genome

- 3 billion bb.
- 200 volume the size of telephone
Book to hold the information.

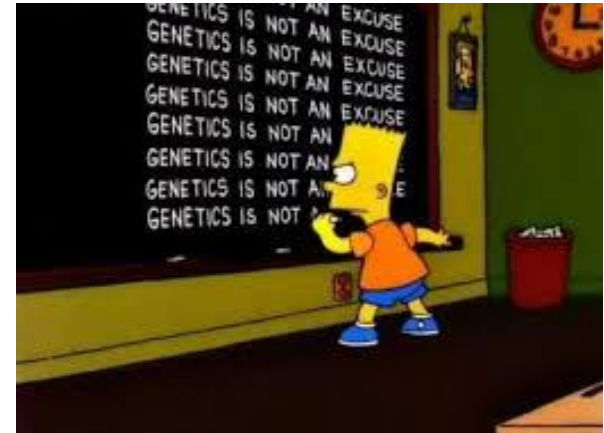
..... So compact structure



Genetics

study of the effect of genetic differences in organisms

study of the mutants organisms with respect to the wild-type (normal phenotype)



Molecular genetics

Study the structure and function of genes at a molecular level with understanding the interactions bet the various **systems** of a cell and learning how these interactions are regulated

Techniques:

Cloning

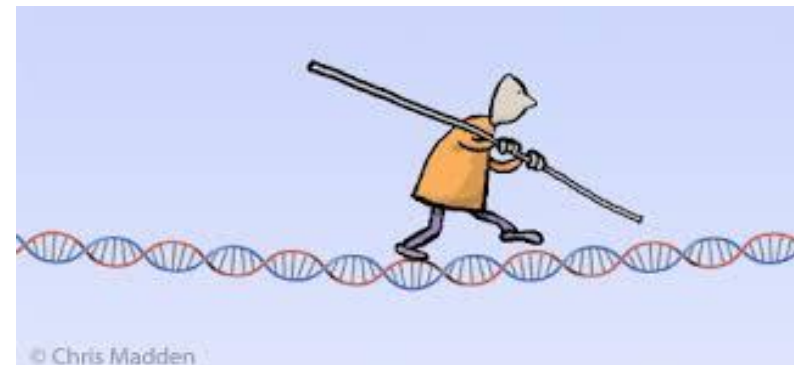
PCR

Gel electrophoresis

Sothern plot

Sequencing

Arrays



Cytogenetics

- visual study of chromosomes at microscopic level

Techniques:

Karyotype (chromosomal complement)

Fish

Idiogram (stylised form of karyotype)



Mutation

- errors usually occur in the polymerization of the second strand
- error rate; 1 error / 10¹⁰ bases 'proofreading function'
- mutagenic:
radiations, chemicals or inherited

THANKS FOR YOUR ATTENTION

• ANY QUESTIONS?

