



ARJUNA NEET BATCH



CELL THE UNIT OF LIFE

By : Biswajit Sir

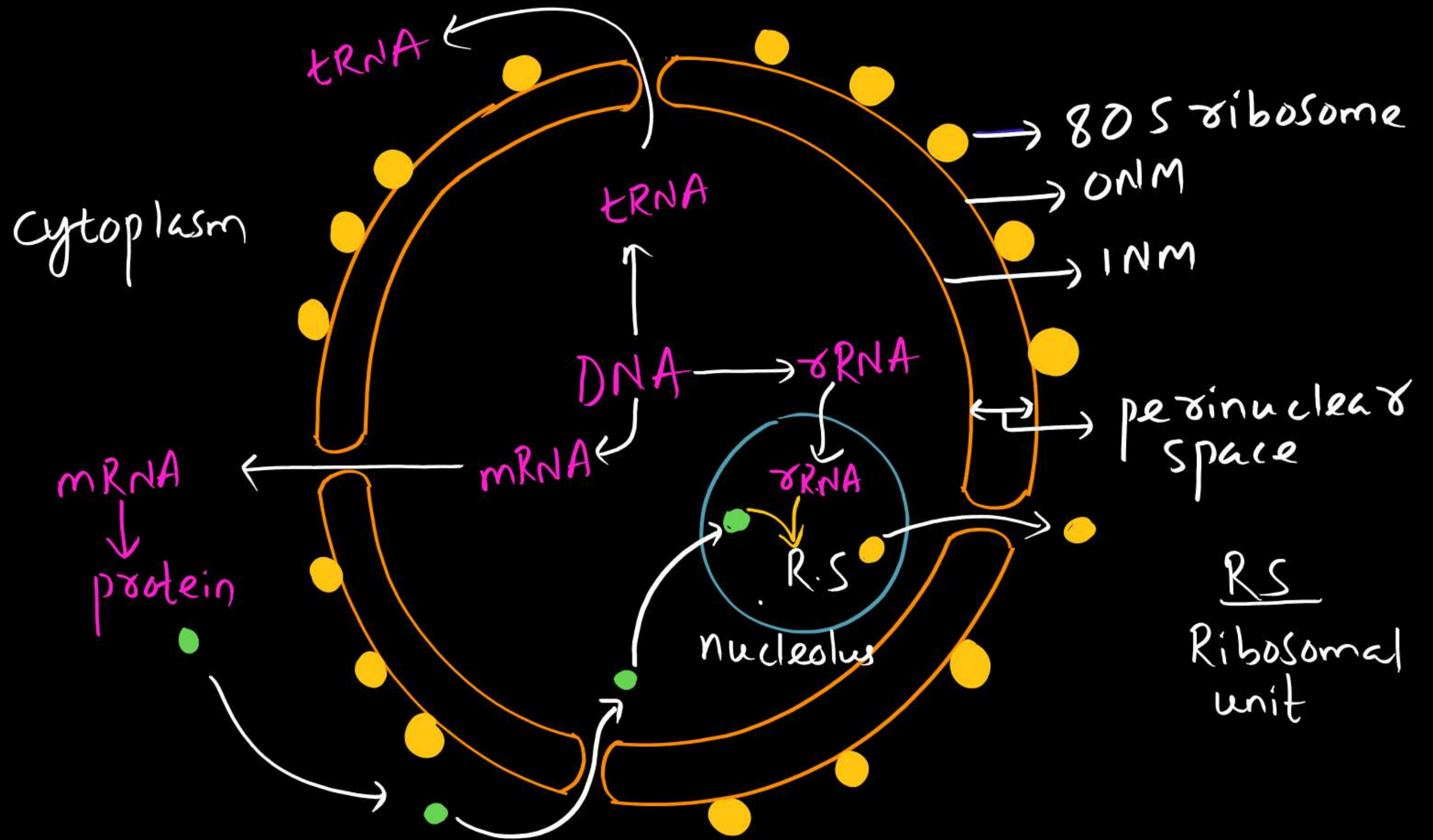
Nuclear envelope

→ $0\text{NM} + 1\text{NM} + \text{perinuclear space}$

↳ space b/w 0NM , 1NM

↳ 10-50nm diameter.

→ barrier b/w materials of nucleus and cytoplasm.



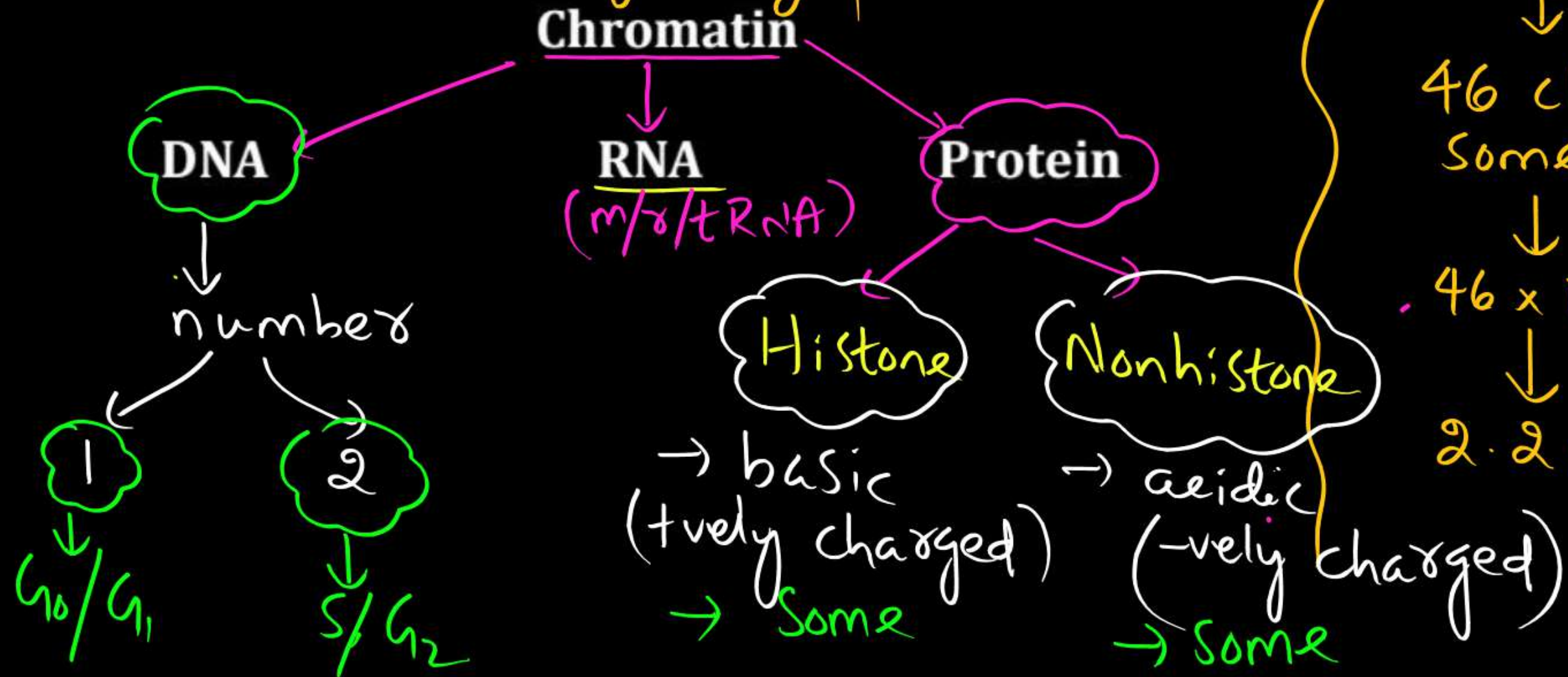
Nucleus $\rightarrow 10^{-6} \text{ m}$



Chromatin

- Term \rightarrow Given by Flemming (1879)
 - \rightarrow Derived from Greek word Chroma (Color).
- Gets stained by basic dye. E.g.- Acetocarmine.

\hookrightarrow +vely charged

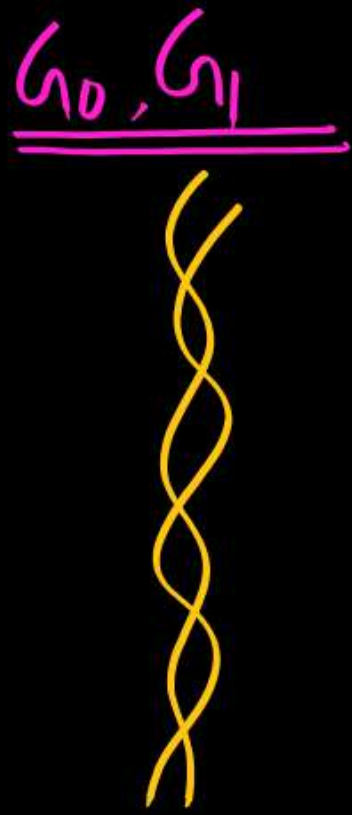


ds DNA

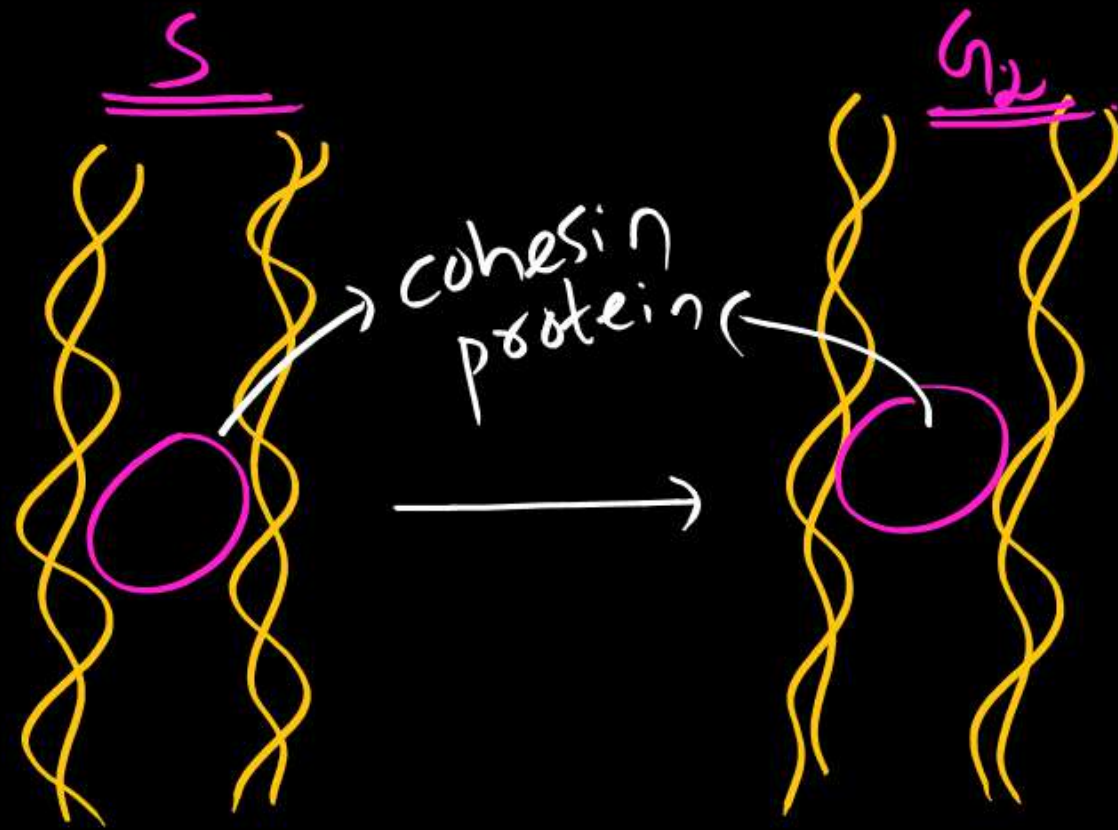
transcription

ssRNA

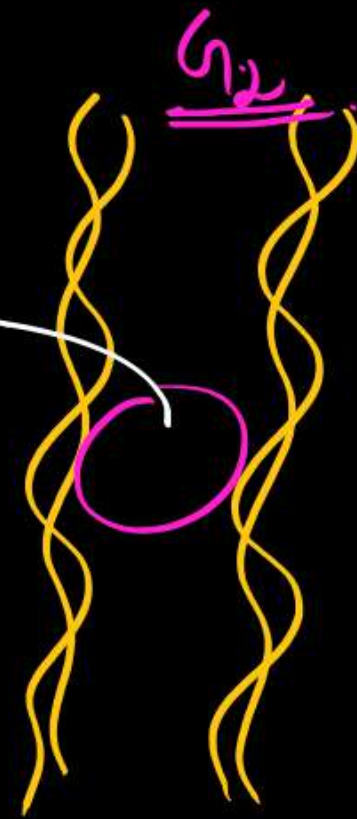
Chrom → ~~DNA~~ + ~~RNA~~ + ^{NA}~~protein~~
 NA
 → nucleoprotein complex



1 X chromatid
1 X ds DNA



1 X chromatid
2 X ds DNA

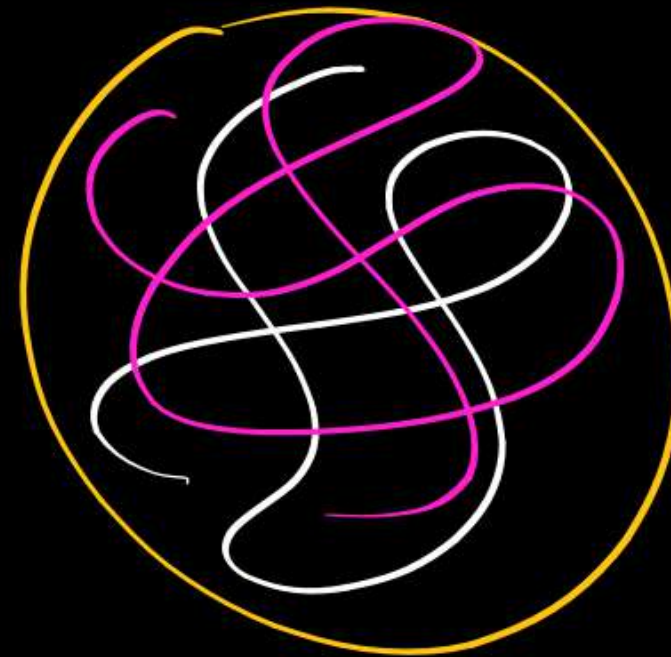
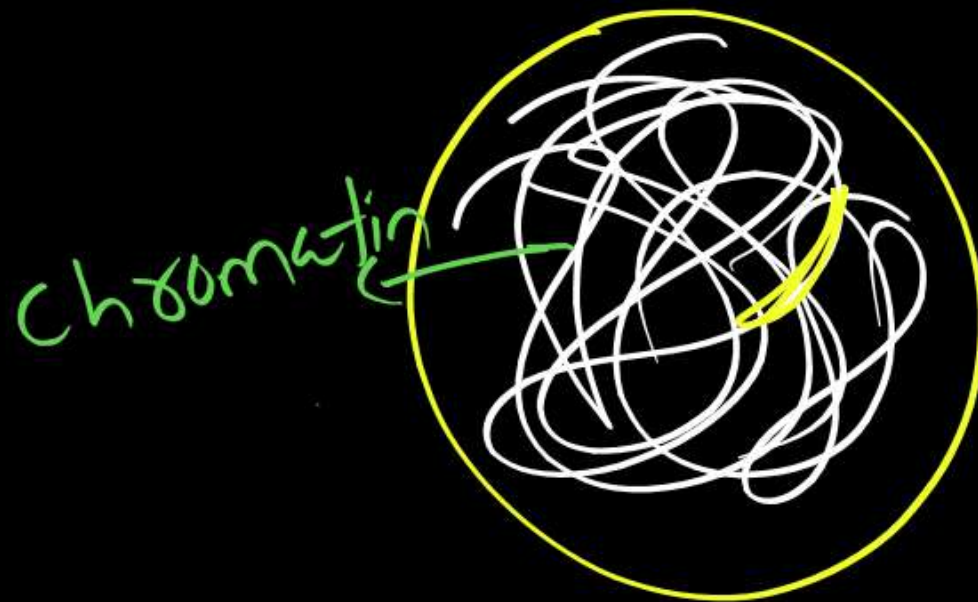


1 X chromatid
2 X ds DNA .

DNA + RNA
↓
N/A

Chromatins:

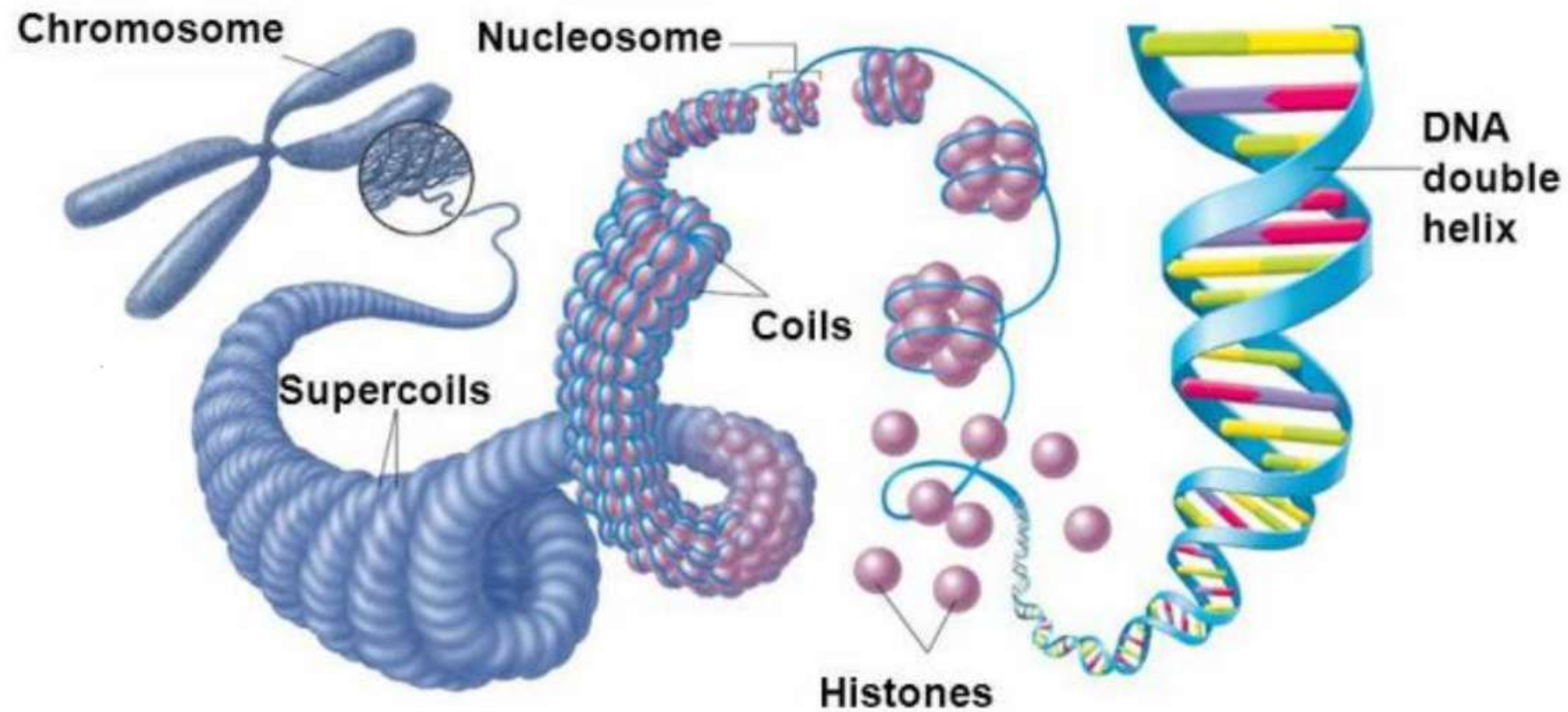
- are highly extended and elaborate nucleoprotein fibres
- form loose and indistinct network of nucleoprotein fibres in interphasic nucleus







DNA and Chromosomes

– Eukaryotic Chromosome Structure



Nucleolus

- **Discovery – Fontana**
- **Term – Bowmann**
- **Non-membrane bound**  **Its content is in direct contact with nucleoplasm.**
- **Stained by acidic dye.**
↳ -vely charged
- **Attached to chromatin at NOR (Nucleolar organizing region)**
- **Site of rRNA and ribosomal subunit synthesis.**
-  **Except 5S rRNA**
- **Known as ribosome factory**

Ca^{2+}

chromatin

nucleoplasm

rRNA genes

rRNA

nucleolus

ribosomal Subunit

NOR

protein (P)

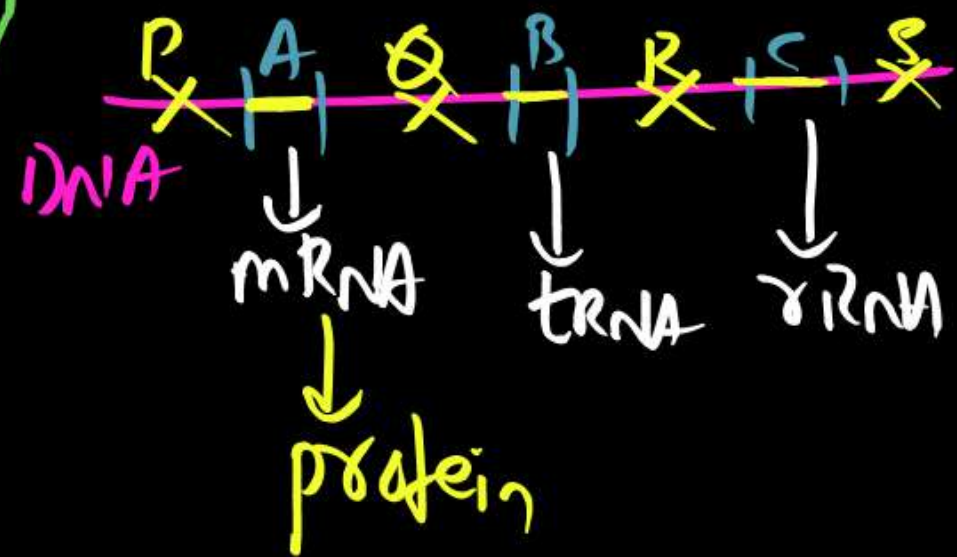
gene

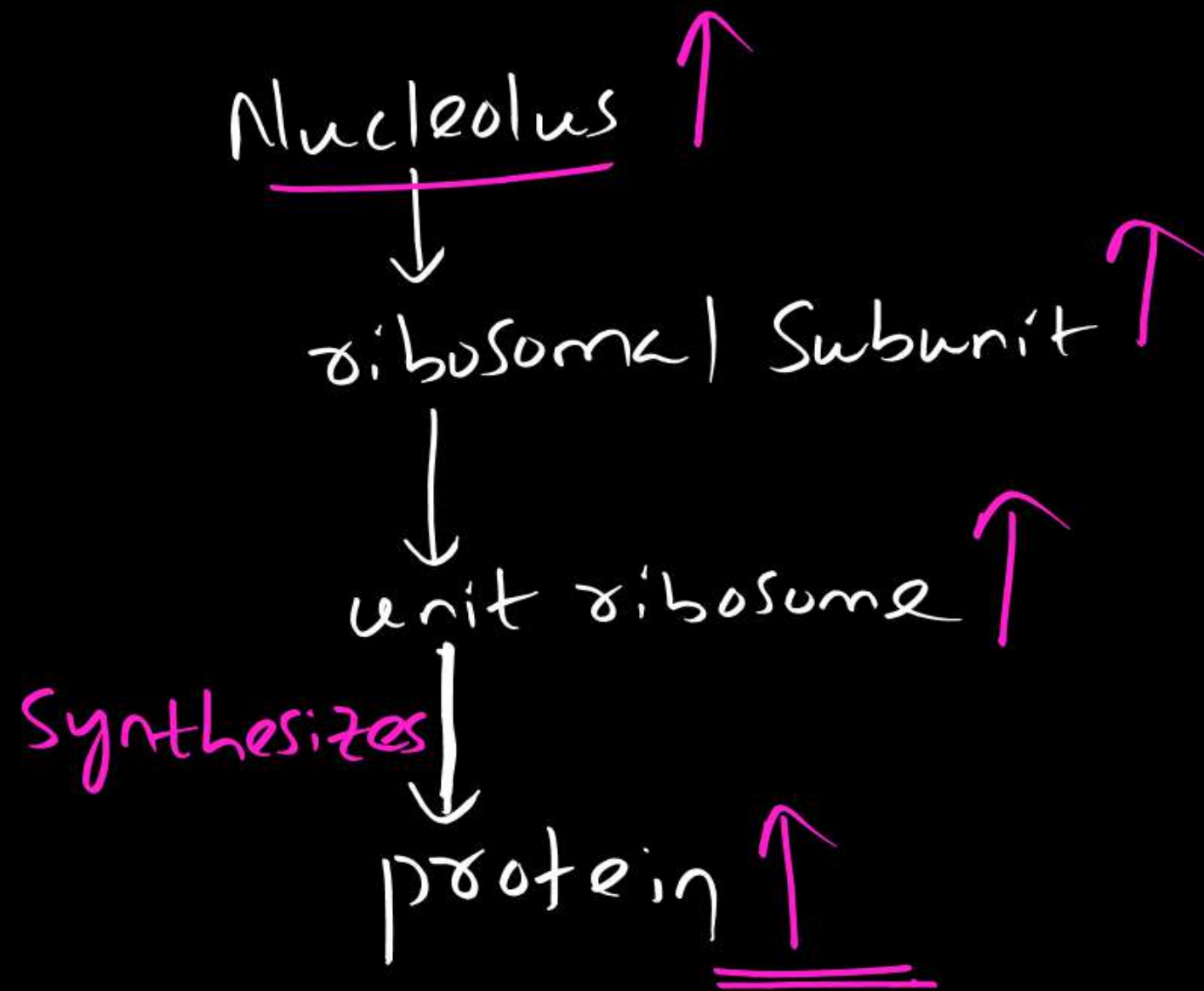
ds DNA

tRNA

mRNA

protein





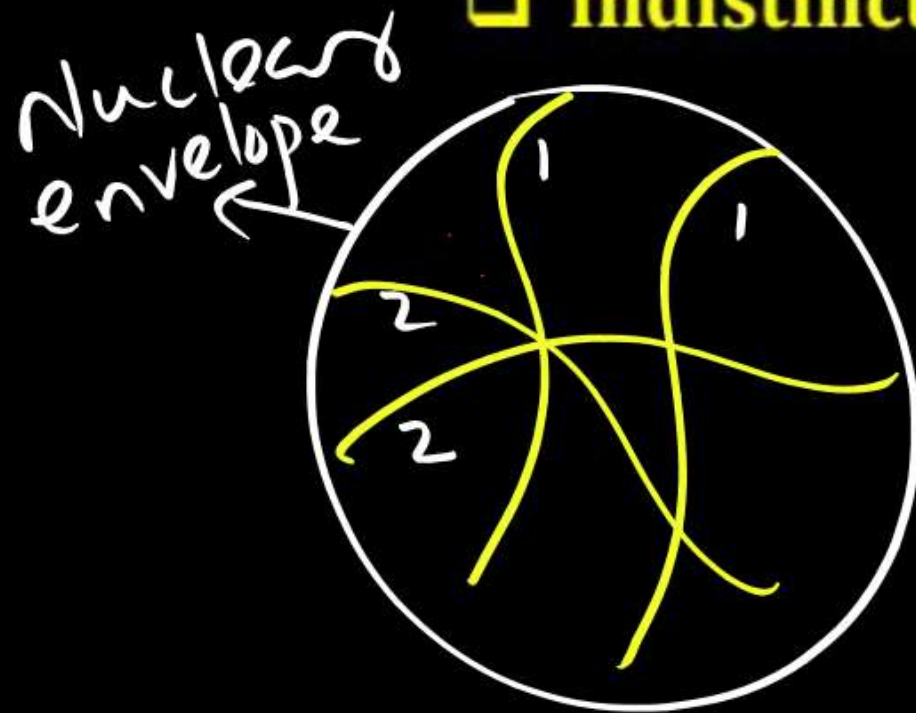
Number of Nucleolus

- ❑ Variable
- ❑ More → Cells involved in synthesis of more proteins
- ❑ Few → Cells involves in synthesis of less proteins.

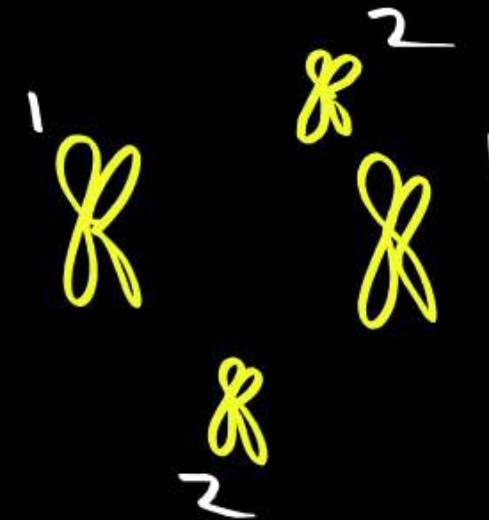
Chromosomes:-



- ☐ Interphase
- ☐ Long, thin
- ☐ indistinct



- ☐ M-Phase
- ☐ Short, thick
- ☐ distinct



Components of chromosome

(1) Pellicle

Proteinaceous covering of chromosomes.

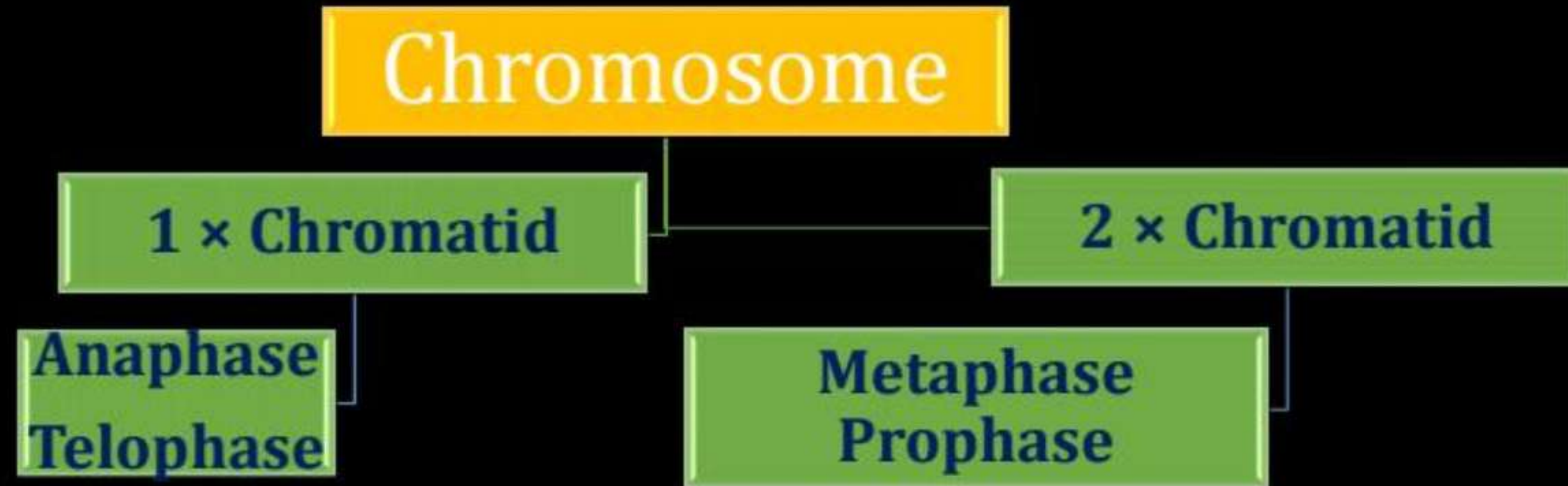
(2) Matrix

- **Semifluid present inside pellicle.**
- **Contains minerals, enzymes, ions**

(3) Primary Constriction

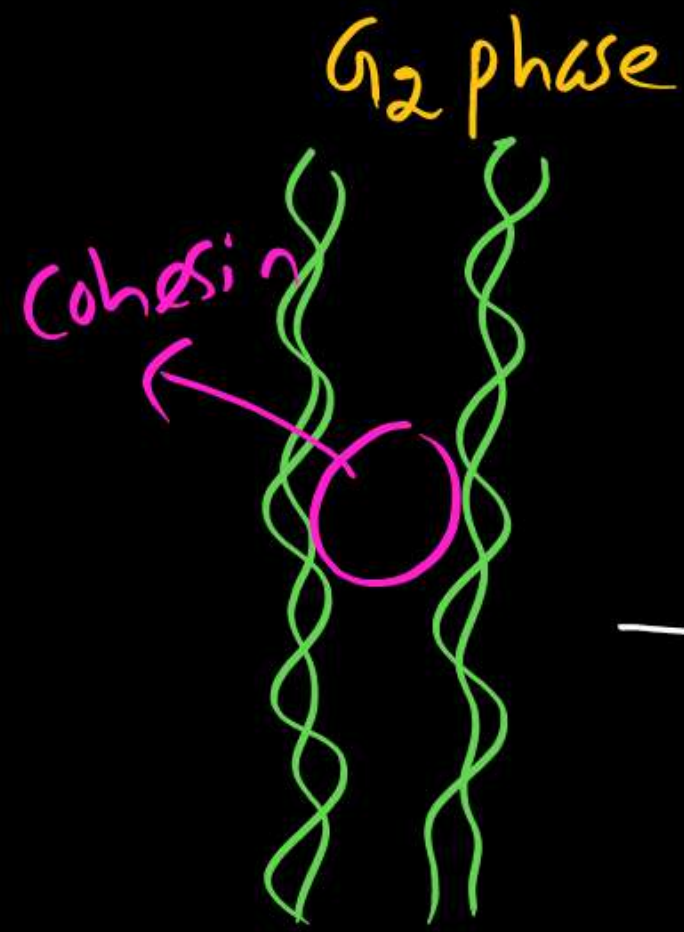
- **Known as Centromere**
- **It's position is variable.**
- **Posses disc shaped, small proteinaceous Kinetochore (Binding site for spindle fibre) complex on its both side.**

(6) Chromatids

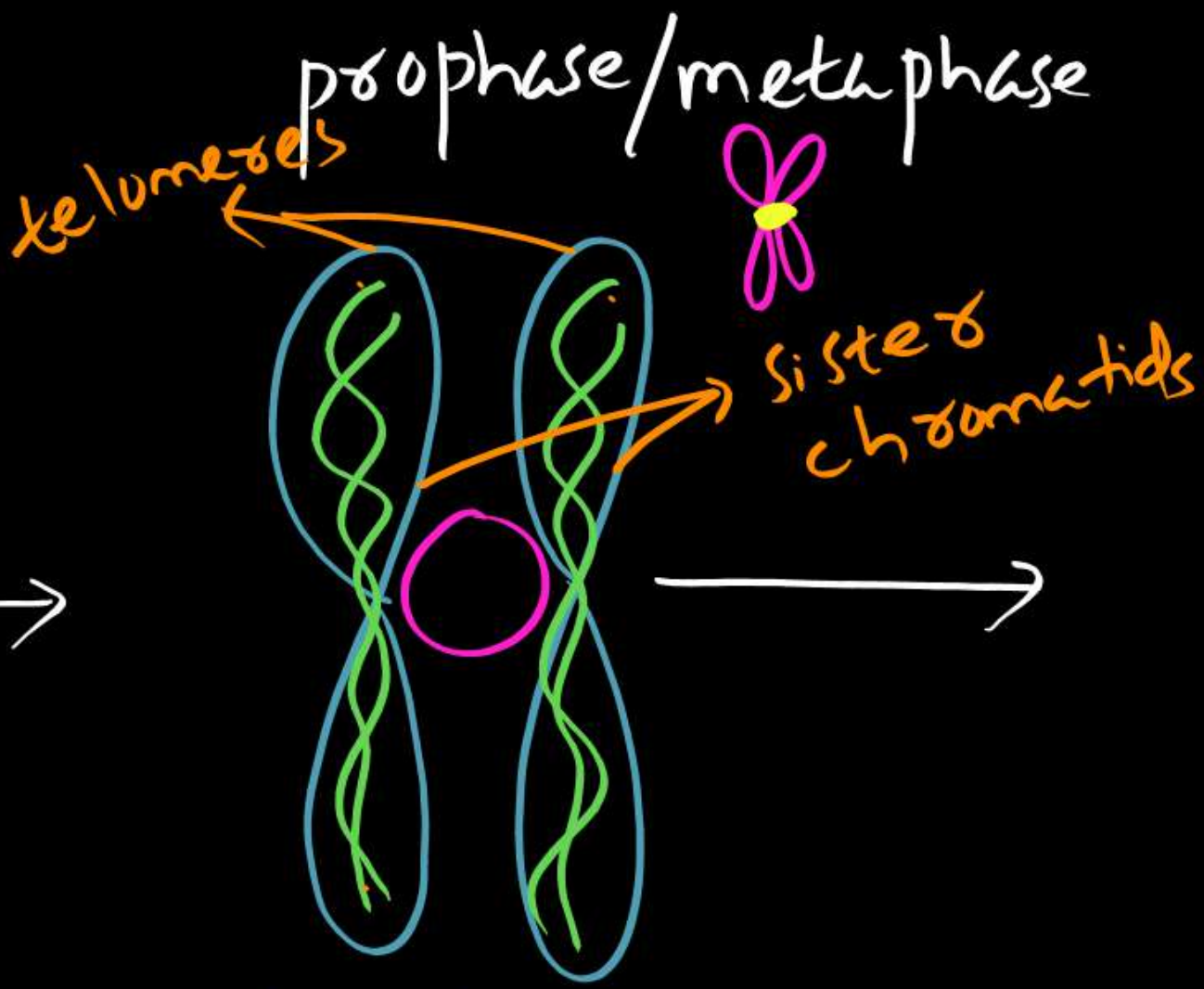
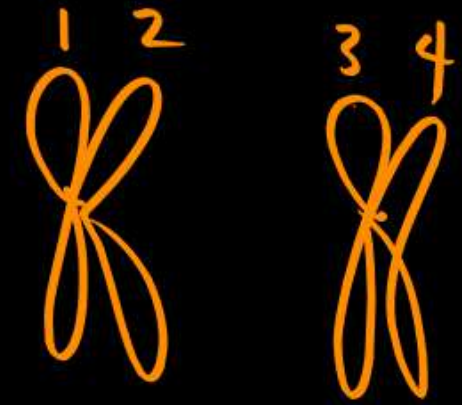


1 x Chromatid – 1 x ds DNA

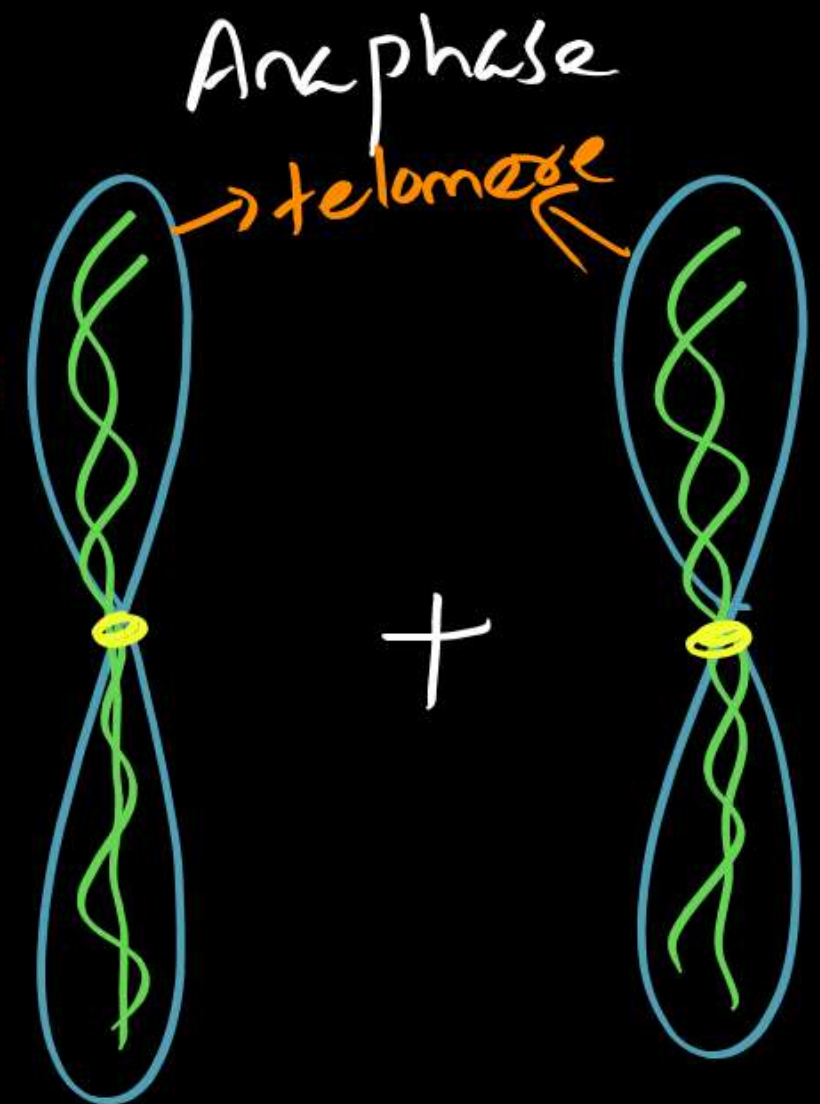
Two sister chromatids are held together at centromere by cohesion protein.



1x Chromatin
2x ds DNA



1x chromosome
2x chromatids
2x ds DNA
1x centromere
4x telomeres



1x Chromosome
1x chromatid
1x ds DNA
1x centromere
2x telomere

1x chromo
some
1x chromatid
1x ds DNA
1x centro
mere
2x telomeres

Types of chromosome (On the basis of position of Centromere)

Chromosome	Position of Centromere	Shape	Arms
Metacentric (Median/isobrachial)	At middle of chromosome	V shape	Equal
Submetacentric (Submedian/heterobrachial)	Near middle of chromosome	L shape	Unequal 1. Short arms (P) 2. Long arms (q)
Telocentric (appear to have 1 arm)	At telomere	I shape	-
Acrocentric	Near telomere	I shape	Unequal 1 × very long 1 × very short