VIDYAPEETH

Batch Code : 11-YN401MH

- Botany
- कोशिका चक्र एंव कोशिका विभाजन

Lecture No.- 1

Dr. Jaiveer Chaudhary Sir

Today's Targets

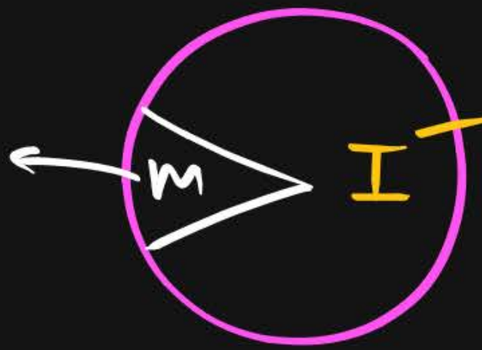
1. कोशिश। चक्र
2.
3.
4.

cell cycle

विभाजन की तैयारी (I)

Interphase
अंतरावस्था

विभाजन (m)



विभाजन अवस्था 5% से कम समय

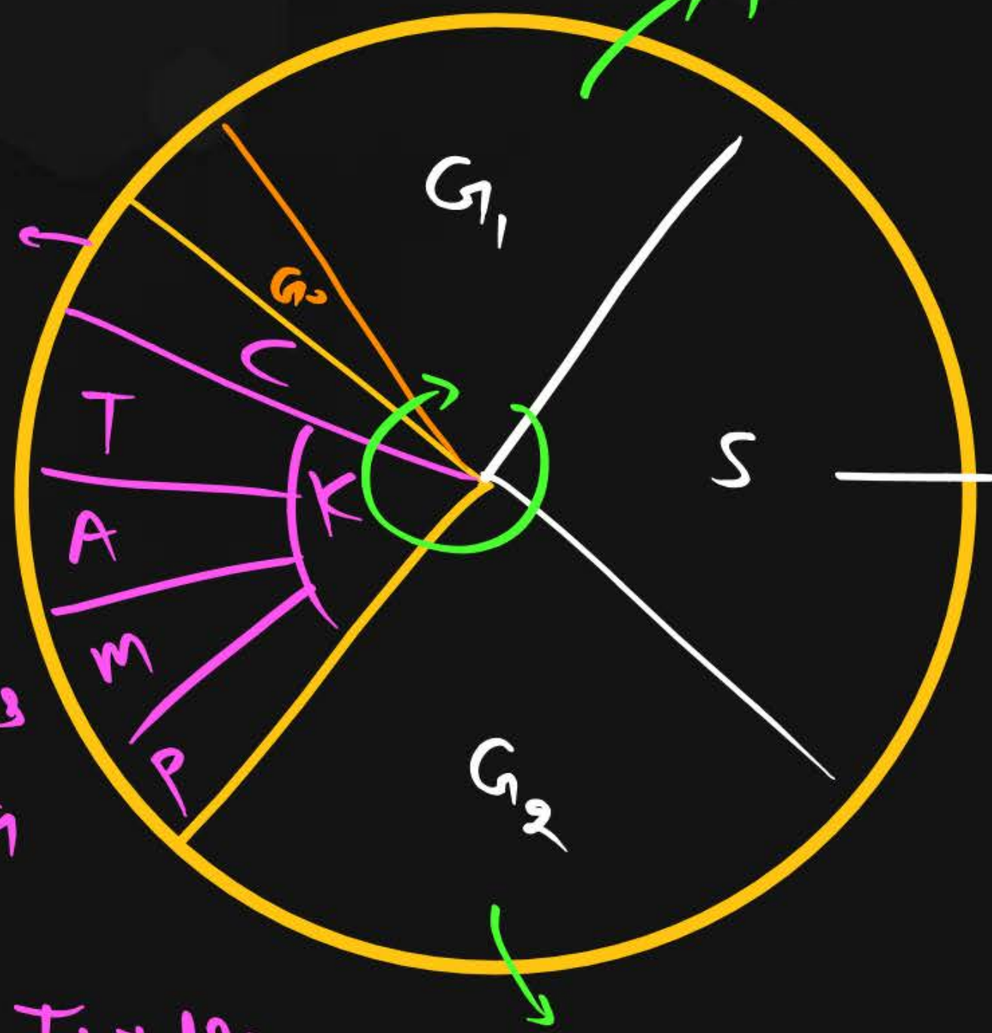
Interphase 95% से अधिक समय

नाभिकीय अवस्था

तैयारी

सर्वाधिक सक्रिय अवस्था

विश्राम अवस्था



post mitotic phase (G1)

pre DNA synthesis phase

cytokinesis
কোষদ্রব্য দ্বিখণ্ডন

S → DNA এর প্রতিলিপিকরণ

K → Karyokinesis
কেন্দ্রক বিভাজন

P → prophase

M → Metaphase

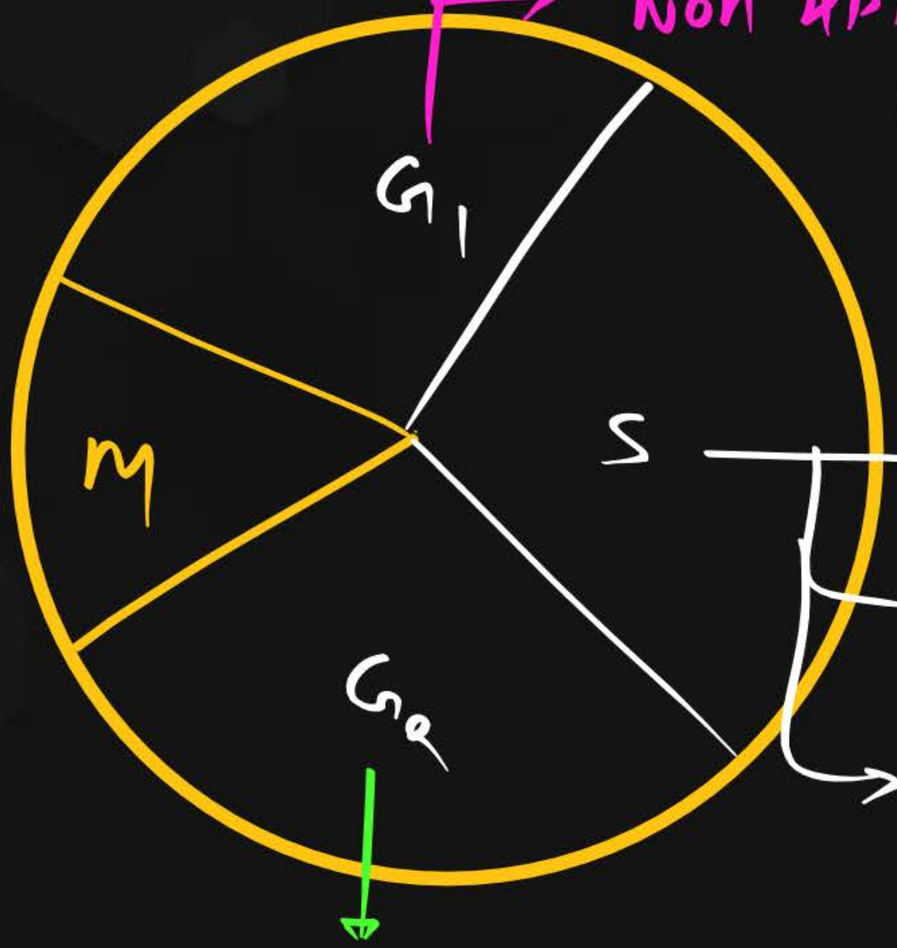
A → Anaphase

T → Telophase

pre mitotic phase (G2)

post DNA synthesis phase

Interphase



→ अधिकांश कोशिकाओं का प्रतिस्थापन
→ Non histone protein का संश्लेषण
(DNA and RNA polymerase)

S → DNA का द्विगुणन
→ Histone protein का निर्माण
→ तारक केन्द्र का द्विगुणन
(last S अवस्था में)

Tubulin प्रोटीन का निर्माण
विभाजन के लिए तैयारी

Homework

Todays lecture

Next Class Target

Topic M अवस्था

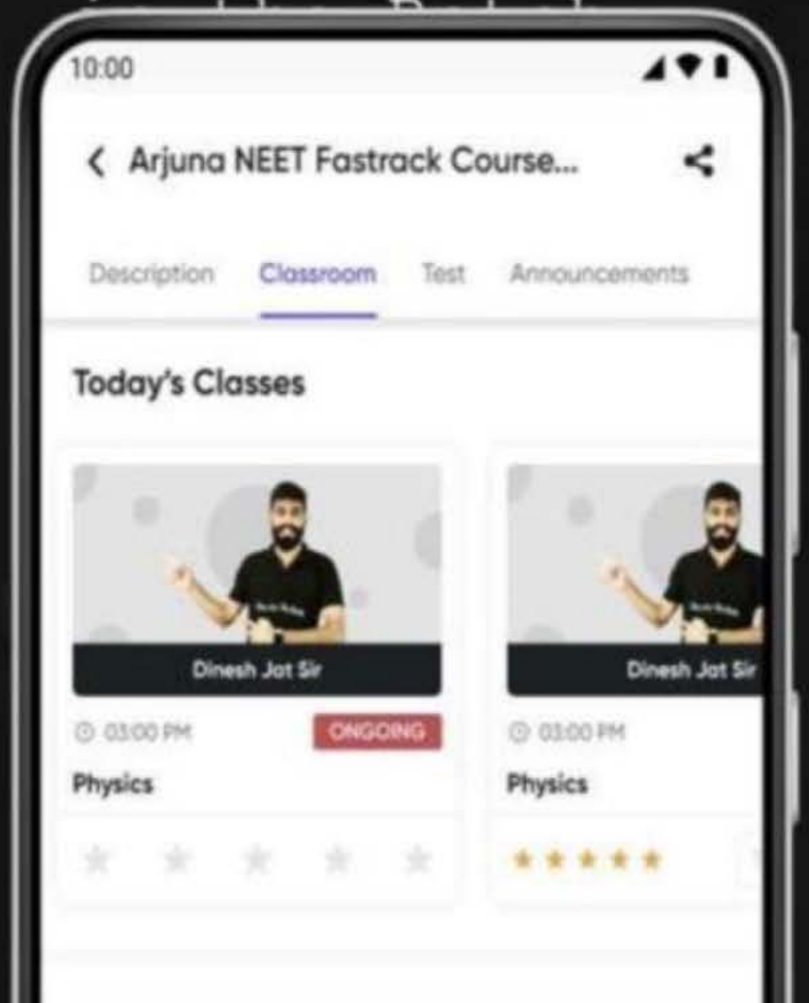
Topic समसूत्री विभाजन

Topic

Topic

Thank You...

Rate your today's class



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VIDYAPEETH

Batch Code : 11-YN401MH

- Botany

- Cell Cycle and Cell Division
  (कोशिका चक्र एवं कोशिका विभाजन)

Lecture No.- 02

Dr. Jaiveer Chaudhary Sir

Today's Targets

1. कोशिका चक्र
2. समसूत्री विभाजन
3.
4.

The sequence of events by which a cell duplicates its genome, synthesises the other constituents of the cell and eventually divides into two daughter cells is termed cell cycle.

G_1 S G_2

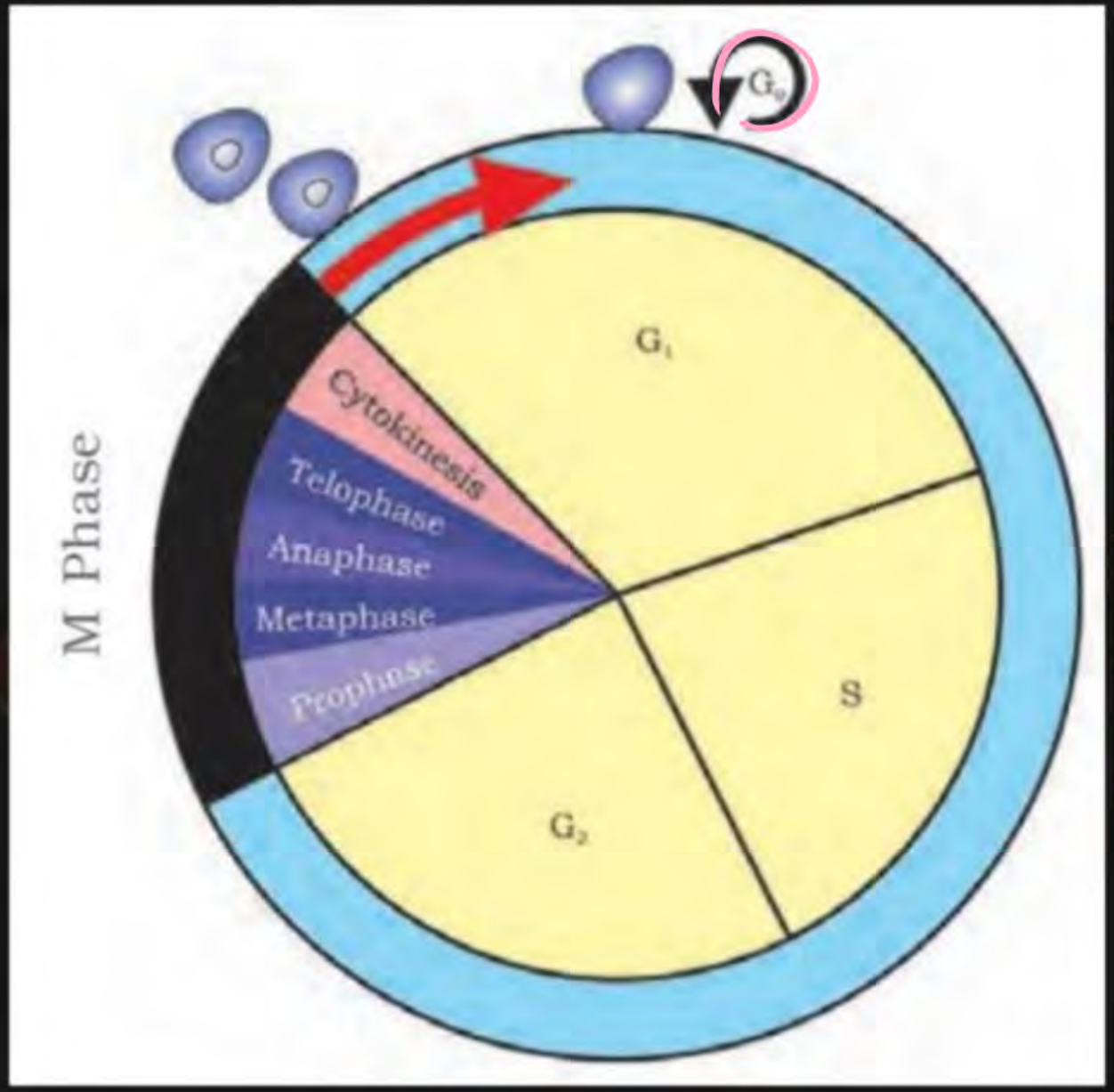
कोशिका चक्र कि अवधि :→

→ मानव कोशिका → 24 HRS

HeLa cell

ही - ला

Yeast → 90 min



G_0 अवस्था

(Quiescent Stage)

प्रशांत अवस्था

Exit (बाहर)

→ Nurve cell

→ kidney cell

→ muscle cell

→ cork cell

Suspend

निलंबन

Heart cell

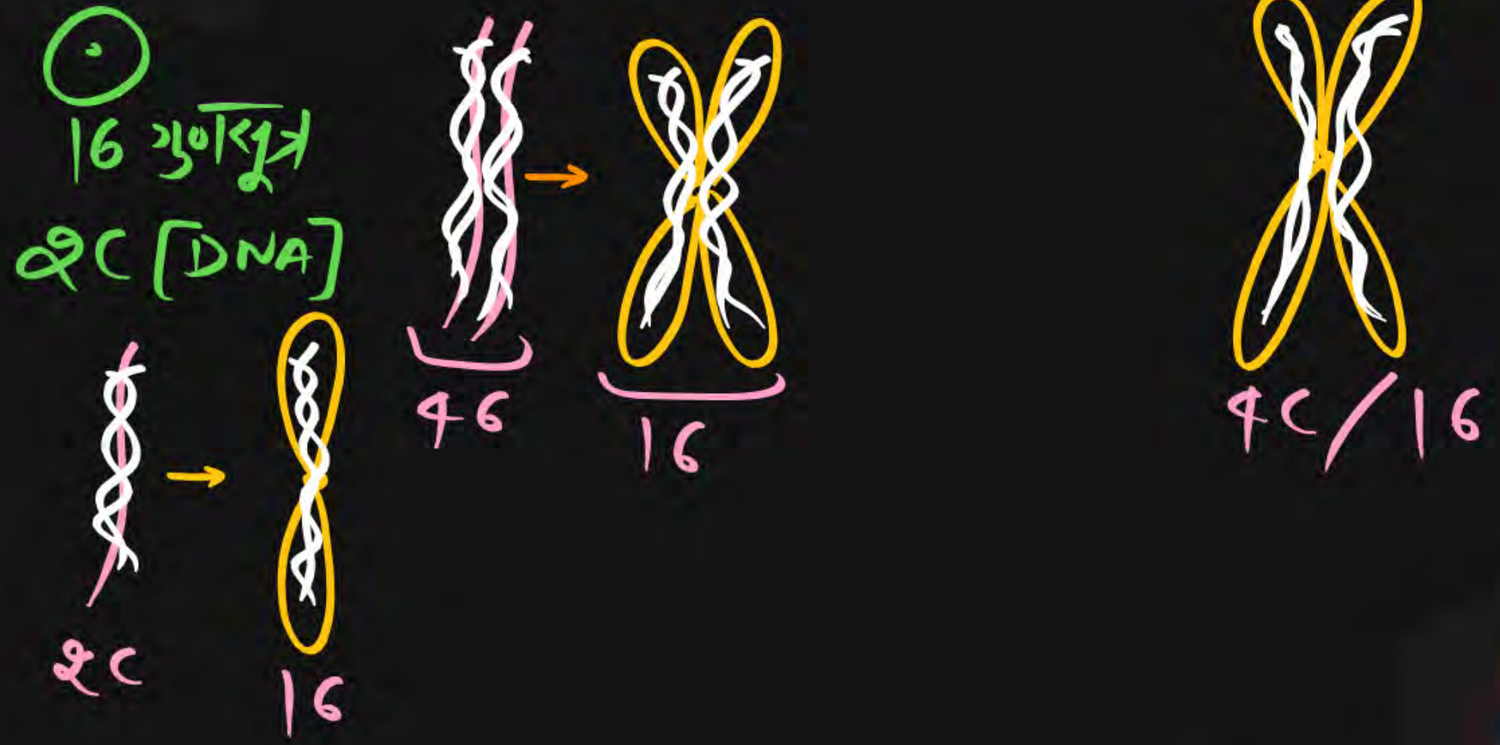
liver cell

Parenchyma

पेरेनकाइमा कोशिका

onion Root tip cell

G_1 S G_2



2C → 4C

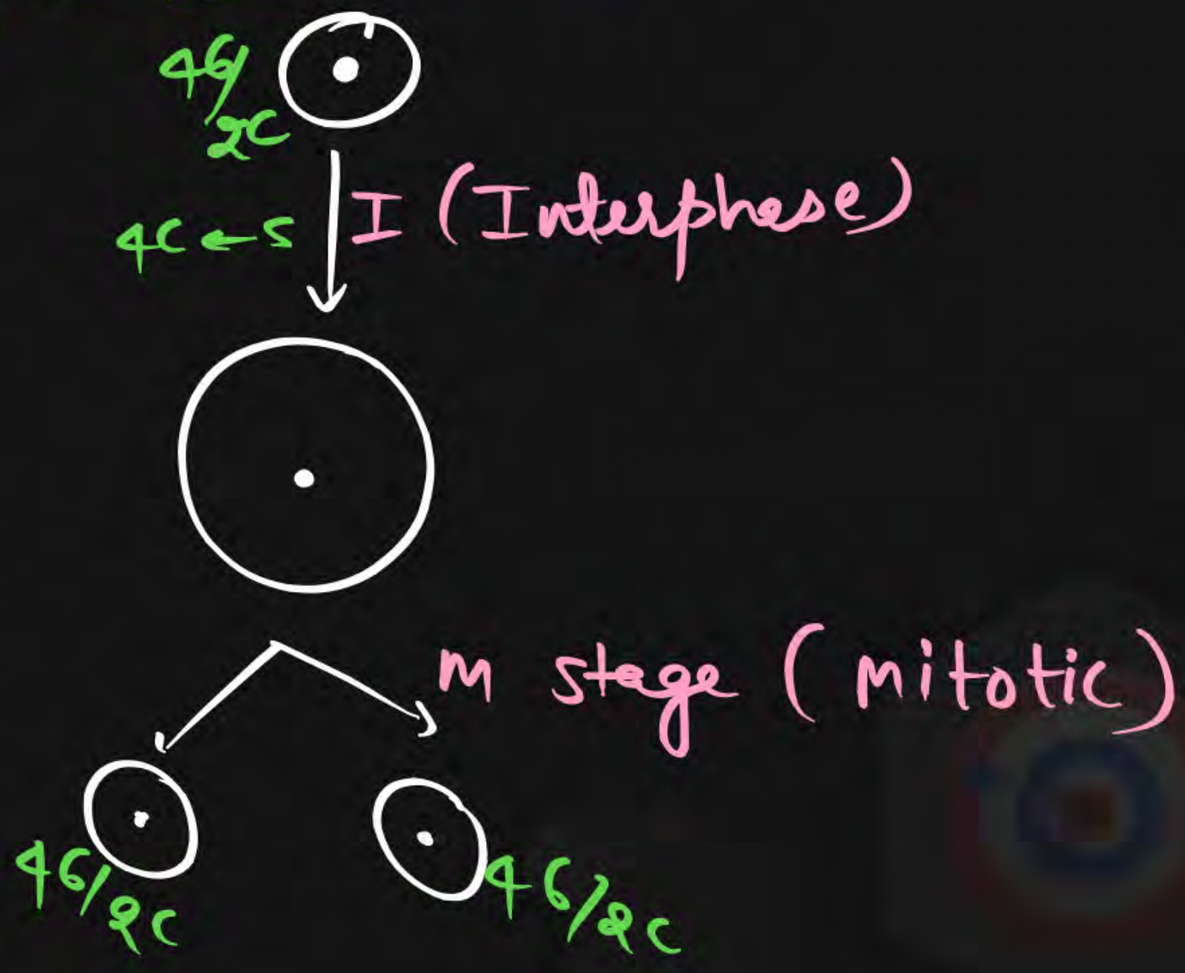
2C

4C

Mitosis

- Prophase
- Metaphase
- Anaphase
- Telophase

समसूत्री विभाजन



Prophase

Prophase is marked by the initiation of condensation of chromosomal material.

chromatin

→ पतले गुणसूत्र

Chromosomal material condenses to form compact mitotic chromosomes. Chromosomes are seen to be composed of two chromatids attached together at the centromere.

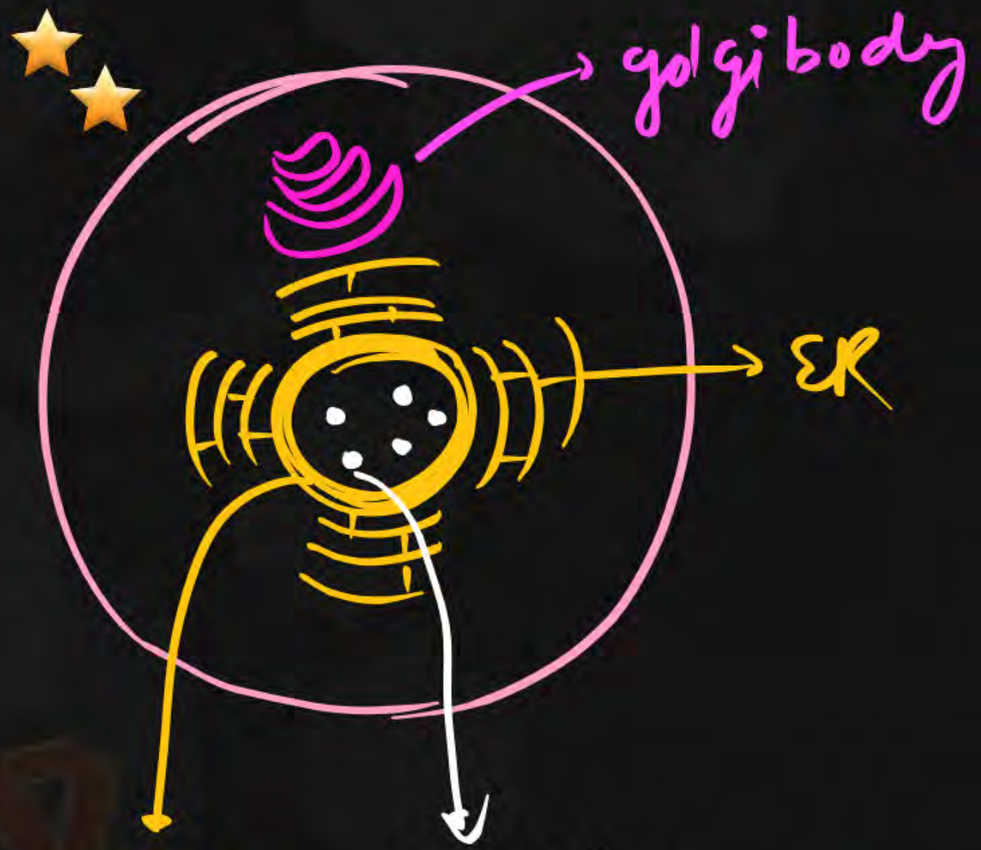
→ Two Chromatids
अर्धगुणसूत्र

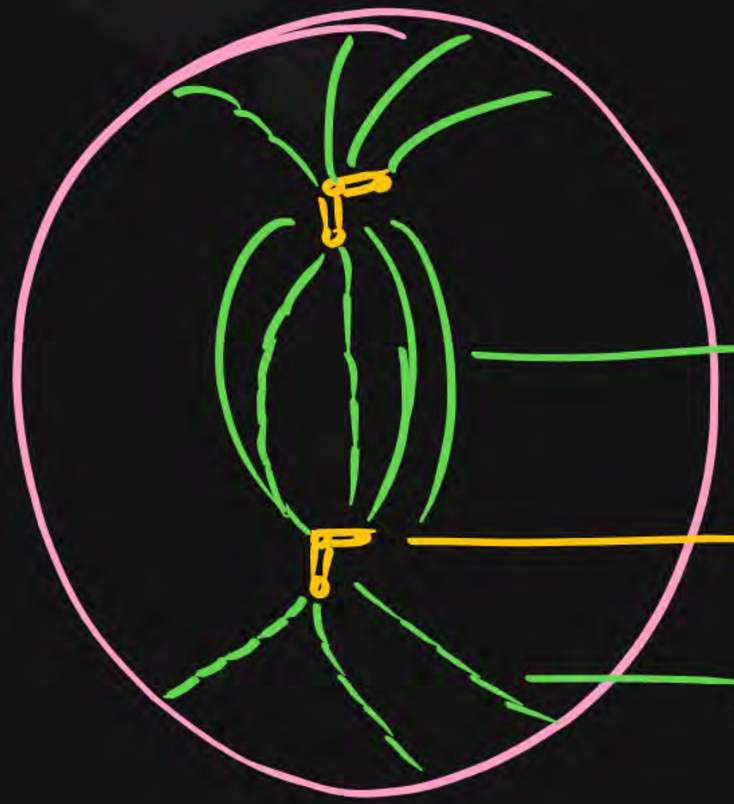
Aster, (तारक)
तर्कु तंतु

गुणसूत्र बिंदु
centromere

Centrosome which had undergone duplication during interphase, begins to move towards opposite poles of the cell. Each centrosome radiates out microtubules called asters. The two asters together with spindle fibres forms mitotic apparatus.

समसूत्री विभाजन
उपकरण





तर्कु तंतु (a)

तारक काय (b)

Astral rays (c)

तारक किरणें

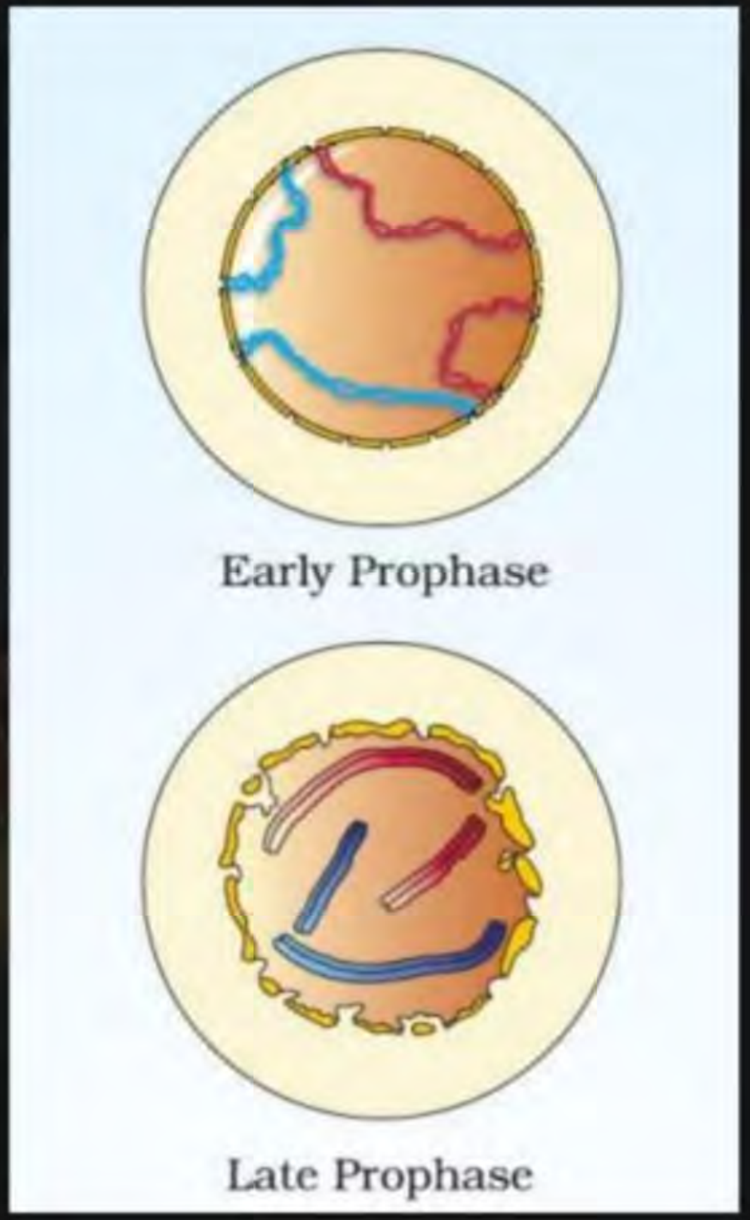
यादपो → An Astral division

$2c + 2b + a$ → Astral division

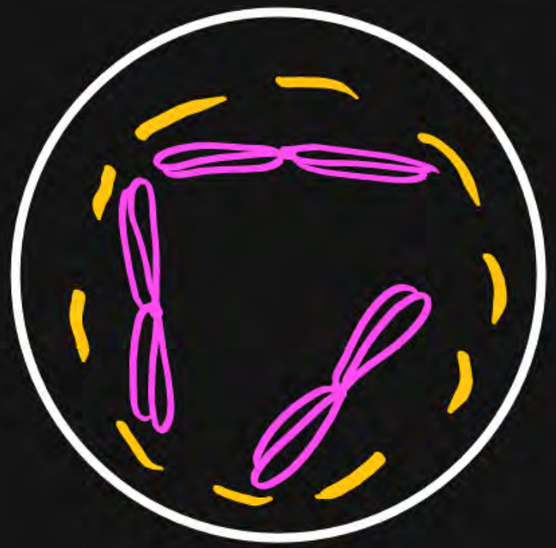
Mitotic apparatus

↓

Ont only in animal



early prophase



late prophase

Metaphase

Condensation of chromosomes is completed and they can be observed clearly under the microscope. This then, is the stage at which morphology of chromosomes is most easily studied.

(आकारिकी)

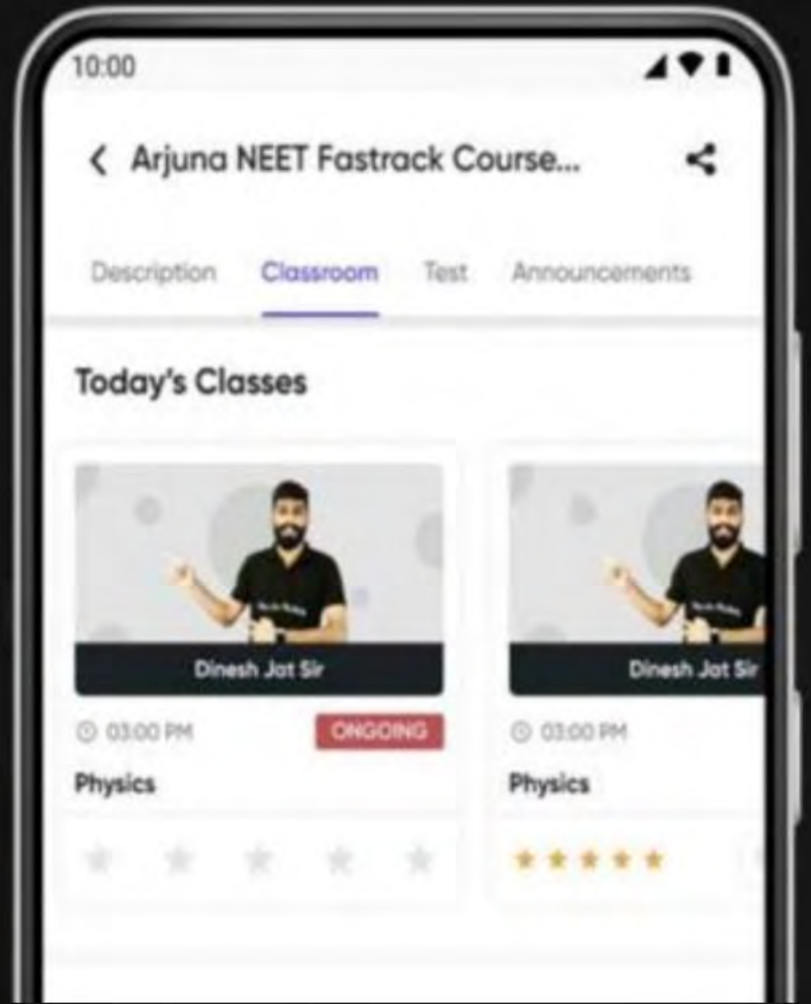
Thickest and shortest chromosome

मोटे छोटे

Thank You...

★★★★★

Rate your today's class in the Batch



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- Cell Cycle and Cell Division
  (कोशिका चक्र एवं कोशिका विभाजन)

Lecture No.-03

Dr. Jaiveer Chaudhary Sir

Today's Targets

1. मध्यावस्था
2. पश्चावस्था
3. अन्तयावस्था
4. क्षुद्र प्रश्न

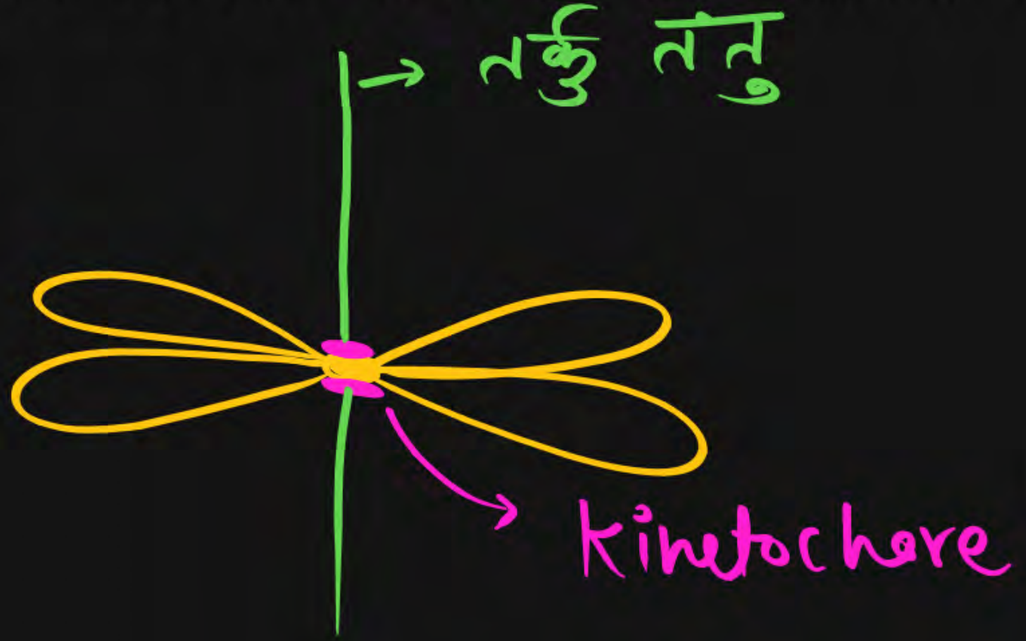
Metaphase

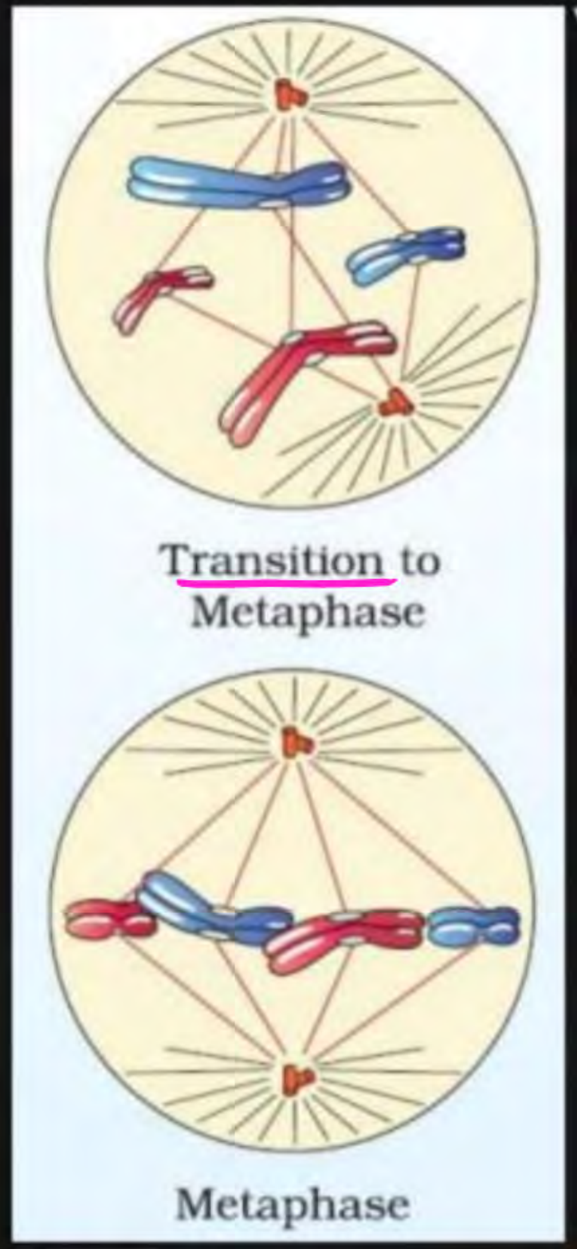
Condensation of chromosomes is completed and they can be observed clearly under the microscope. This then, is the stage at which morphology of chromosomes is most easily studied.

Karyotype →
- गुणसूत्रों कि संख्या
- भुजा अनुपात
- गुणसूत्र बिंदु कि स्थिति
- NOR कि स्थिति

Metaphase

Small disc-shaped structures at the surface of the centromeres are called kinetochores. These structures serve as the sites of attachment of spindle fibres.

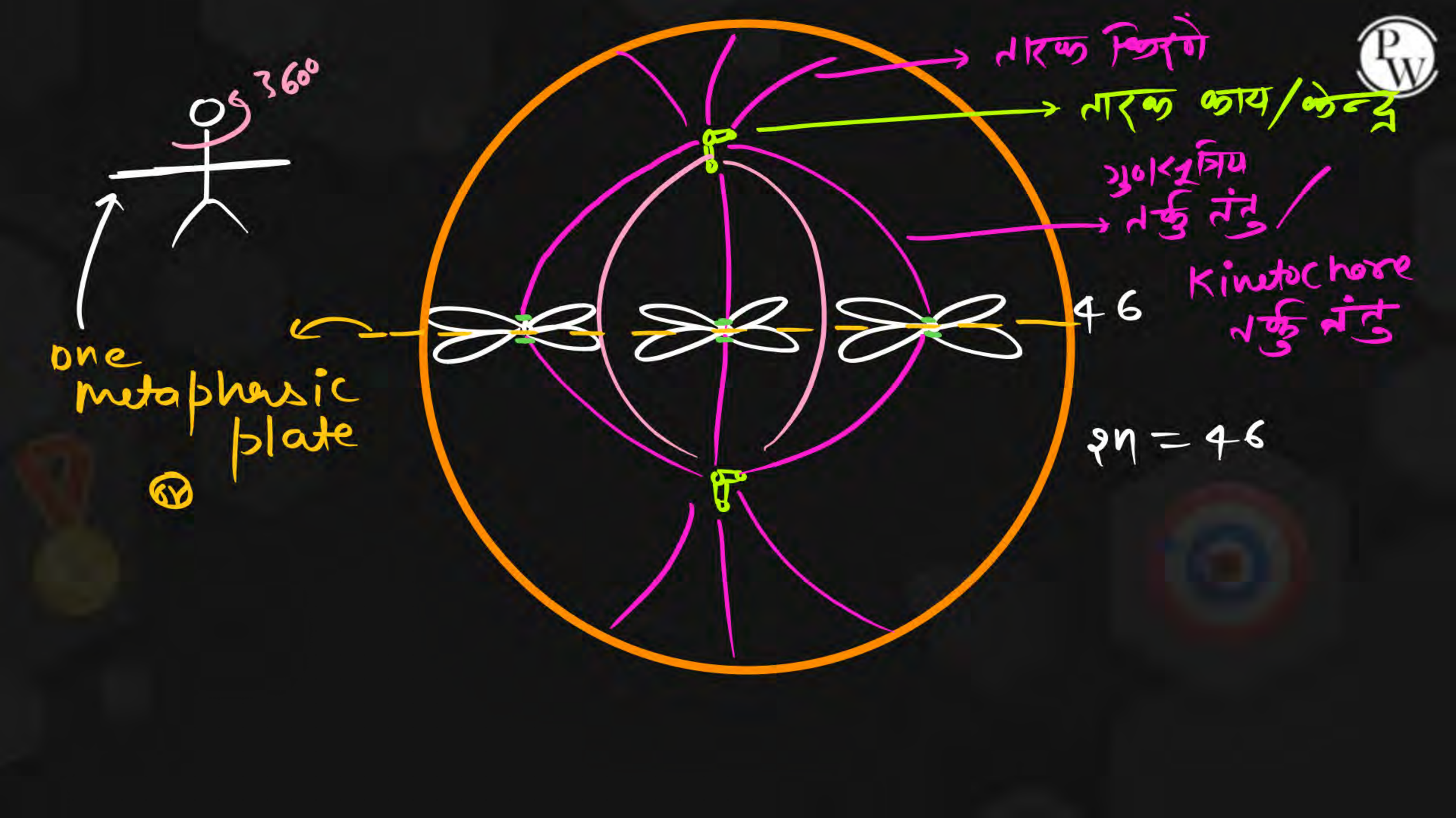




Metaphase

Spindle fibres attach to kinetochores of chromosomes.

Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles.


360°
one metaphasic plate
तारक तन्तु
तारक काय/केन्द्र
गुणसूत्रिय तर्कु तंतु / Kinetochore तर्कु तंतु
46
2n = 46

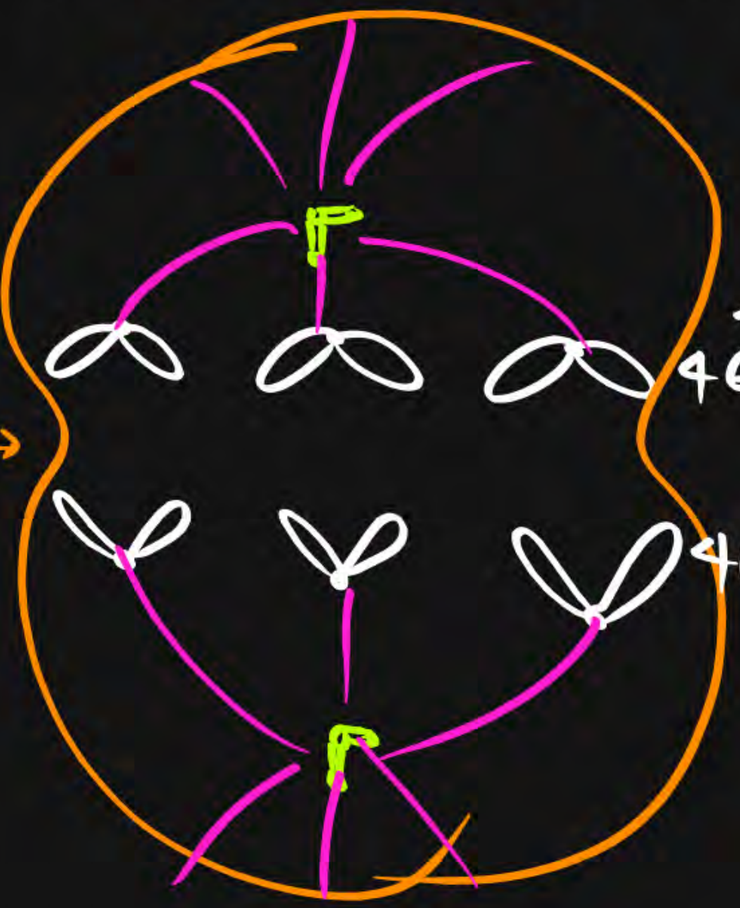
Anaphase

★ Centromere (गुणसूत्र बिंदु) दो भागों में टूट जाता है

At the onset of anaphase, each chromosome arranged at the metaphase plate is split simultaneously and the two daughter chromatids.

गुणसूत्रों की संख्या दो गुनी

Cytokinesis
कोशिका द्रव्य विभाजन
Late Anaphase में
प्रारंभ हो जाता है →

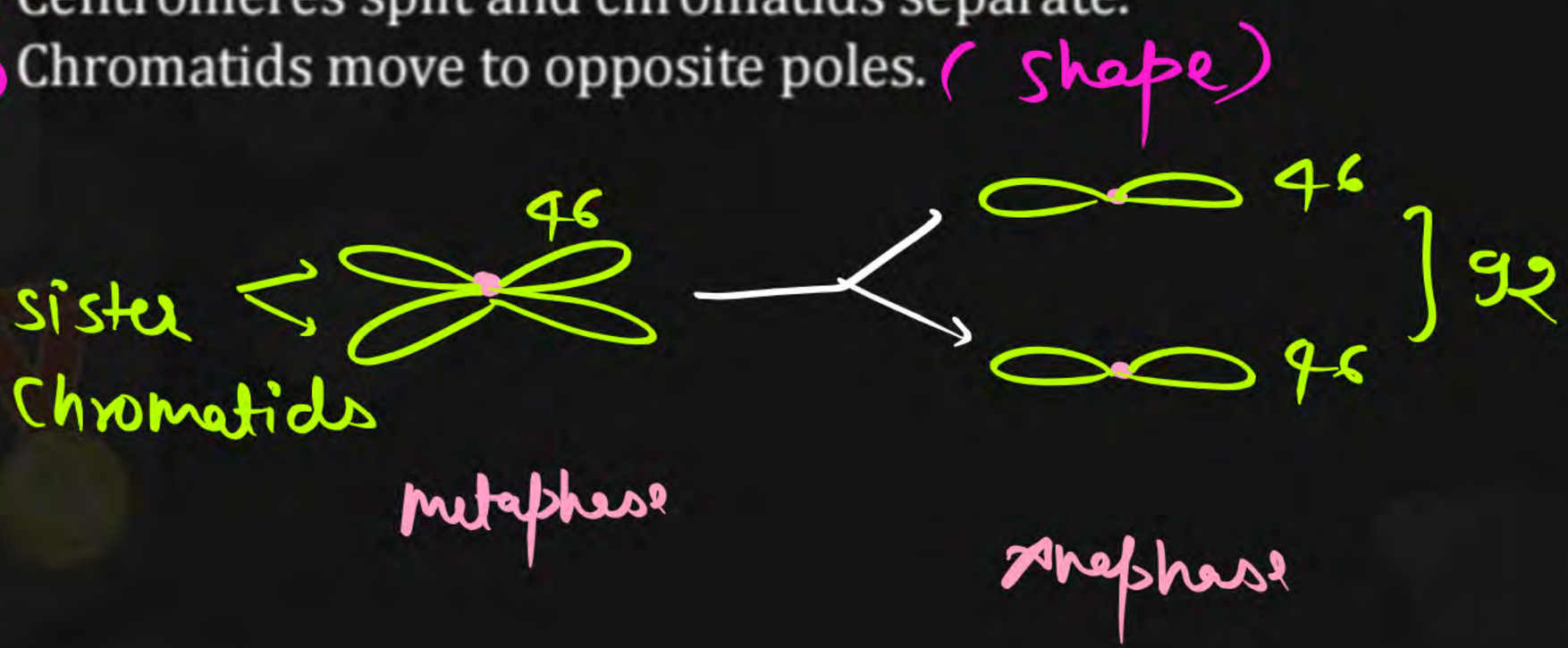


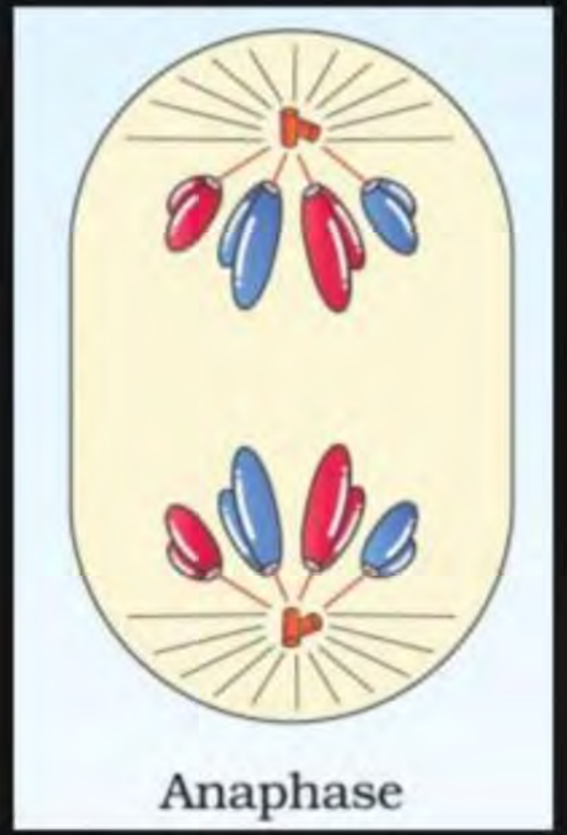
→ 2n
4C
→ 8 = 4n
4C → 2n

Anaphase

Thus, anaphase stage is characterised by the following key events:

1) Centromeres split and chromatids separate.
2) Chromatids move to opposite poles. (Shape)




Anaphase

Shape

M

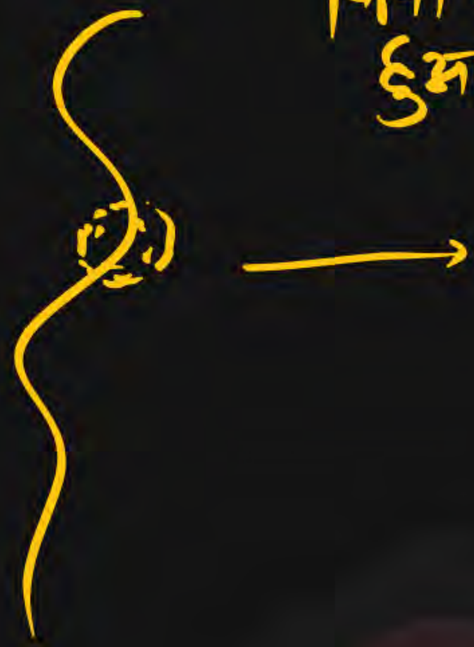
Shape

A

Non stained part

बिना अभिरंजित हुआ भाग

NOR

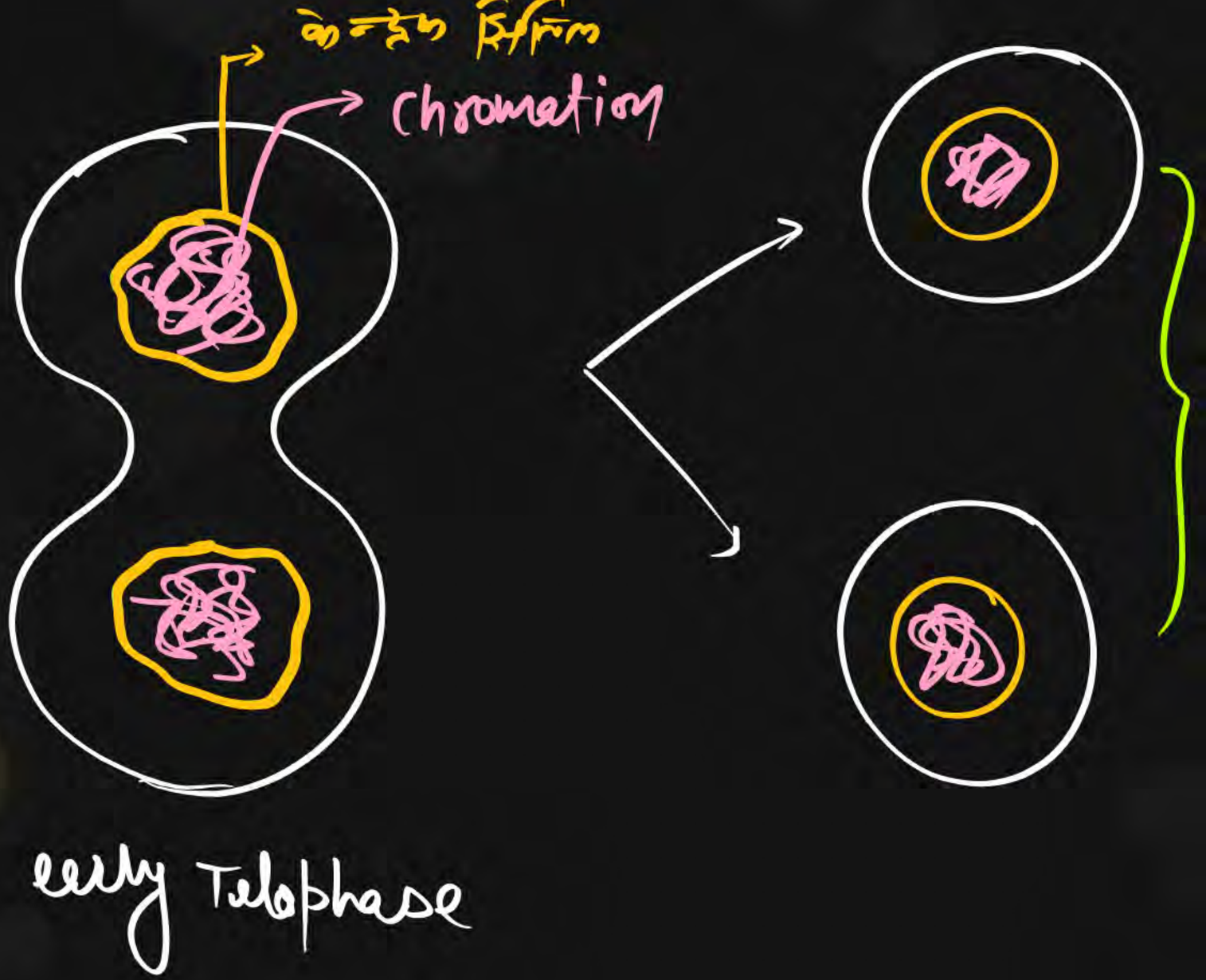


Telophase (Reverse Prophase)

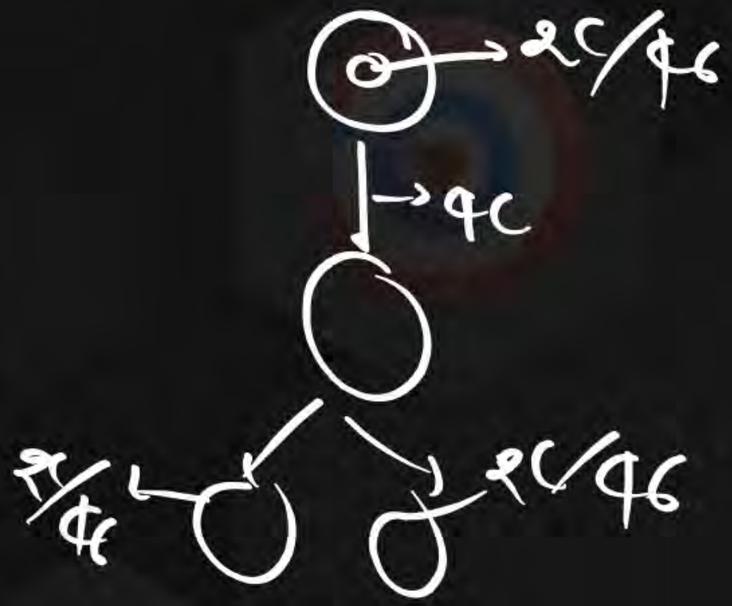
- गुणसूत्र —वियंघनन→ Chromation ← गुणसूत्र अपनी प्रथम पहचान खो देते हैं

- केन्द्रक झिल्ली, केन्द्रिका, धुरे, g.b. पुनः प्रकट हो जाती हैं

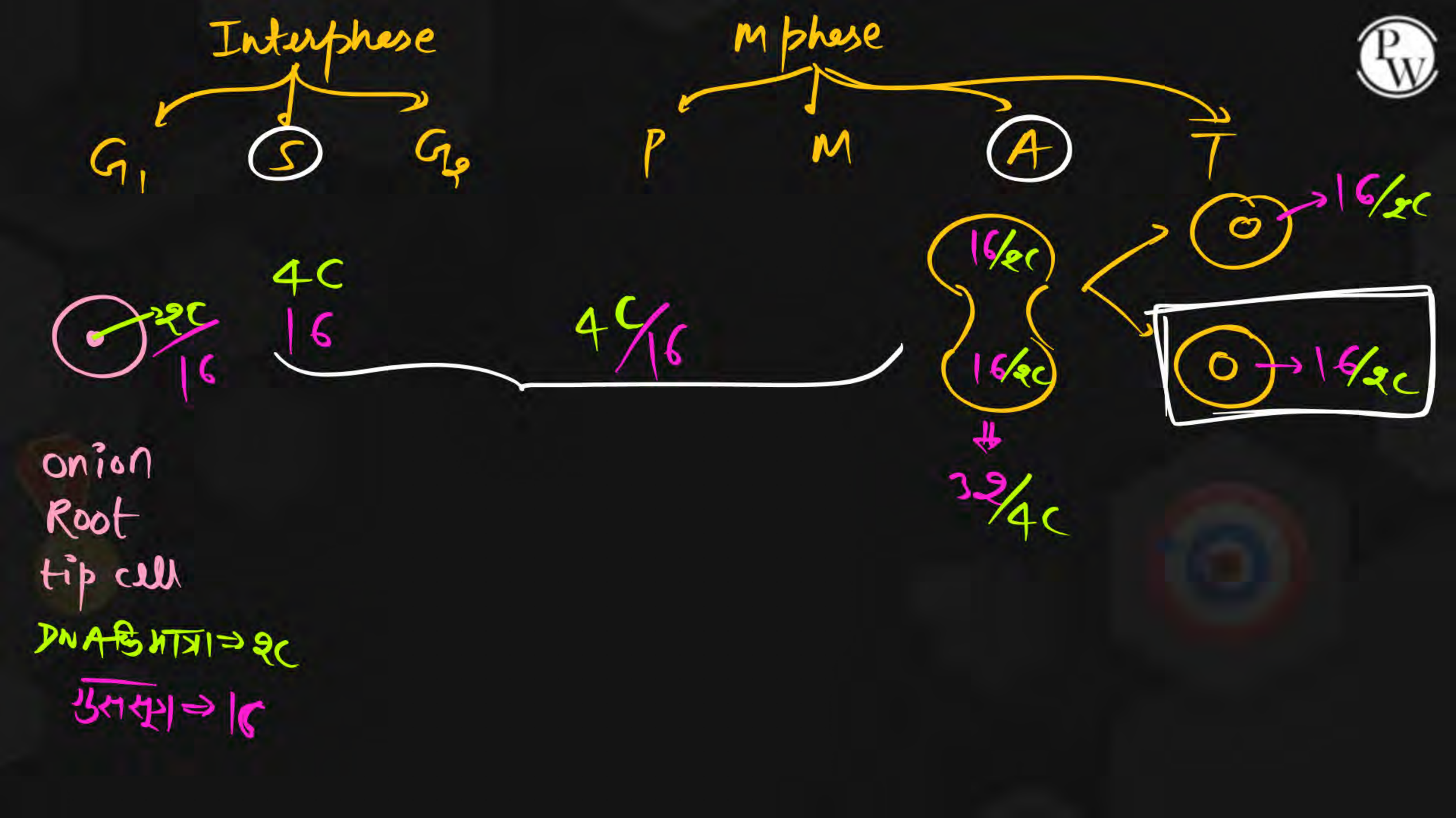
- सभी कोशिकांग पुनः प्रकट हो जाते हैं



Daughter of the cell
कोशिका द्विक



early Telophase


Interphase
M phase
G_1
S
G_2
P
M
A
T
2C
16
4C
16
4C/16
16/2C
16/2C
32/4C
0
16/2C
0
16/2C
onion
Root
tip cell
DNA ভিত্তি মাত্রা ⇒ 2C
ক্রোমোসোম ⇒ 16

Que

one cell (Isolated)
पृथक्कृत

$\frac{1}{4}$th

t = ?
3:58 AM

$\frac{1}{2}$
3:59 AM

full
4:00 AM

समसूत्री
विभाजन

एक विभाजन में समय
= 1 min

Q.

एक विभाजन में लगा समय = 2 min

① कोशिका विभाजनों कि संख्या ? ⑨

② विभाजनों में लगा समय = ?

9 × 2 = 18 min

1 →(2m) 2 →(2m) 4 →(2m) 8 →(2m) 16 →(2m) 32 →(2m) 64 →(2m) 128 →(2m) 256 →(2m) 512

n निष्पादनों के पश्चात
कोशिकाओं की संख्या $= 2^n$

512

$512 = 2^n$

$2^9 = 2^n$

$n = 9$


one cell
onion Root tip cell
512 cells
Ans ⇒ 511
कुल विभाजनों कि संख्या

Next Class Target

Topic कोशिका द्रव्य विभाजन

Topic अर्धसूत्री विभाजन

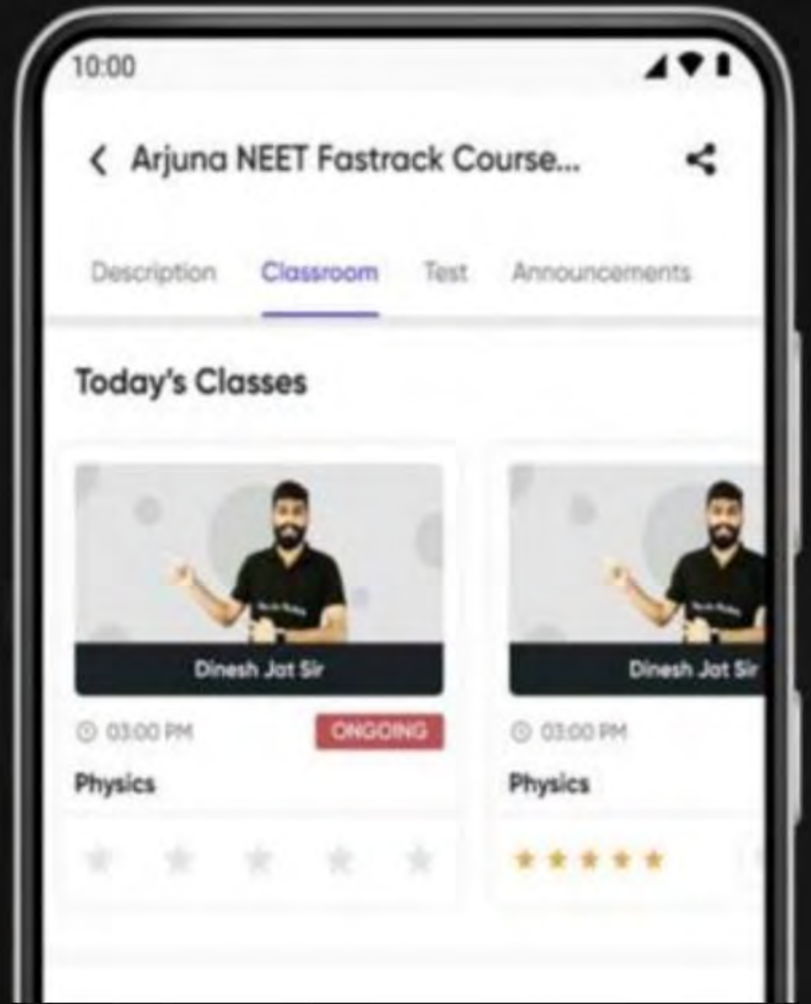
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



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  (कोशिका चक्र एवं कोशिका विभाजन)

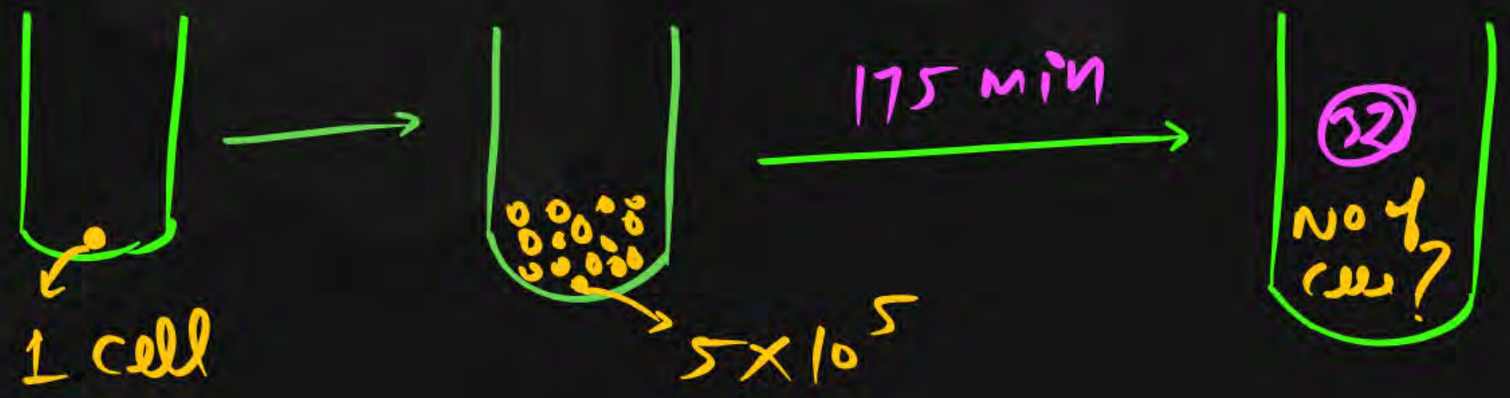
Lecture No.- 04

Dr. Jaiveer Chaudhary Sir

Today's Targets

1. कोशिका द्रव्य विभाजन
2. अर्धसूत्री विभाजन
3.
4.

Qus



$5 \times 10^5 + 32^x$

$5 \times 10^5 \times 32$

विभाजन में
लगा समय = 35 min

$\frac{175}{35} = 5$ विभाजन

$2^5 = 32$

Cytokinesis

→ Start → Late Anaphase
→ completed → Telophase

In Animals

⇒ खांच निर्माण द्वारा

mid body formation

→ असिकेन्द्रिय प्रकार का

In plants

→ फ्रेग्मोप्लास्ट

↓

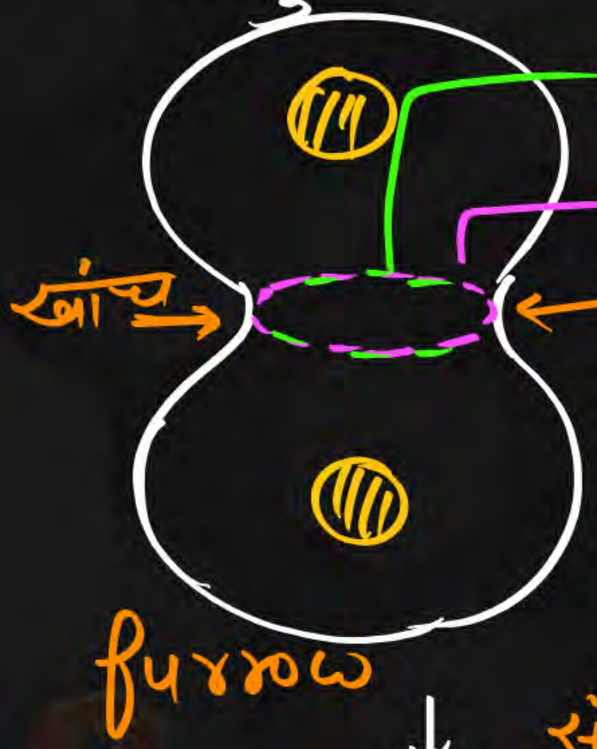
कोशिका पट्ट

↓

मध्य पट्टिका

→ अपकेन्द्रिय प्रकार का

जंतु



Actin protein

MT and MF

खांच

खुस्म तंतु

खुस्म बल्किाएं

furrow

वलय

↓

संकुचनशील वलय

o → golgi पुटिका

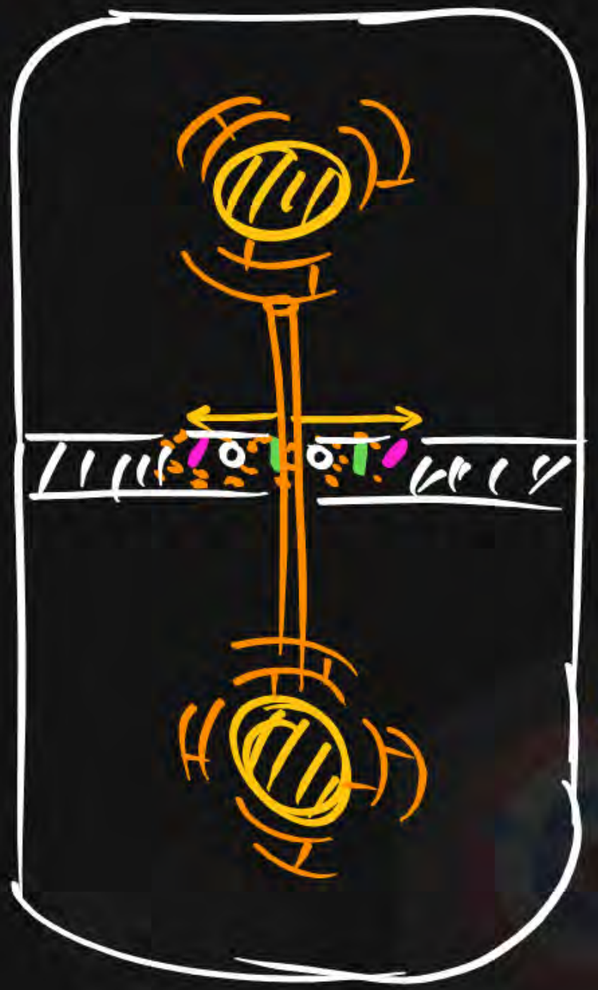
1 → ER के टुकड़े

1 → खुस्म निल्का

⇓

फ्रेग्मोप्लास्ट

पादप



Phragmo plast

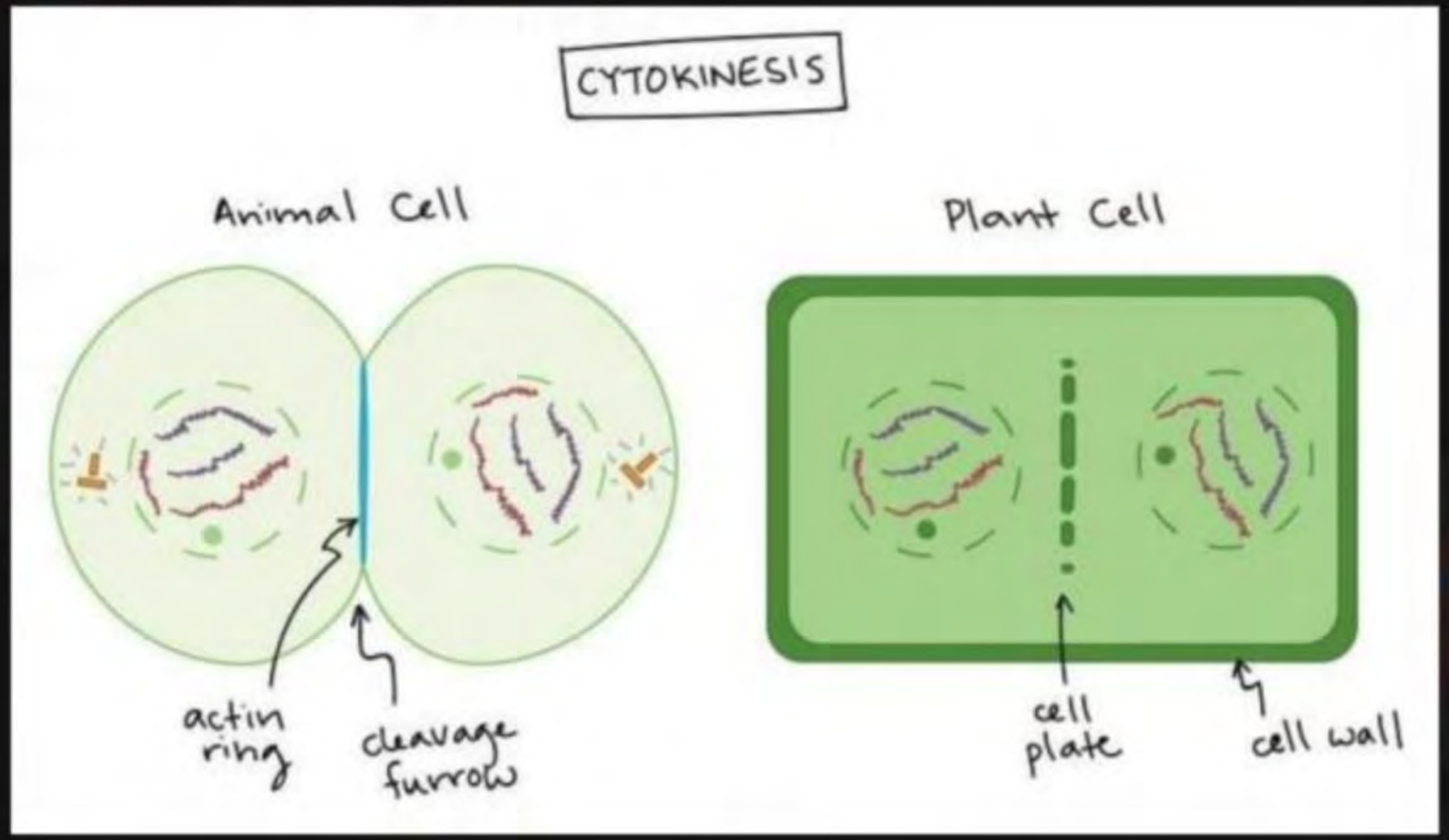
⇓

कोशिका पट्टि

⇓

मध्य पट्लिका

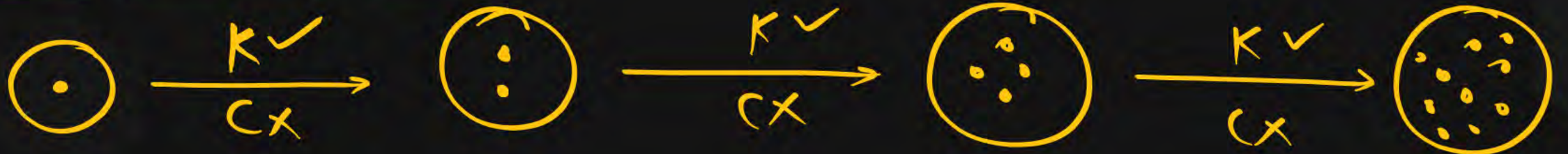
Cytokinesis



Modification of Mitosis

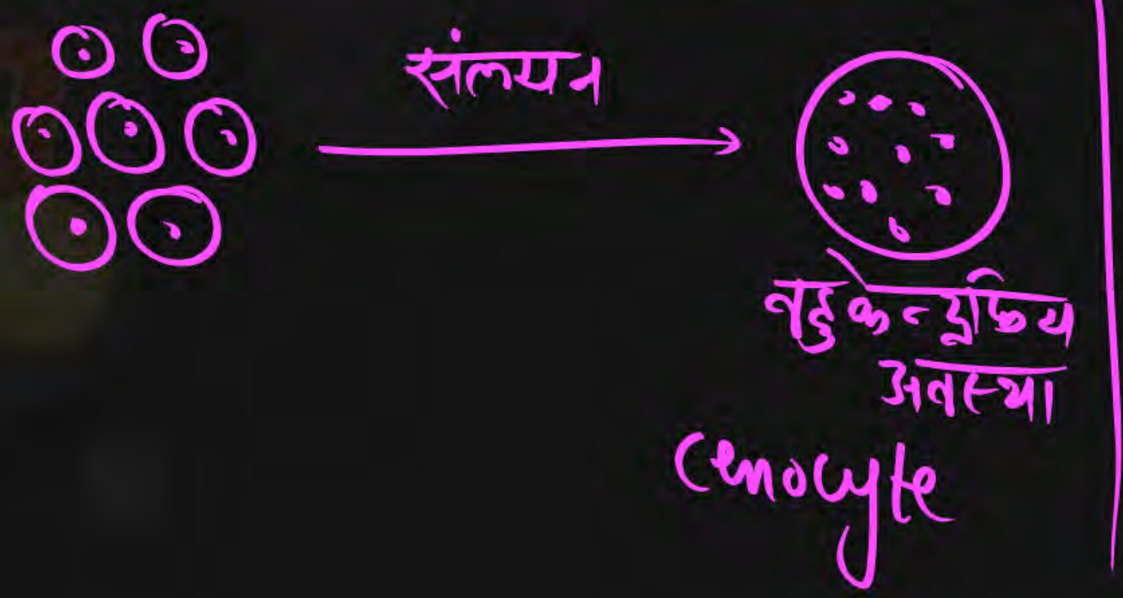
syncyte cenocyte

① युक्त केन्द्रकीय विभाजन :→



बहुकेन्द्रकीय अवस्था
(syncyte)

Ex नारियल का केन्द्रकीय श्वेतपोष



Significants of mitosis

① [zygote → भ्रूण → व्यस्क] growth
युग्मनज

② Repairing (मरम्मत)

③ नई RBC का निर्माण

④ New Hair

⑤ Skin cells

100 → 100
100 → 99
100 → 98
100 → 97
100 → 50

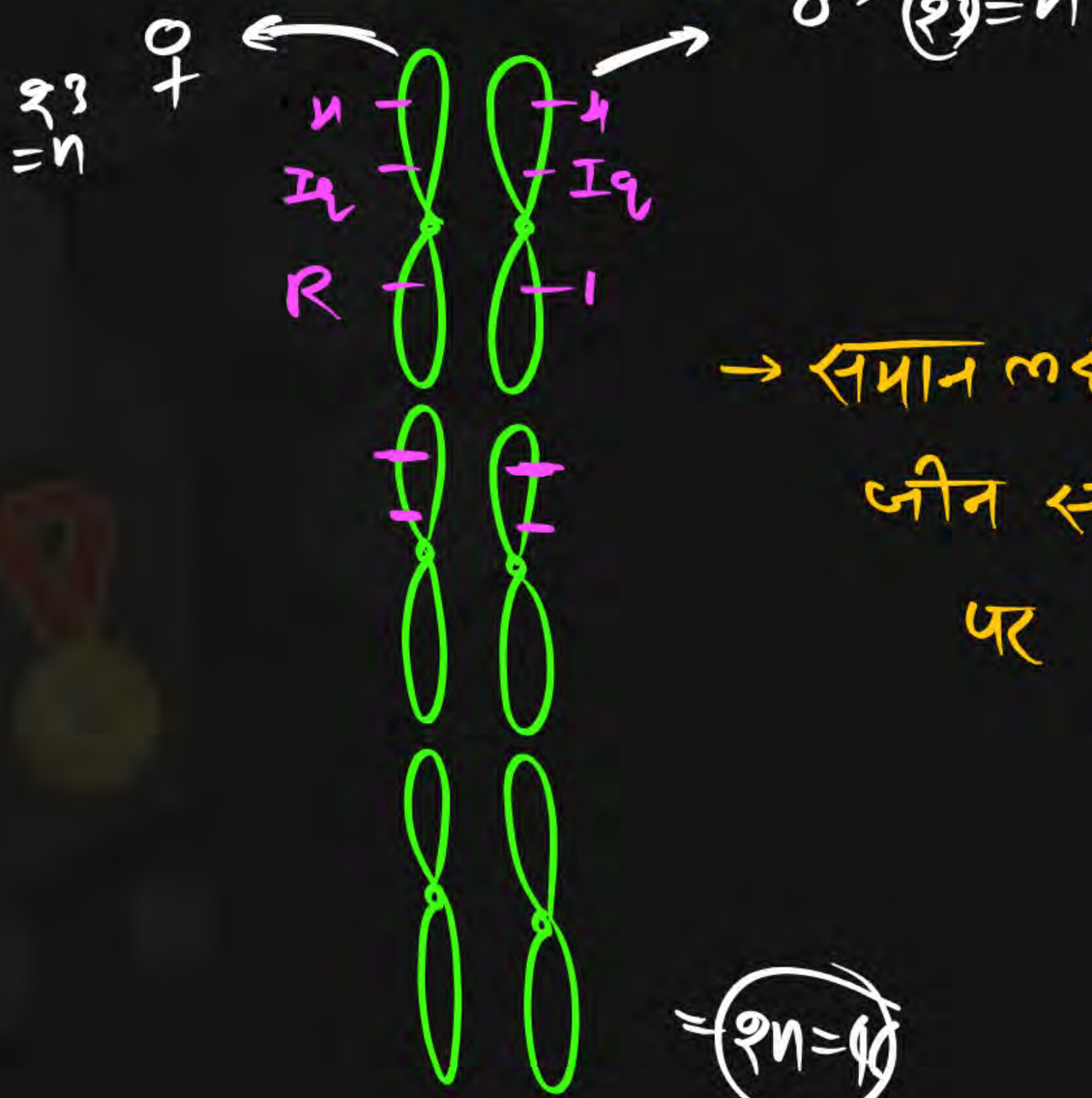
BB
Bb
bb

Meiosis

समजात गुणसूत्रों का पृथक्करण (जीन विनिमय के बाद)

Homologous Chromosome

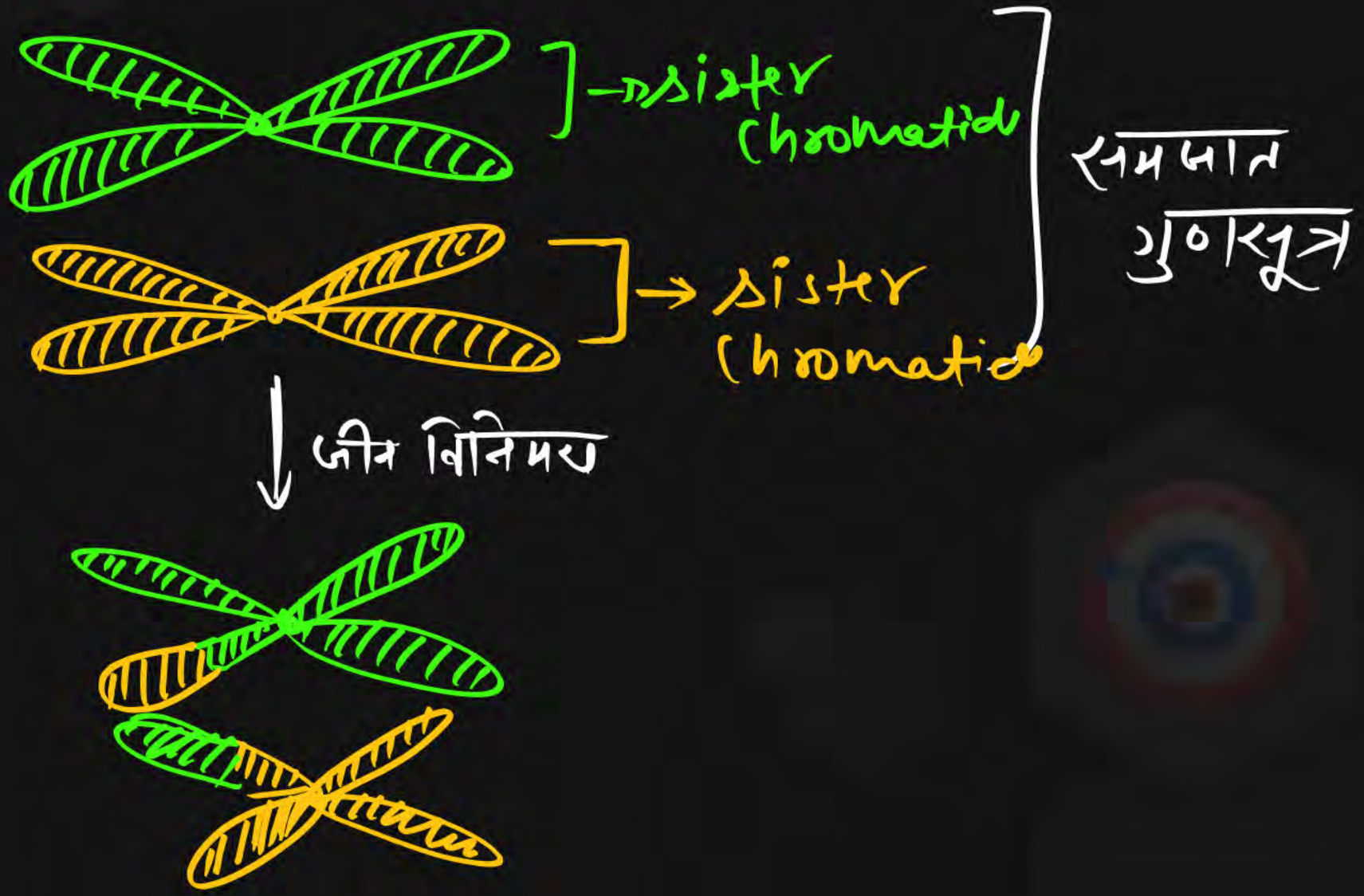
समजात गुणसूत्र



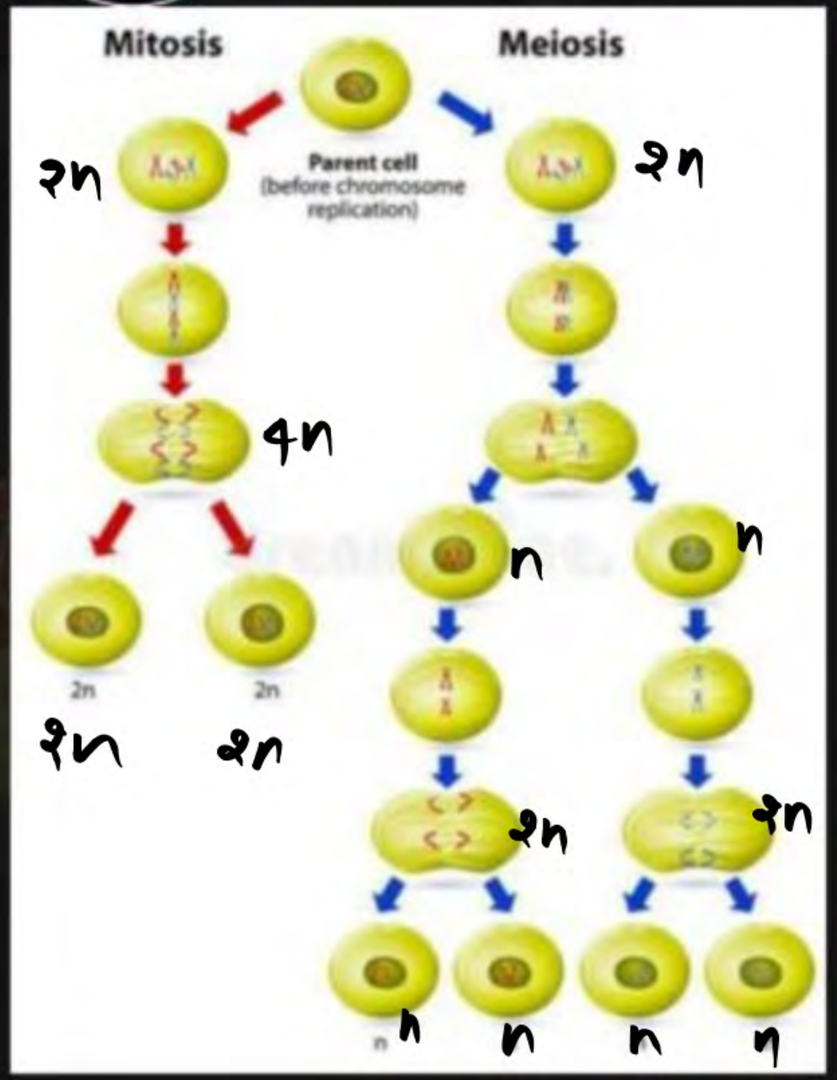
→ समान लक्षणों को जीन समान स्थानों पर उपस्थित होती हैं

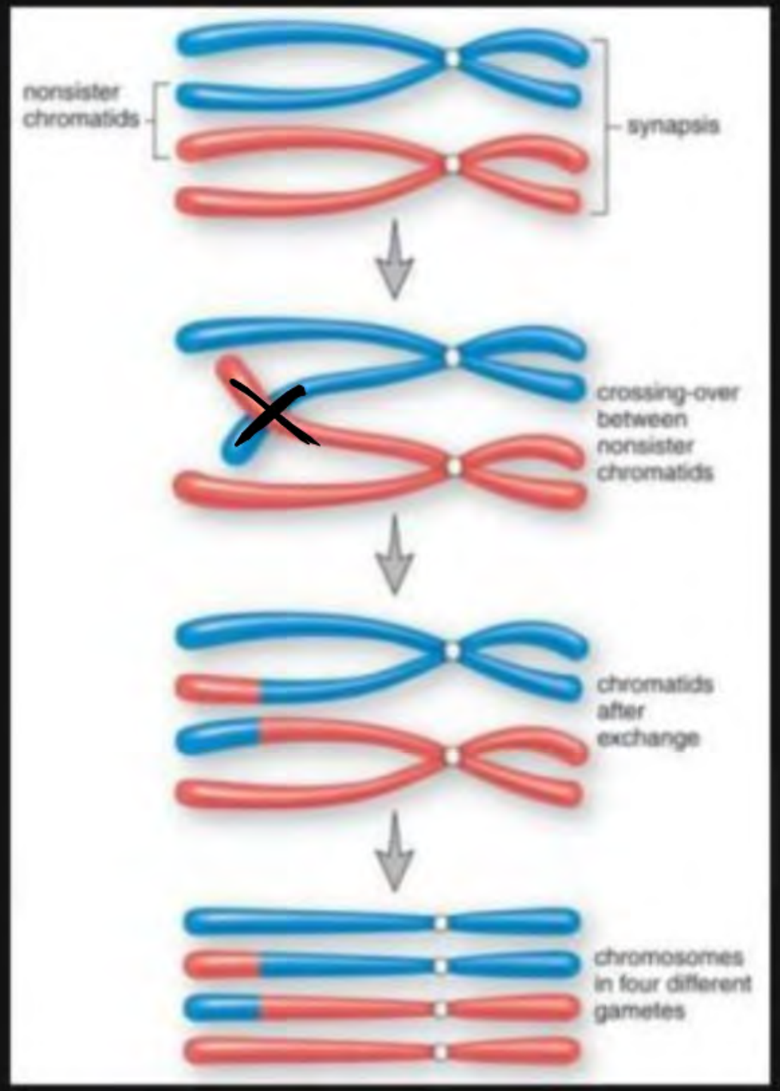
= 2n = 46

crossing over (जीन विनिमय)



Meiosis


Mitosis
Meiosis
Parent cell
(before chromosome replication)
2n
4n
2n
2n
2n
2n
n
n
2n
2n
n
n
n
n


nonsister chromatids
synapsis
crossing-over between nonsister chromatids
chromatids after exchange
chromosomes in four different gametes

MEIOSIS I (Karyokines)

Prophase I → सर्वाधिक लंबी अवस्था

गुणसूत्रों के व्यवहार के आधार पर 5 उपअवस्थाओं में विभाजित किया जाता है।

केन्द्रक झिल्ली का विघटन → प्रारंभ अंत समापन

Chromatin का संघनन → " " "

L	Z	P	DP	Di
Leptotin	Zygotin	Pachyten	Diplotene	Diakinesis

पास-पास ⟶ अदला बदली ⟶ दूर-दूर ⟶ बहुत-दूर

L Z P DP Di

Next Class Target

Topic अर्धसूत्री विभाजन

Topic

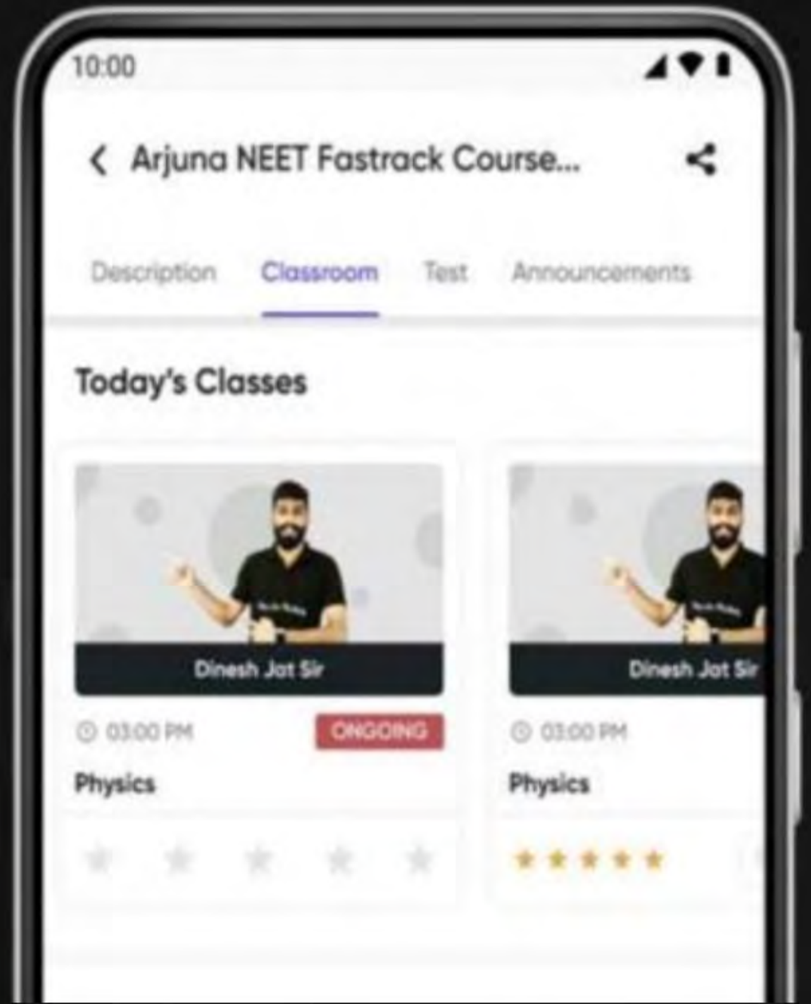
Topic

Topic

Thank You...

★★★★★

Rate your today's class in the Batch



Your Feedback is Valuable to us