VIDYAPEETH

Batch Code : 11-YN401MH

- Botany
- कोशिका चक्र एंव कोशिका विभाजन

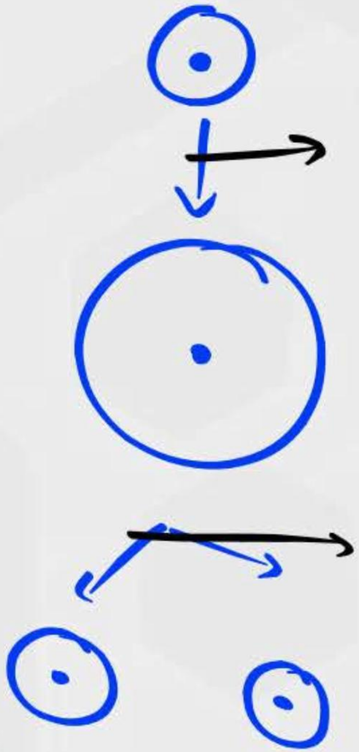
Lecture No.- 1

Dr. Jaiveer Chaudhary Sir

Today's Targets

1. कोशिका चक्र
2.
3.
4.

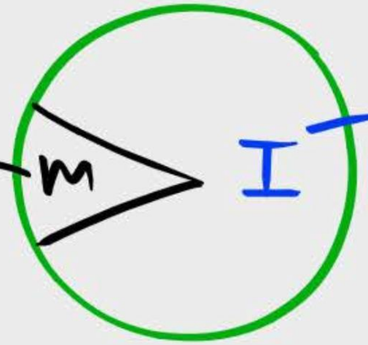
* cell cycle



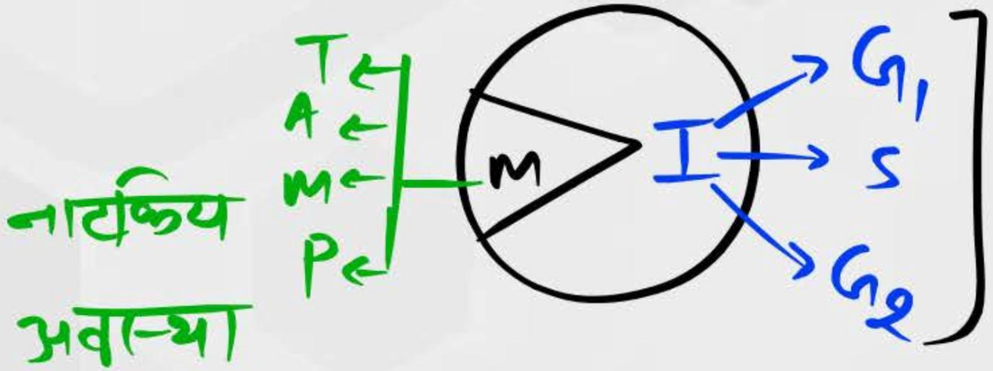
विभाजन की तैयारी (I) → Interphase अंतरावस्था

विभाजन (m)

विभाजन अवस्था 5% से कम समय ← m



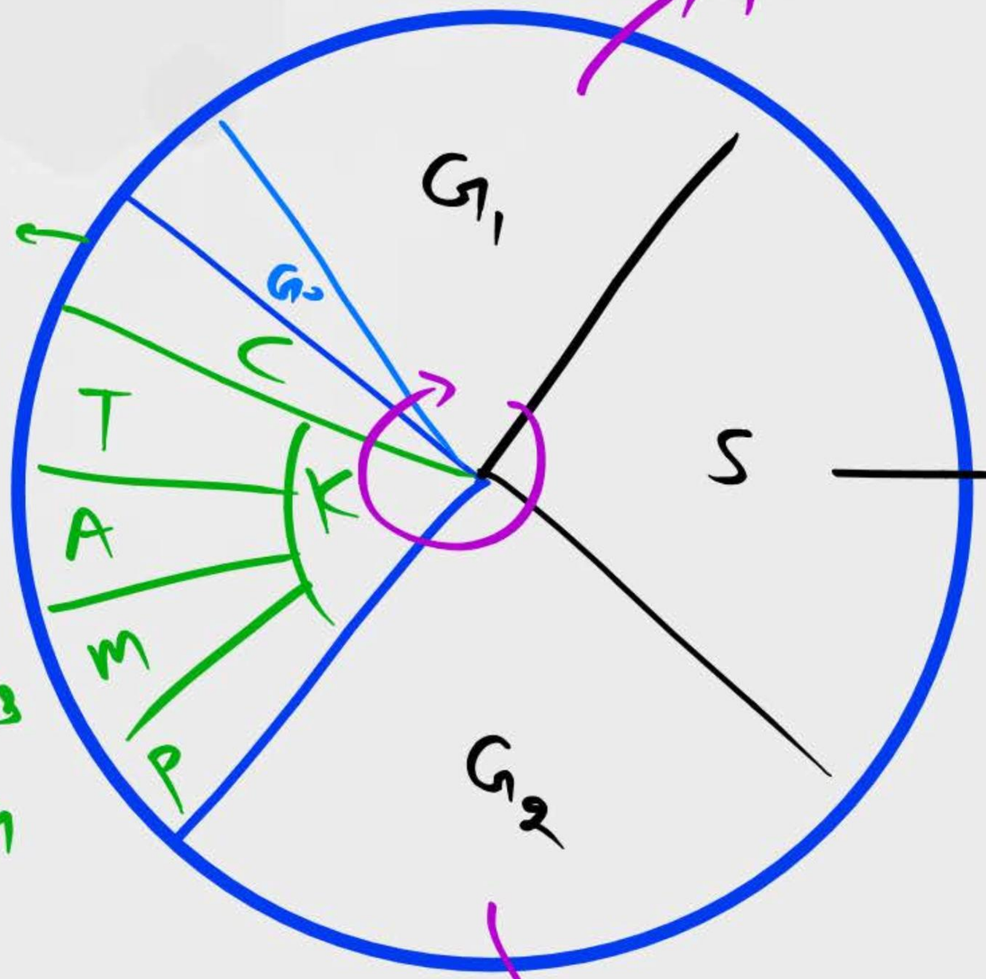
I → Interphase 95% से अधिक समय



तैयारी

सर्वाधिक सक्रिय अवस्था

विश्राम अवस्था



post mitotic phase (G1)

pre DNA synthesis phase

cytokinesis
কোশিকা দ্রব্য বিভাজন

S → DNA এর প্রতিলিপিকরণ

K → Karyokinesis
কেন্দ্রক বিভাজন

P → prophase

M → metaphase

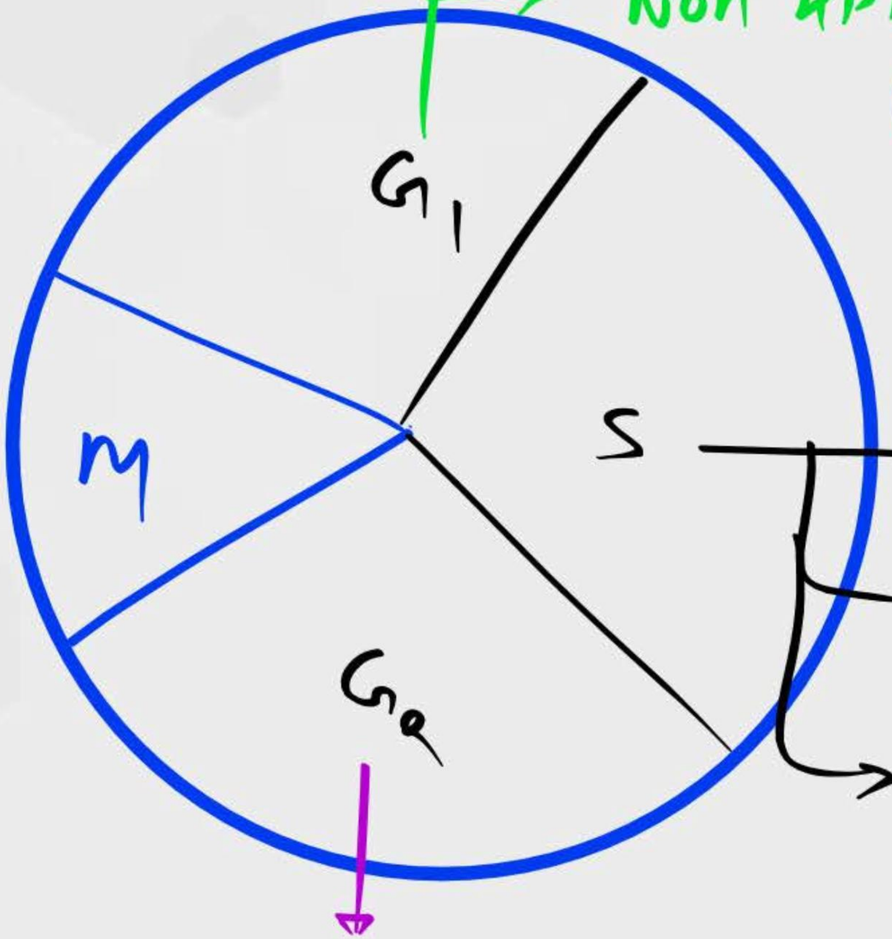
A → anaphase

T → telophase

premitotic phase (G2)

post DNA synthesis phase

Interphase



G1 → 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)

G2 → Tubulene प्रोटीन का निर्माण
विभाजन कि अंतिम तैयारी

Homework

Todays lecture

Next Class Target

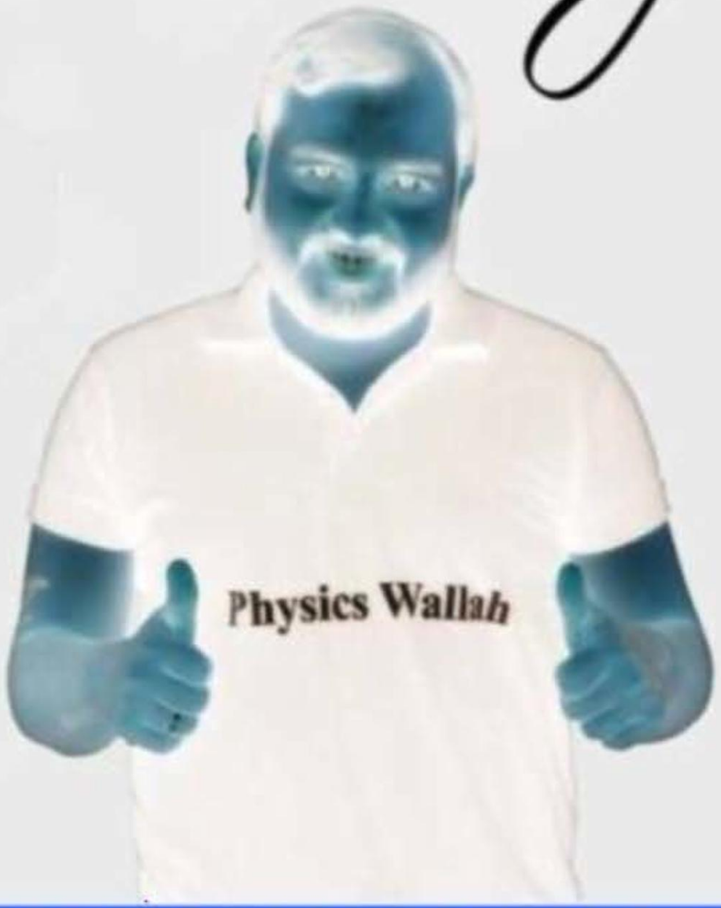
Topic M अवस्था

Topic समसूत्री विभाजन

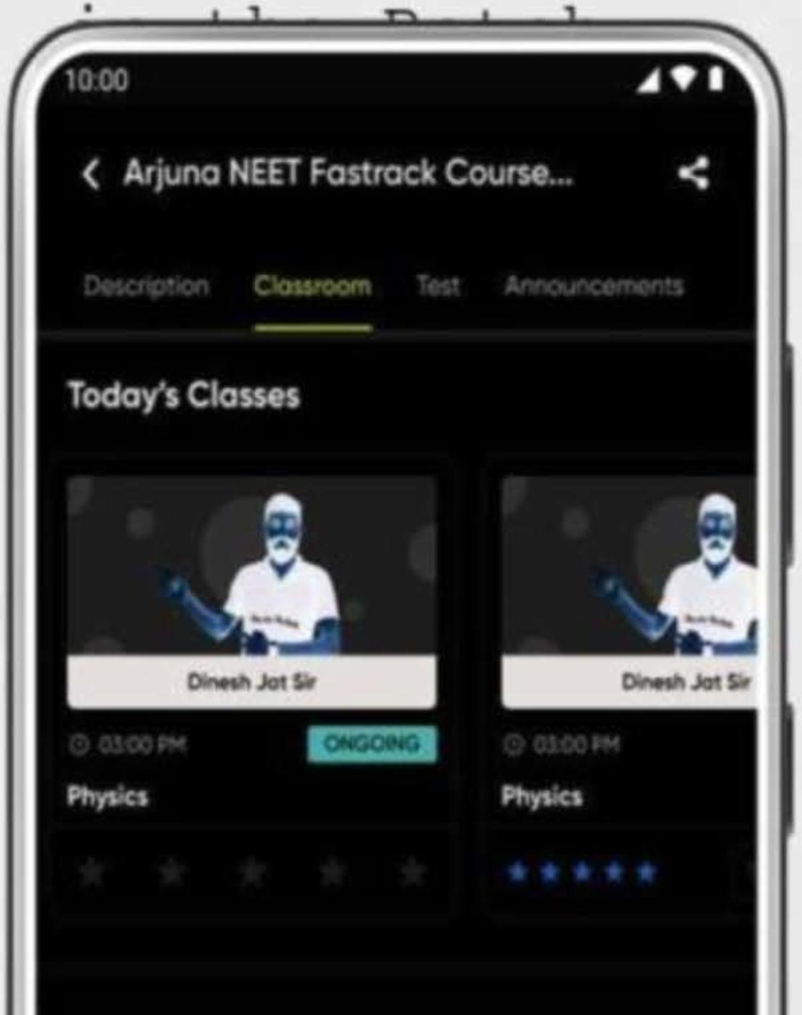
Topic

Topic

Thank You...



Rate your today's class



Your Feedback is Valuable to us

VIDYAPEETH

Batch Code : 11-YN401MH

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

Lecture No.- 02

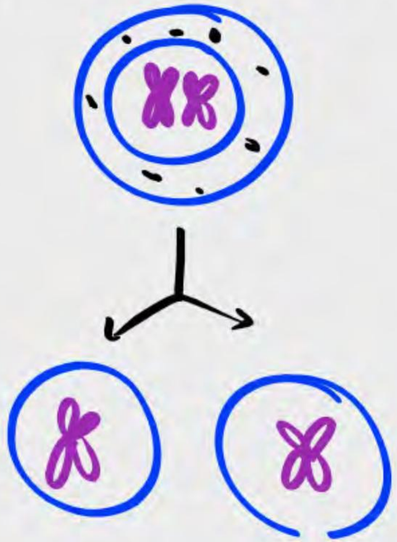
Dr. Jaiveer Chaudhary Sir

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 :→

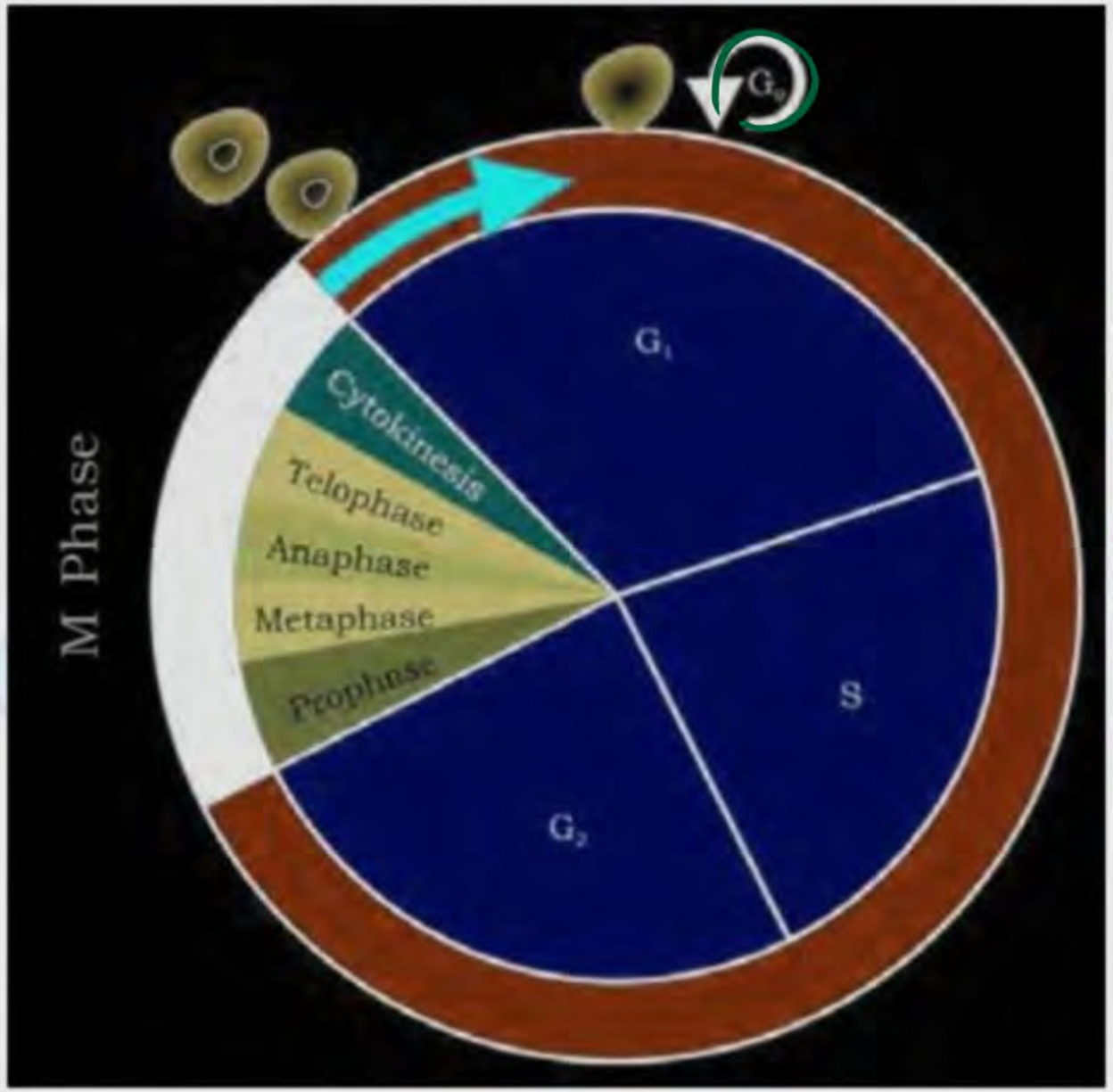
→ मानव कोशिका → 24 HRS

1HR ← M I → 23HR

He-La cell

ही-ला

Yeast → 90 min



G_0 अवस्था
(Quiscent Stage)
प्रशांत अवस्था

Exit (बाहर)

→ Nurve cell
→ kidney cell
→ muscle cell
→ cork cell

suspend
निलंबन

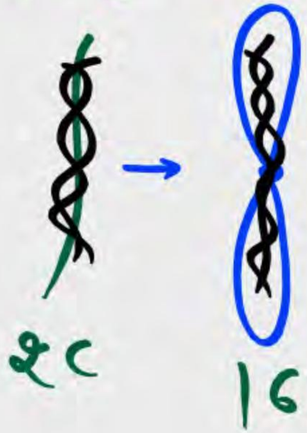
Heart cell
liver cell
Paranchyma
पैरेनकाइमा कोशिका

onion Root tip cell

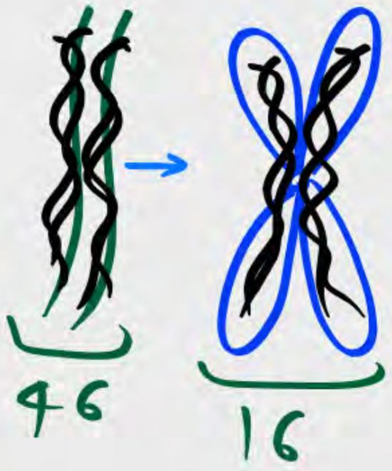
G_1

16 গুণসূত্র

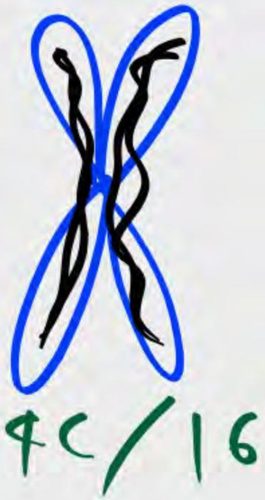
2C [DNA]



S



G_2



2C → 4C

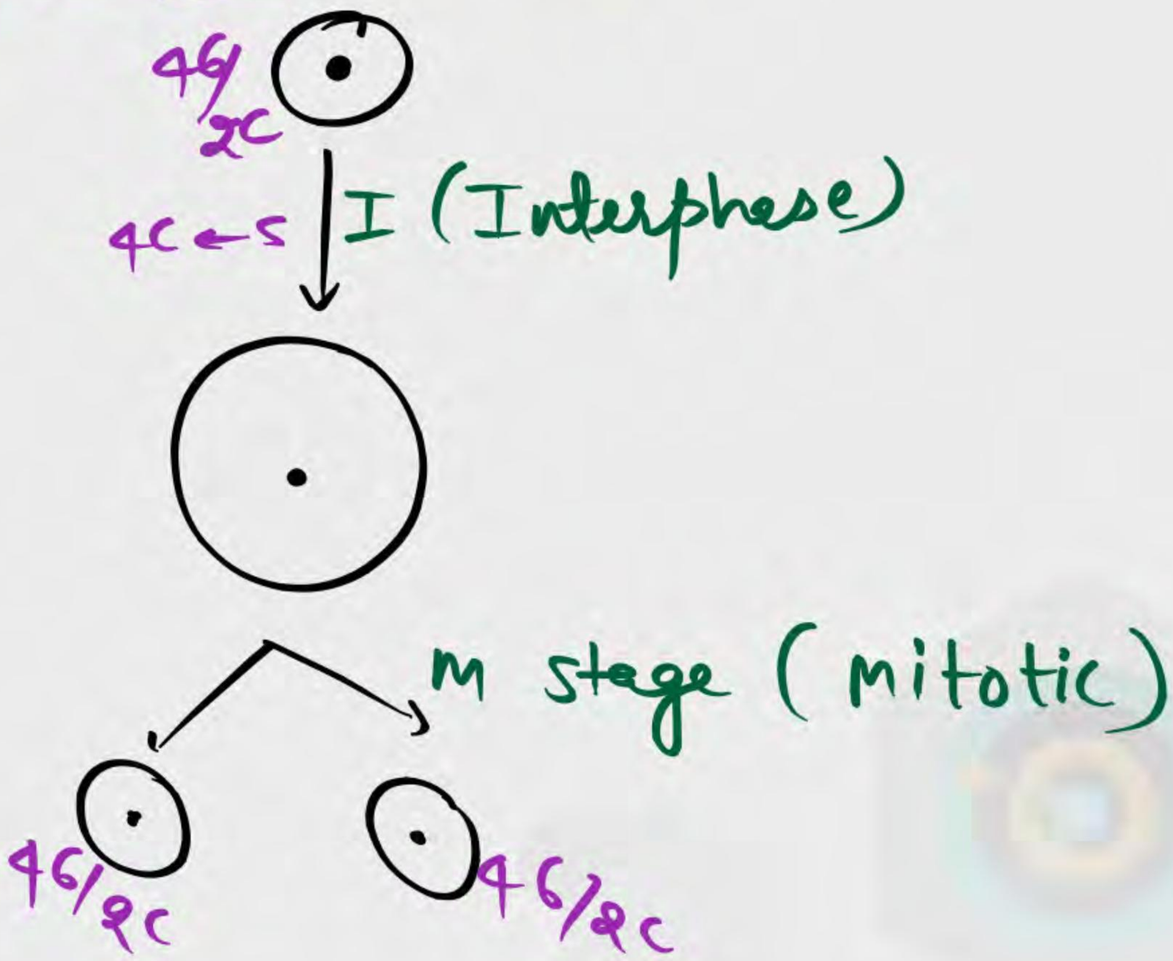
2C

4C

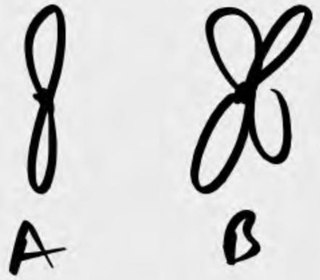
Mitosis

- Prophase
- Metaphase
- Anaphase
- Telophase

समसूत्री विभाजन



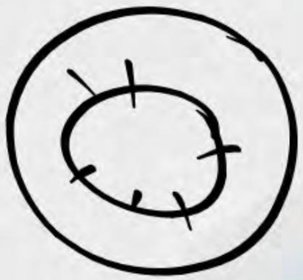
Prophase



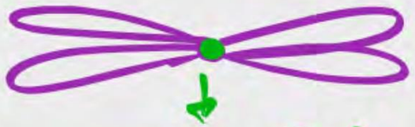
Prophase is marked by the initiation of condensation of chromosomal material.

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.



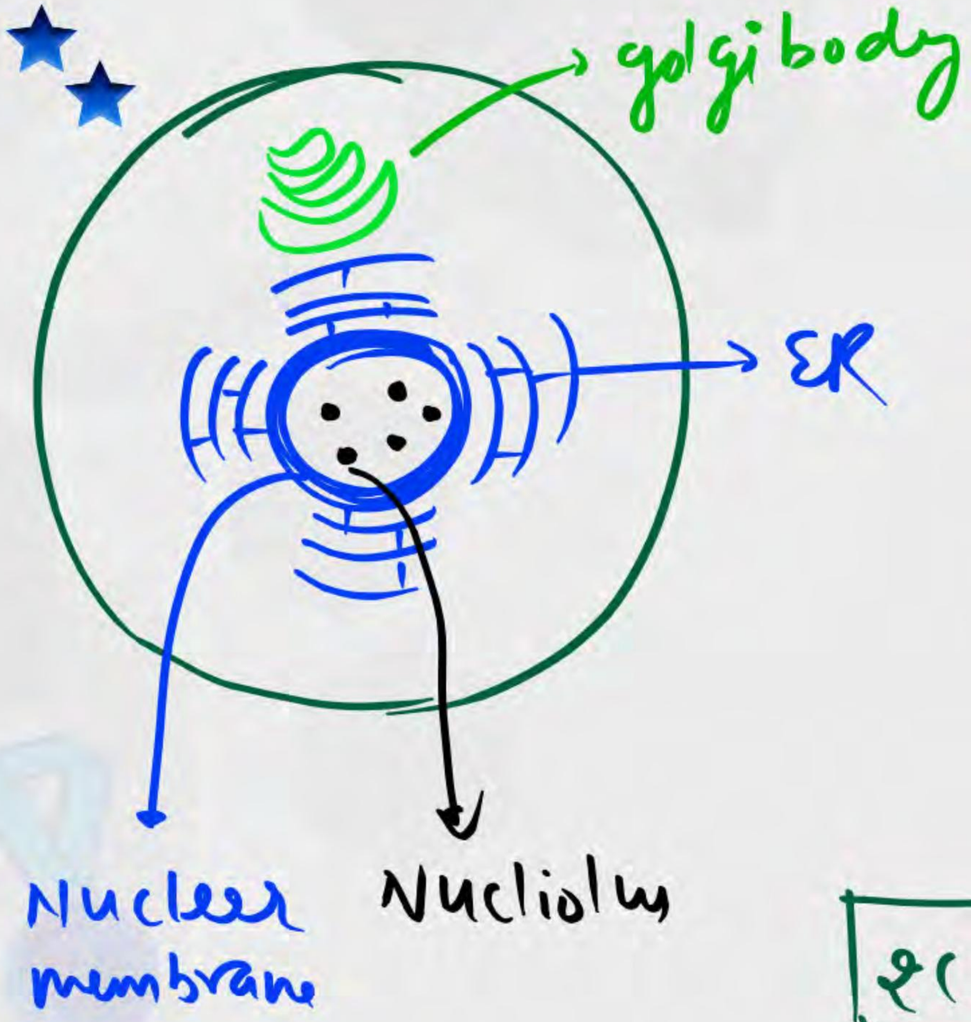
Two Chromatids
अर्धगुणसूत्र

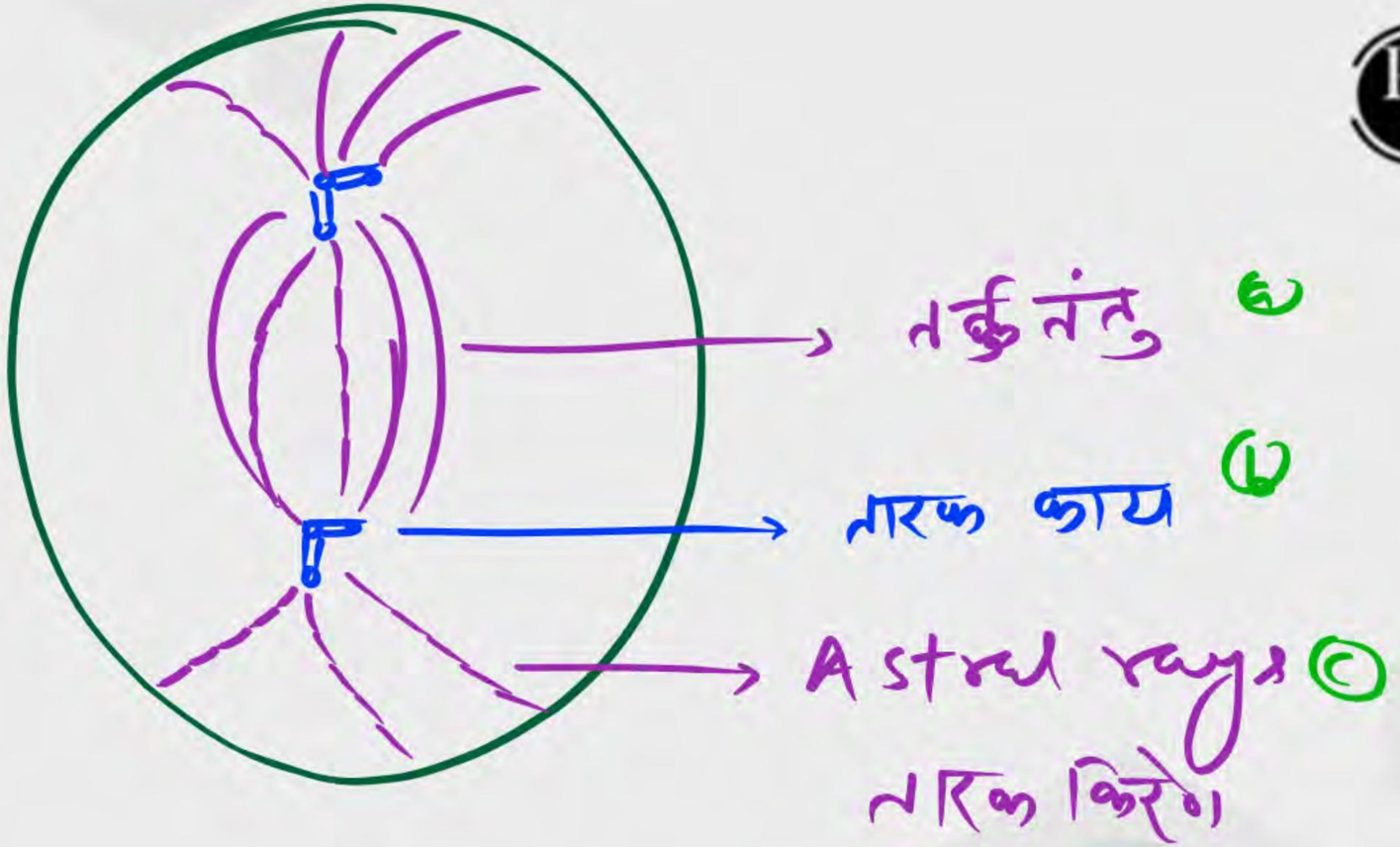
Aster, (तारक)
तर्कु तंतु

गुणसूत्र बिंदु
centromer

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





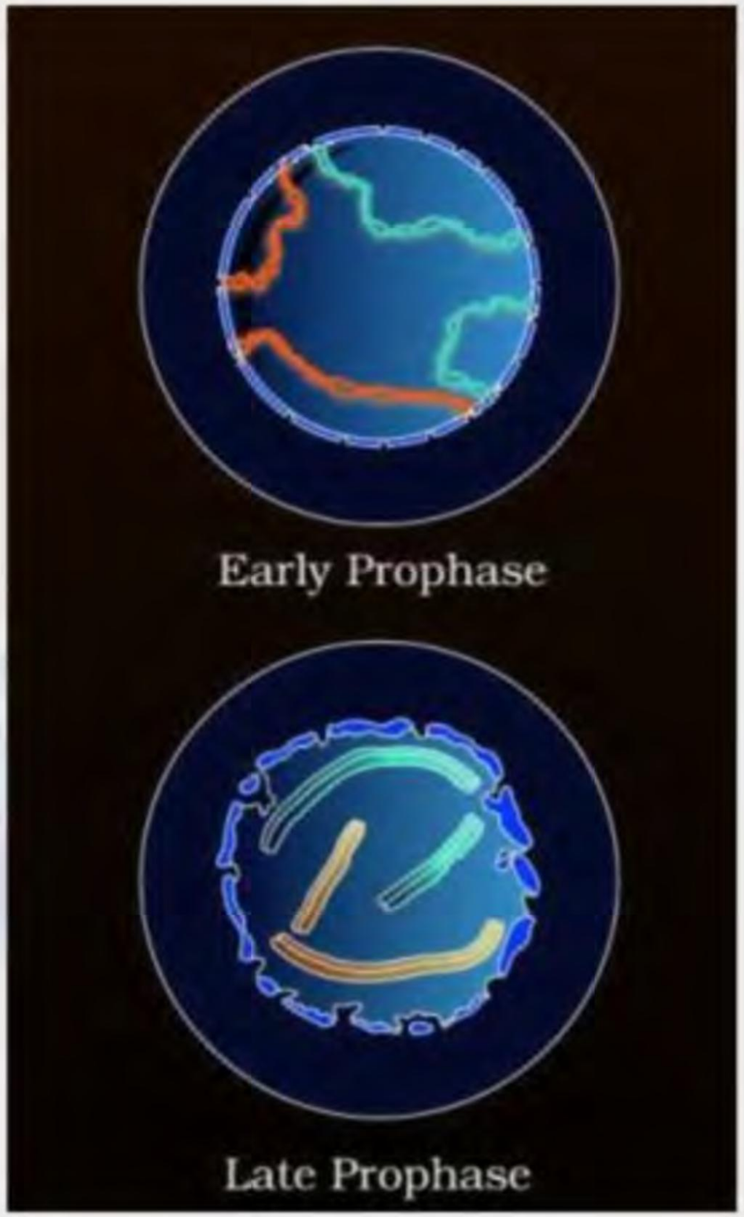
पादपों → An Astral division

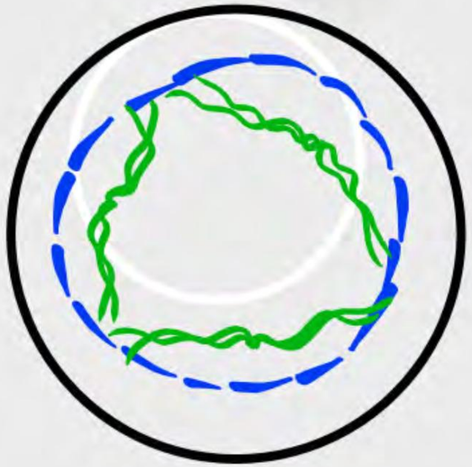
$\boxed{2c + 2b + a}$ → Mitotic apparatus

Astral division

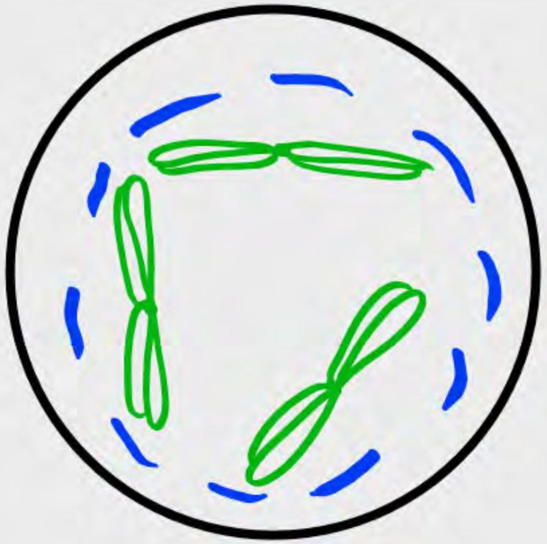
↓

Not only in animal





early prophase



late prophase

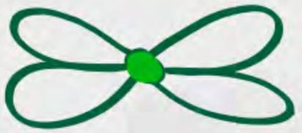
Metaphase

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

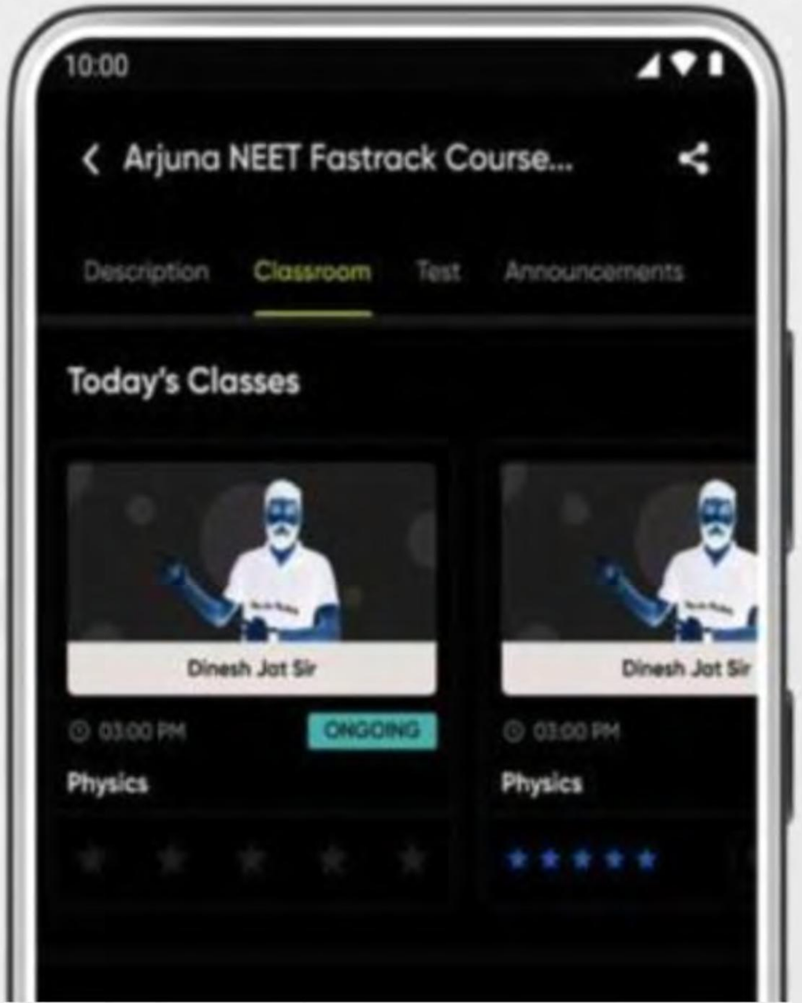


Thank You...

Your Feedback is Valuable to us

★★★★★

Rate your today's class in the Batch



VIDYAPEETH

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  (कोशिका चक्र एवं कोशिका विभाजन)

Lecture No.-03

Dr. Jaiveer Chaudhary Sir

Today's Targets

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

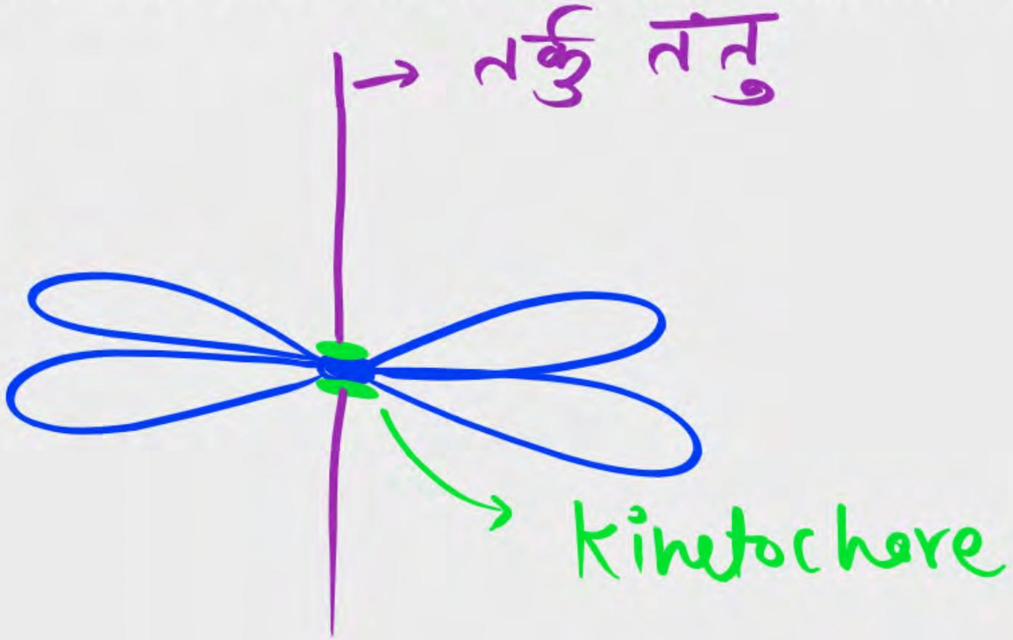
Metaphase

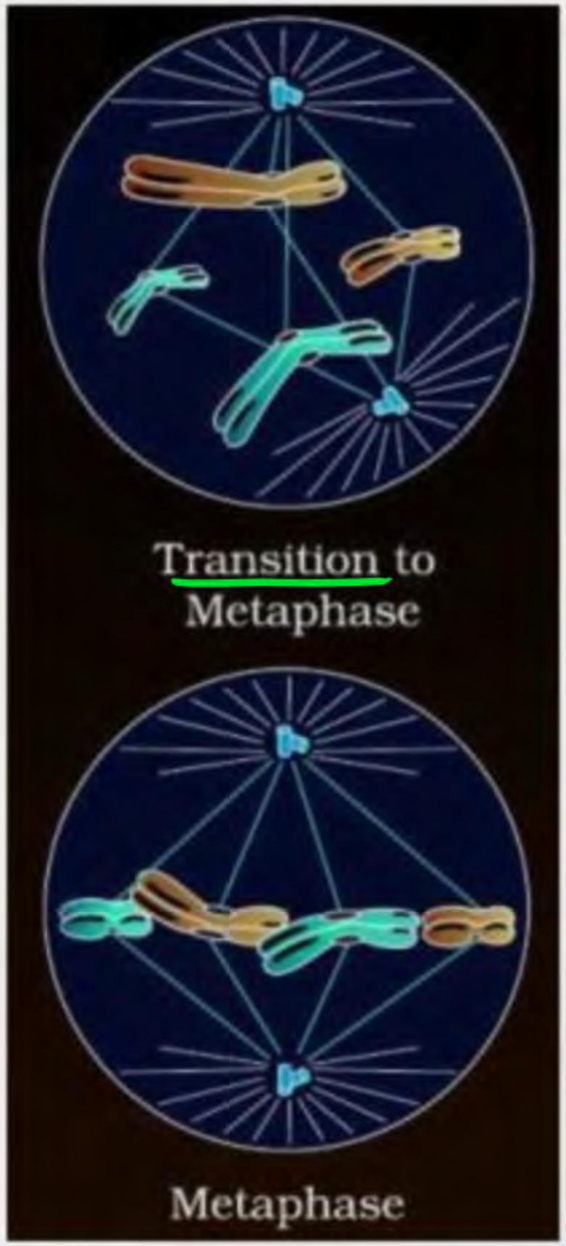
Condensation of chromosomes is completed and they can be observed clearly under the microscope. This then, is the stage at which morphology of chromosomes is most easily studied.

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.

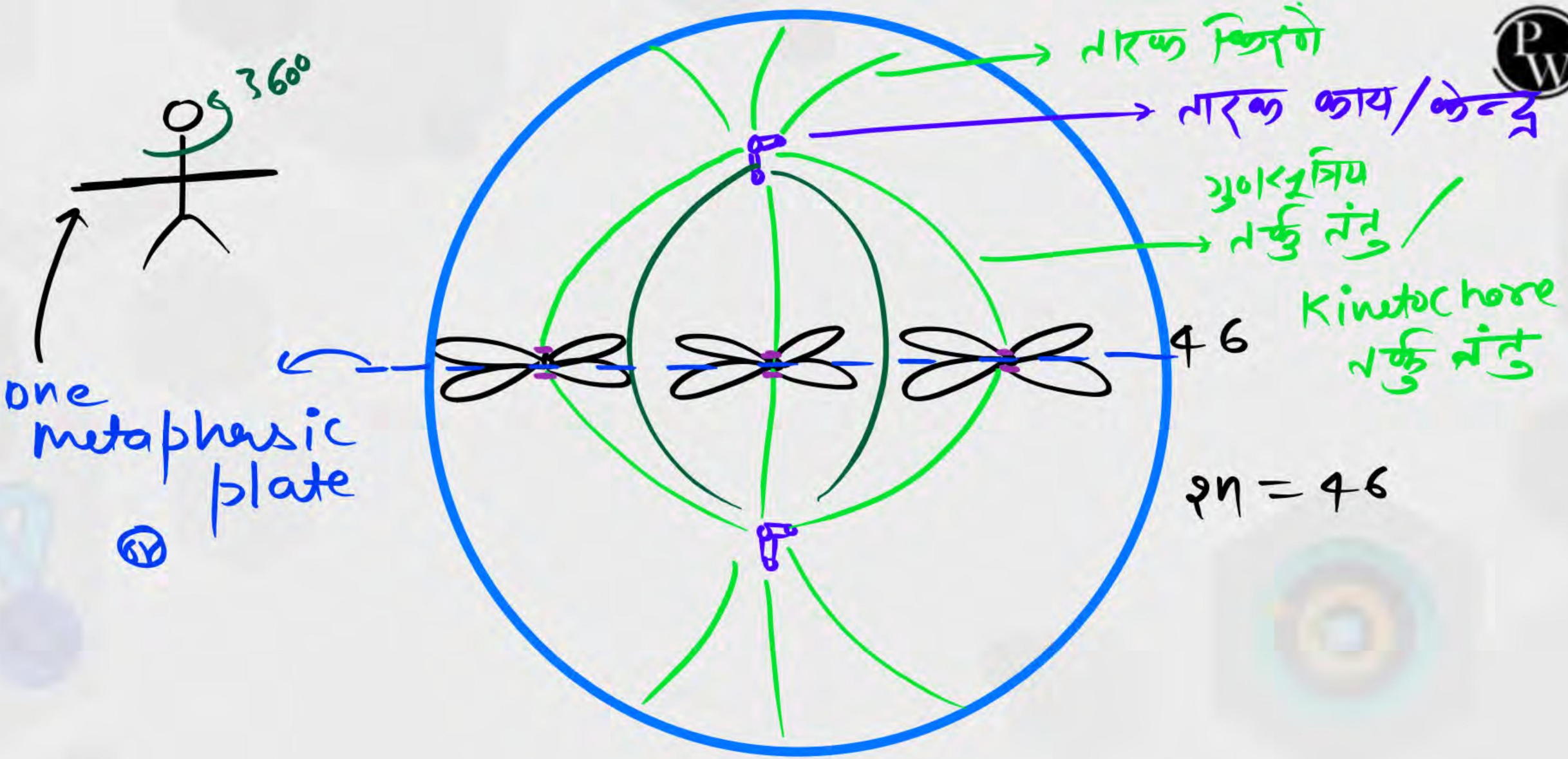




Metaphase

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
তারক কিরণ
তারক কায়/কেন্দ্র
গুণাকৃতিয় তন্তু /
Kinetochore তন্তু
46
2n = 46

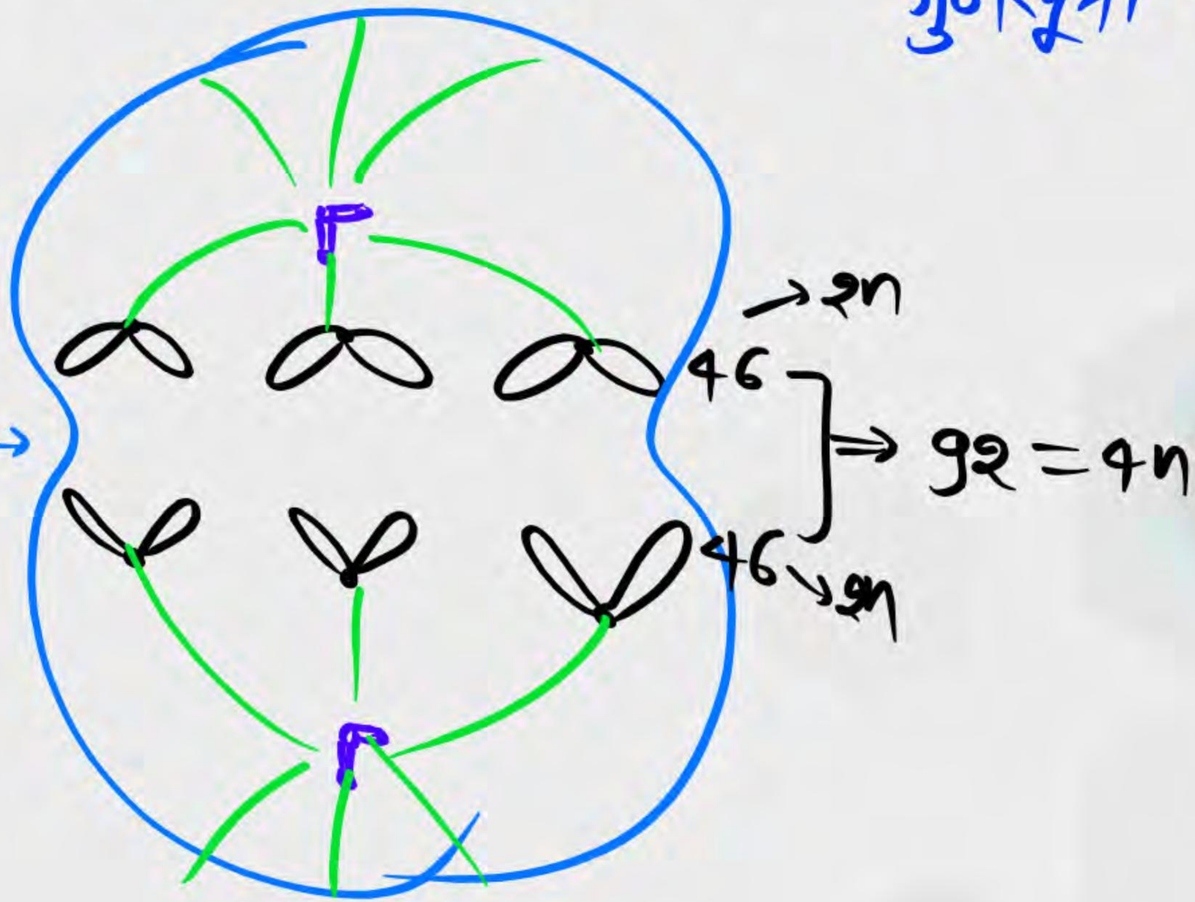
Anaphase

★ 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

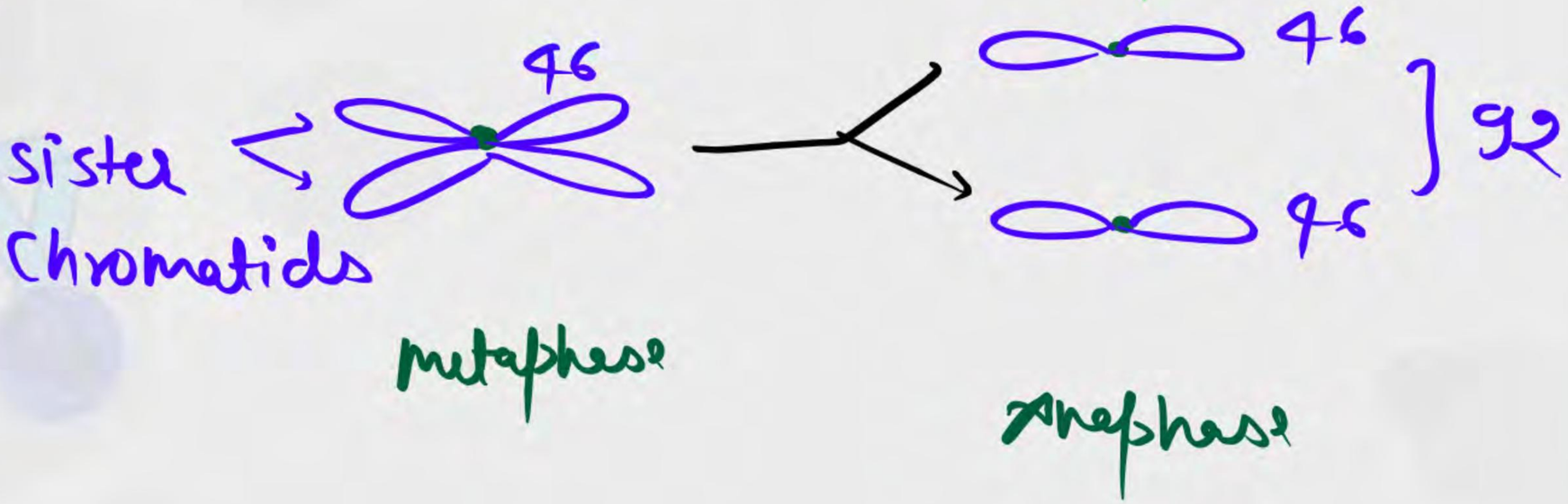
cytokinesis कोशिका द्रव्य विभाजन Late anaphase में प्रारंभ हो जाता है



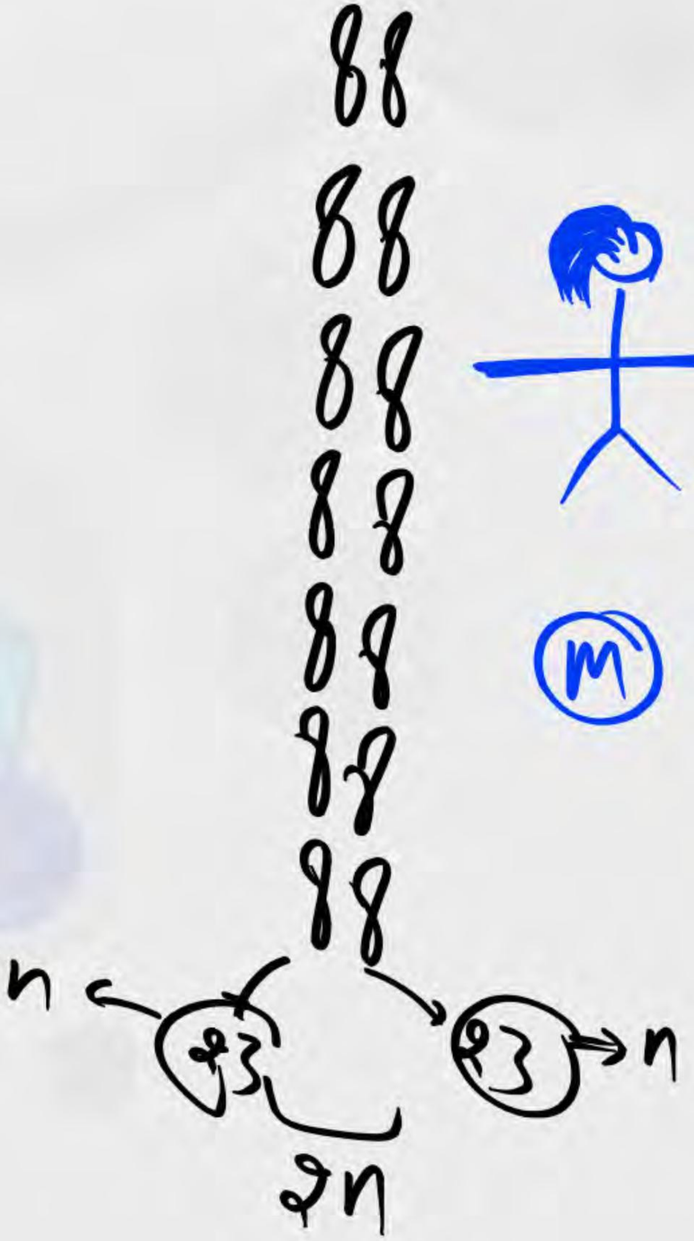
Anaphase

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

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



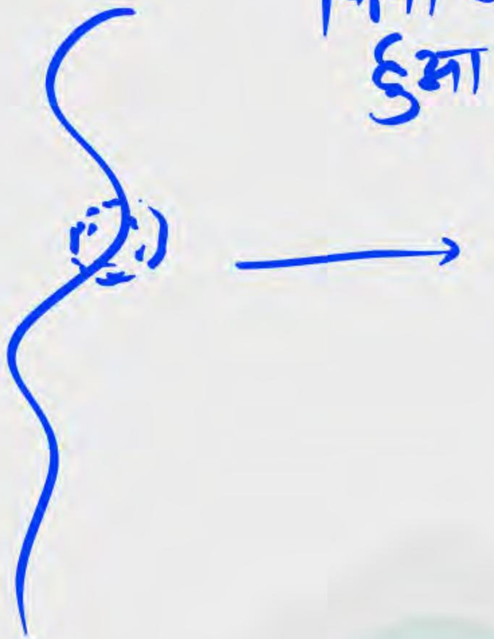
Shape



Shape

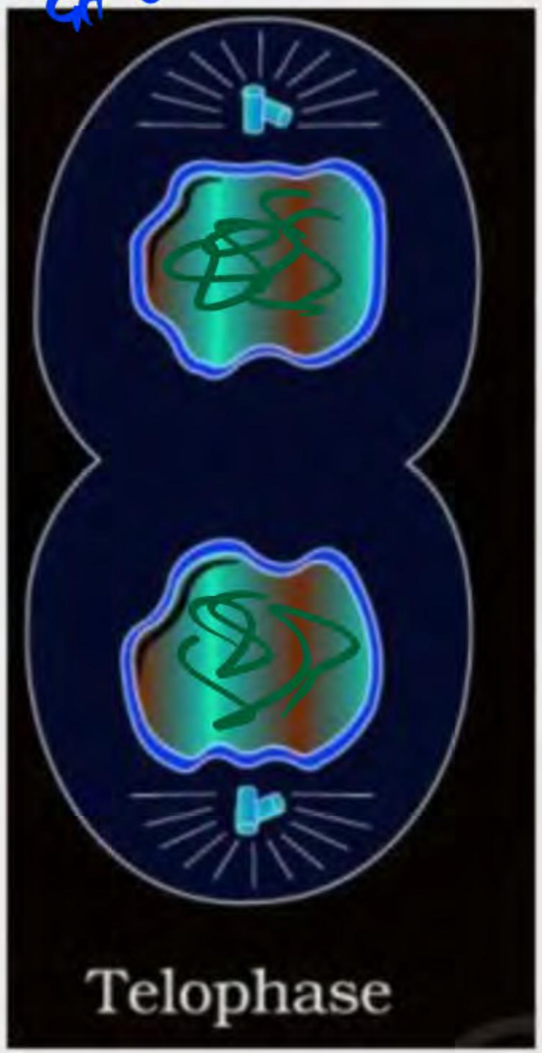
Non stained part

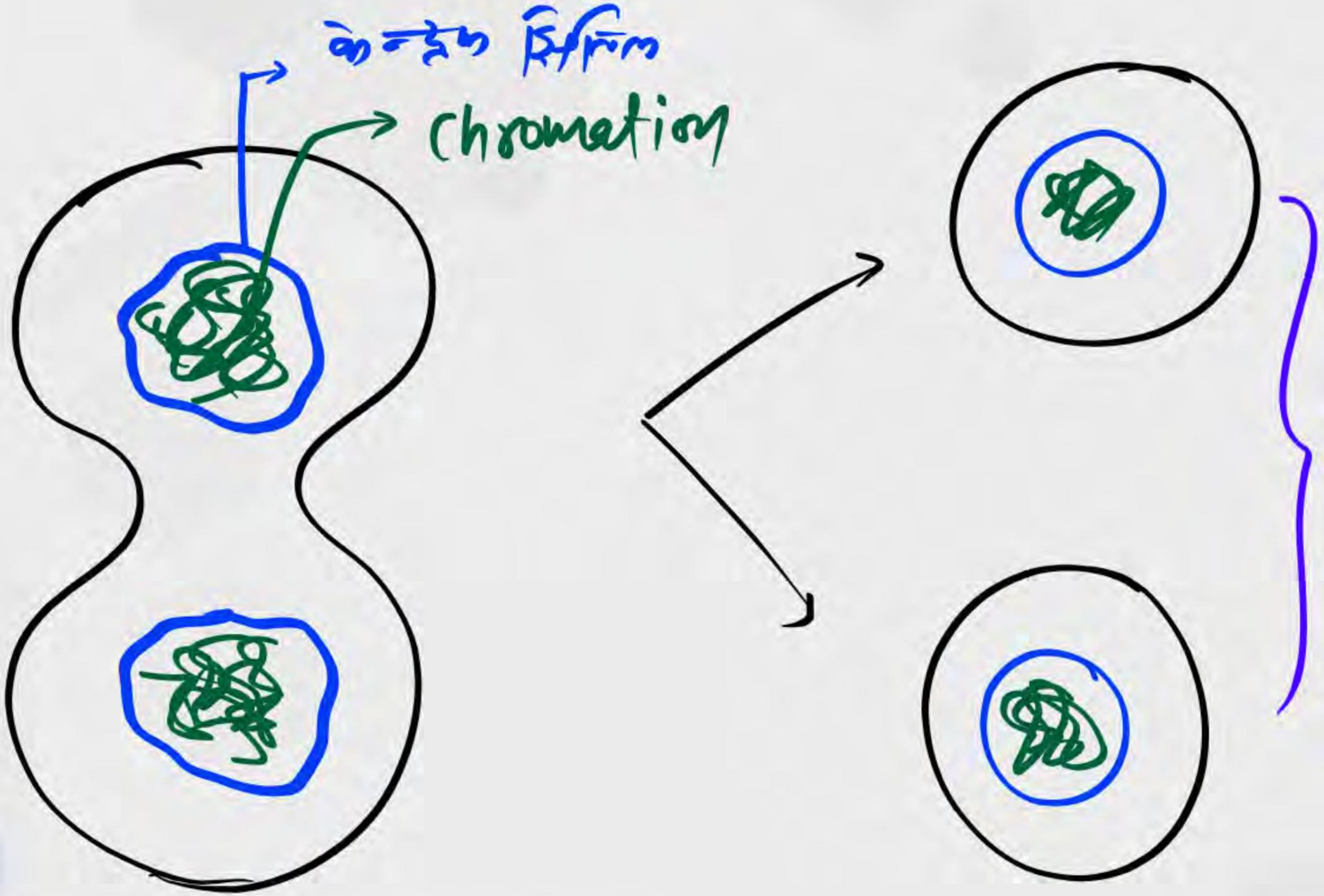
बिना अभिरंजित हुआ भाग



Telophase (Reverse Prophase)

- गुणसूत्र —विसंघनन→ Chromation → गुणसूत्र अपनी पहचान खो देते है
- केन्द्रक झिल्ली, केन्द्रिका, धुरा, g.b. पुनः प्रकट हो जाती है
- सभी कोशिकांग पुनः प्रकट हो जाते है

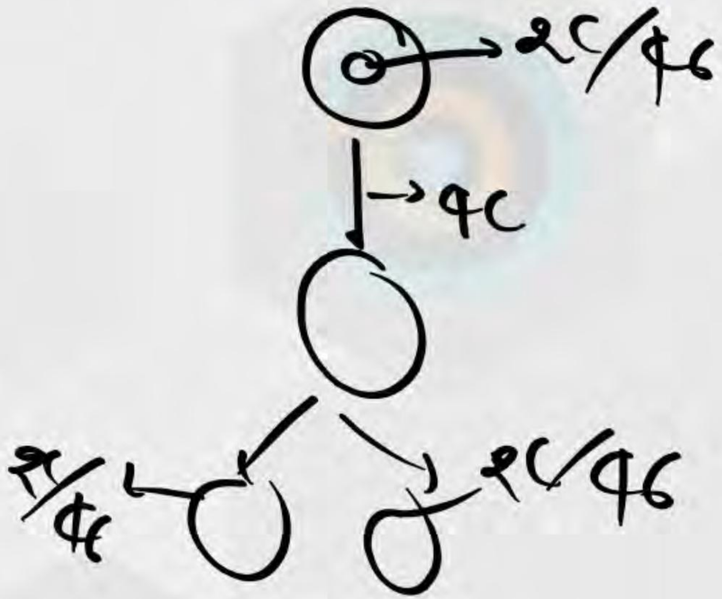




early Telophase

Siad of the cell

कोशिका द्विक



Interphase → G_1, S, G_2

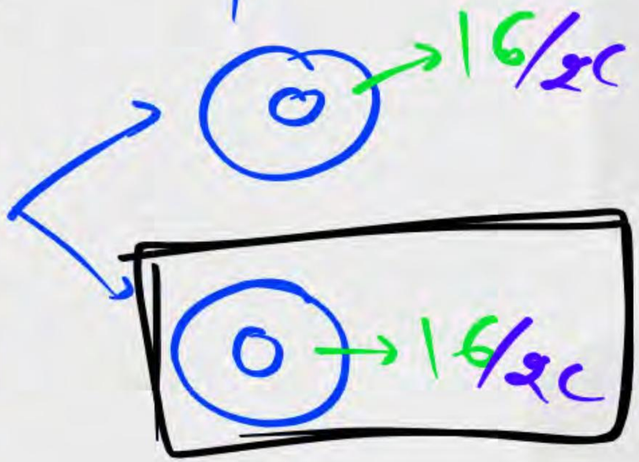
M phase → P, M, A, T

4C/16

4C/16

⇓

32/4C

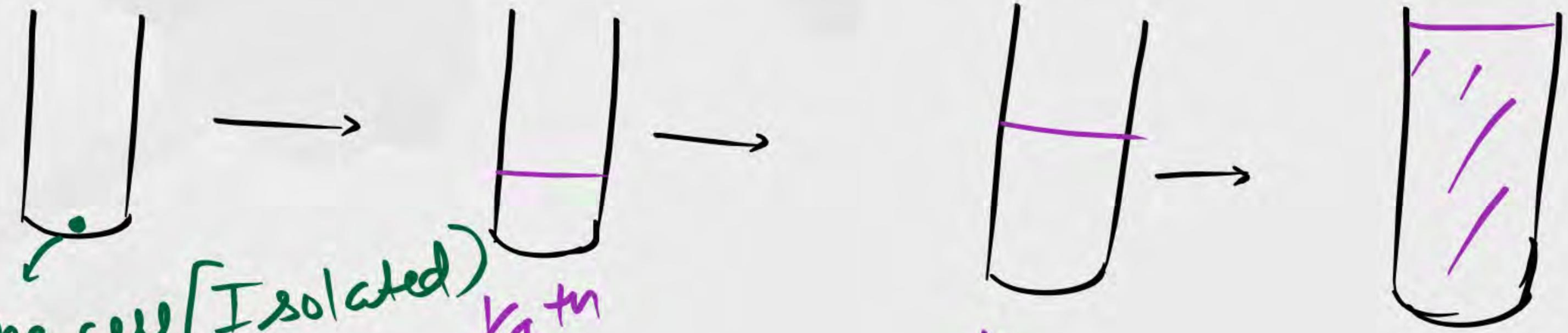


onion
Root
tip cell

DNA ভিত্তি মাত্রা ⇒ 2C

গুণসূত্র ⇒ 16

Q.4



one cell (Isolated)
प्रारम्भ में

1/4 th

t = ?

3:58 AM

1/2

3:59 AM

full

4:00 AM

समसूत्री
विभाजन

एक विभाजन में समय
= 1 min

Que

एक विभाजन में लगा समय = 2 min

① कोशिका विभाजनों कि संख्या ? → 9

② विभाजनों में लगा समय = ?

$9 \times 2 = 18$ min

$1 \xrightarrow{2m} 2 \xrightarrow{2m} 4 \xrightarrow{2m} 8 \xrightarrow{2m} 16 \xrightarrow{2m} 32 \xrightarrow{2m} 64 \xrightarrow{2m} 128 \xrightarrow{2m} 256 \xrightarrow{2m} 512$

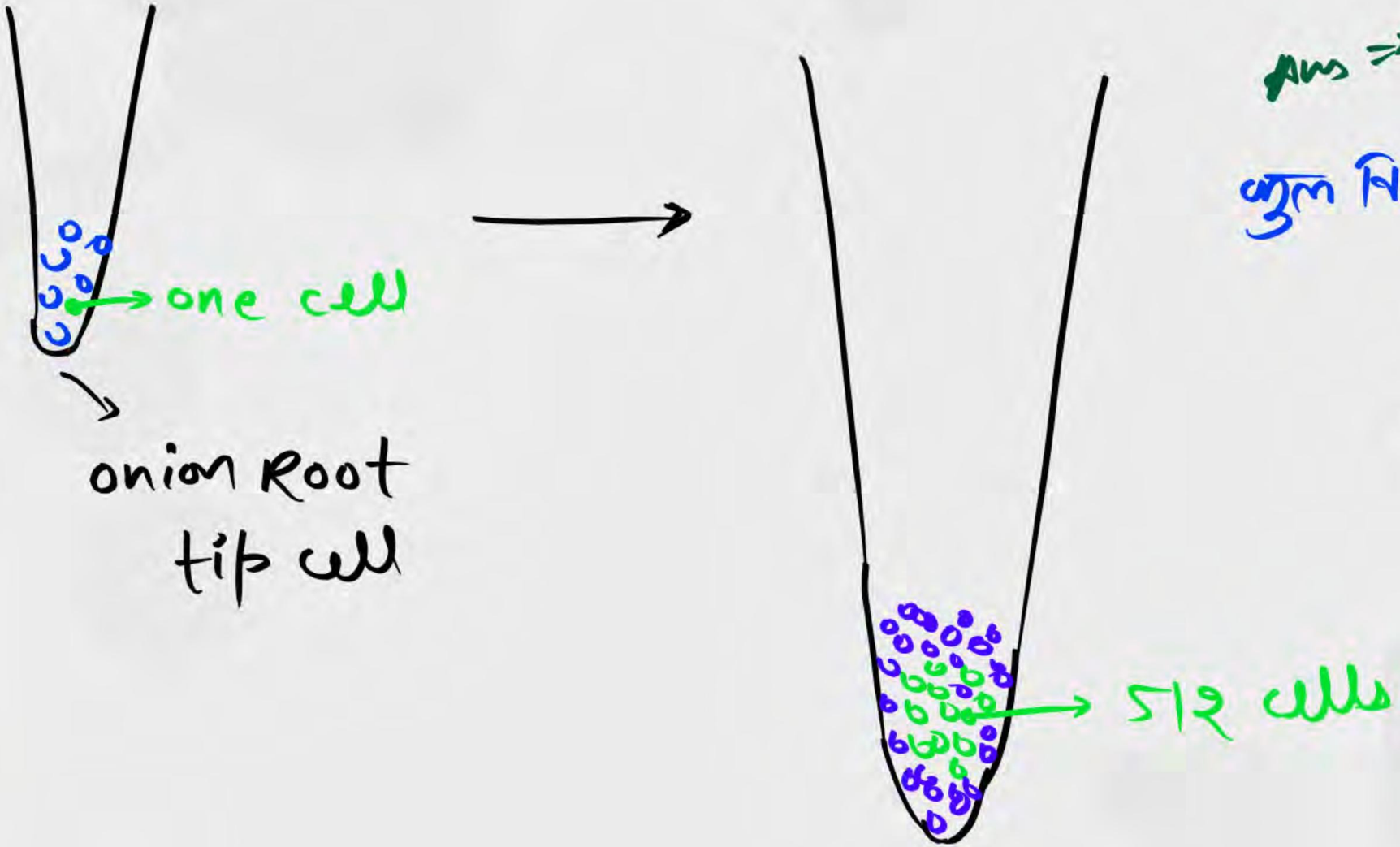
n विभाजनों के पश्चात कोशिकाओं की संख्या $= 2^n$

512

$512 = 2^n$

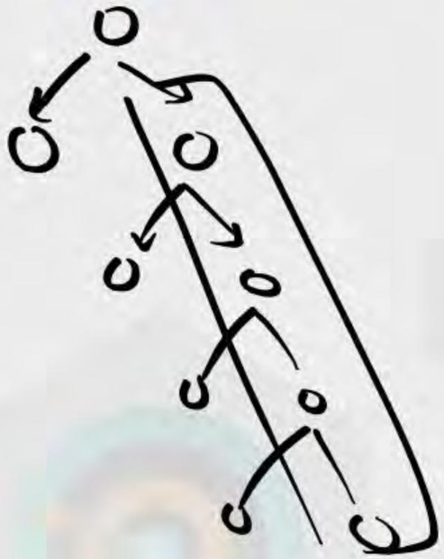
$2^9 = 2^n$

$n = 9$



Ans ⇒ 511

कुल विभाजनों कि संख्या



Next Class Target

Topic कोशिका द्रव्य विभाजन

Topic अर्धसूत्री विभाजन

Topic

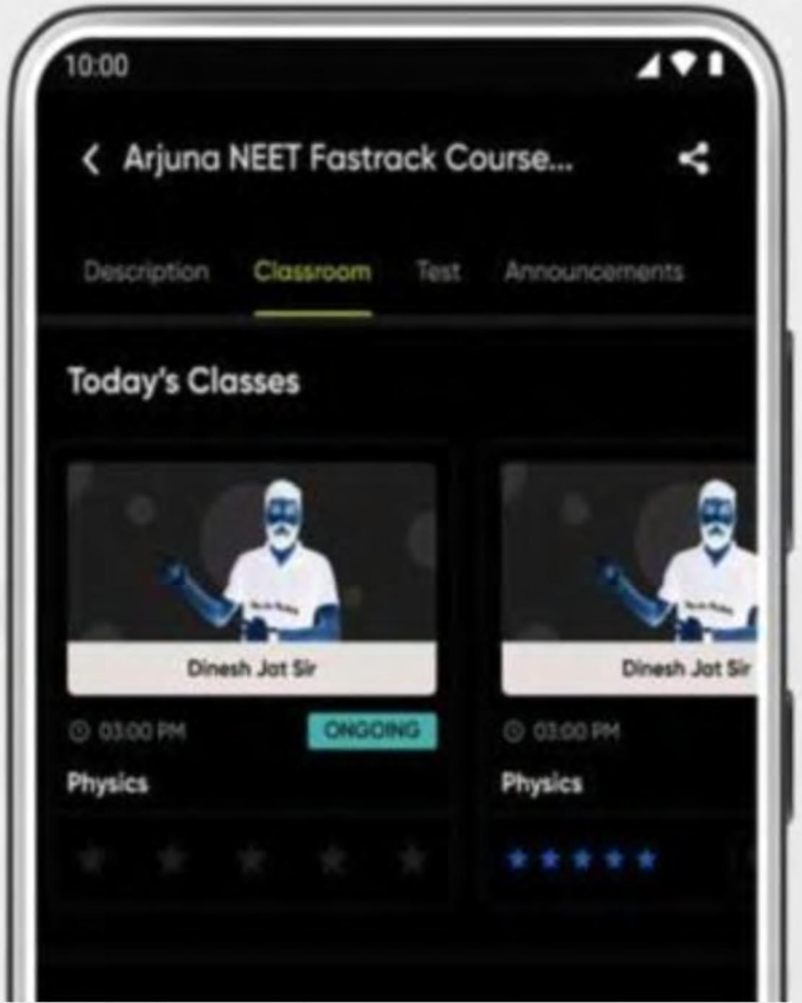
Topic

Thank You...

Your Feedback is Valuable to us

★★★★★

Rate your today's class in the Batch



VIDYAPEETH

Batch Code : 11-YN401MH

- Botany

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

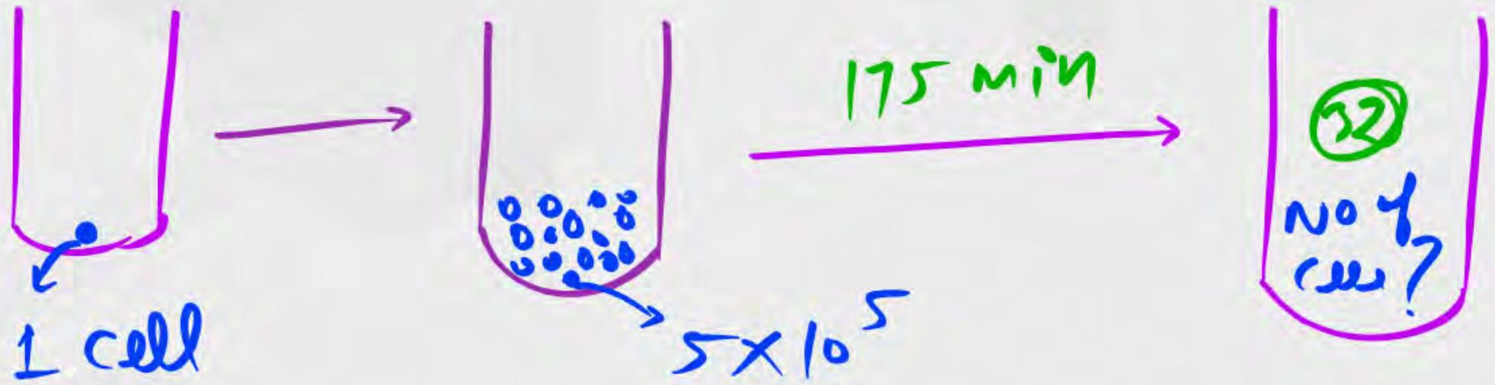
Lecture No.- 04

Dr. Jaiveer Chaudhary Sir

Today's Targets

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

Qm



विभाजन में लगा समय = 35 min

$\frac{175}{35} = 5$ विभाजन

$2^5 = 32$

$5\times10^5 + 32$ ✗

✓ $\boxed{5\times10^5 \times 32}$

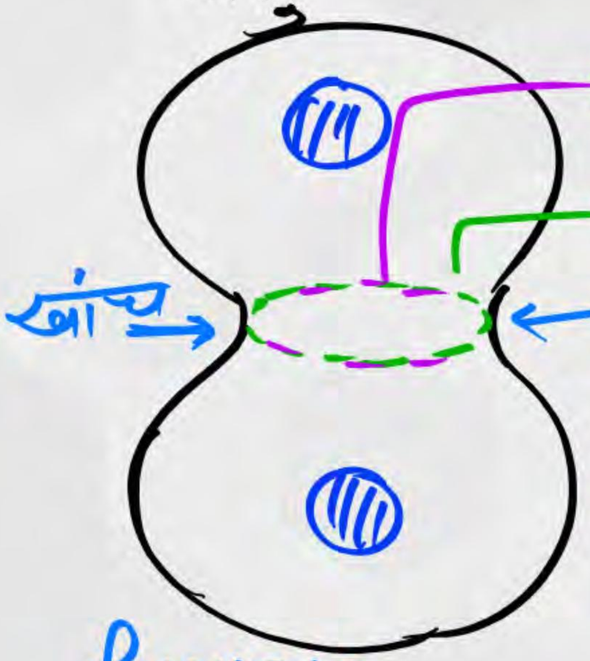
Cytokinesis

→ Start → late Anaphase

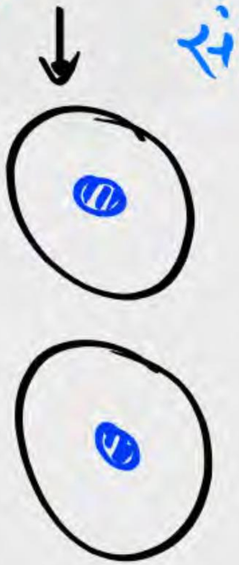
→ completed → Telophase

In Animals	In plants
→ खांच निर्माण द्वारा mid body formation	→ फ्रागमोप्लास्ट ↓ कोशिका पट्ट ↓ मध्य पट्टिका
→ अभिकेन्द्रिय प्रकार का	→ अपकेन्द्रिय प्रकार का

जंतु



furrow



o → golgi पुटिका

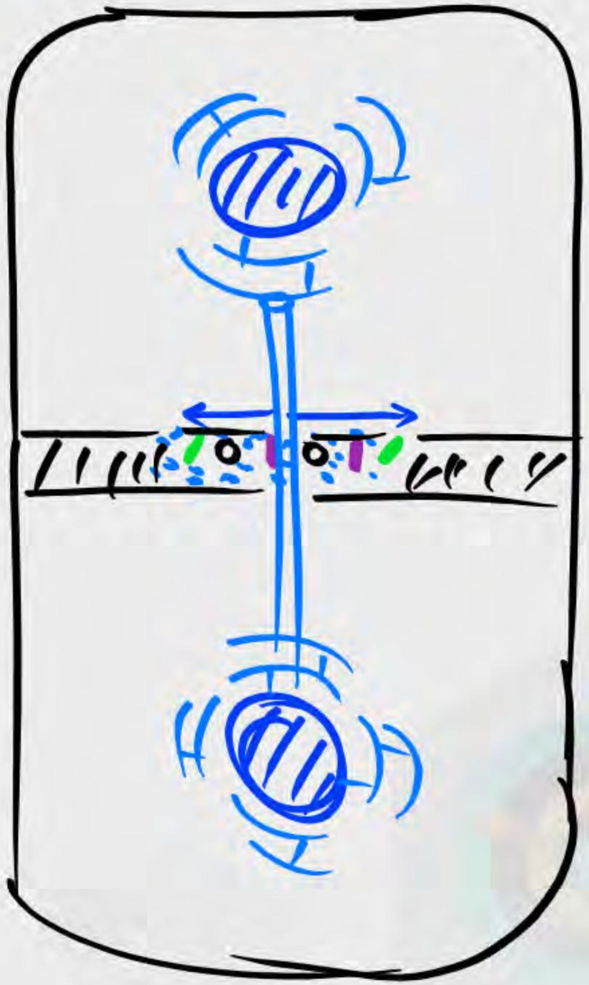
1 → ER के टुकड़े

1 → सूत्र निकाय

⇓

फ्रेग्मोप्लास्ट

पादप



Phragmo plast

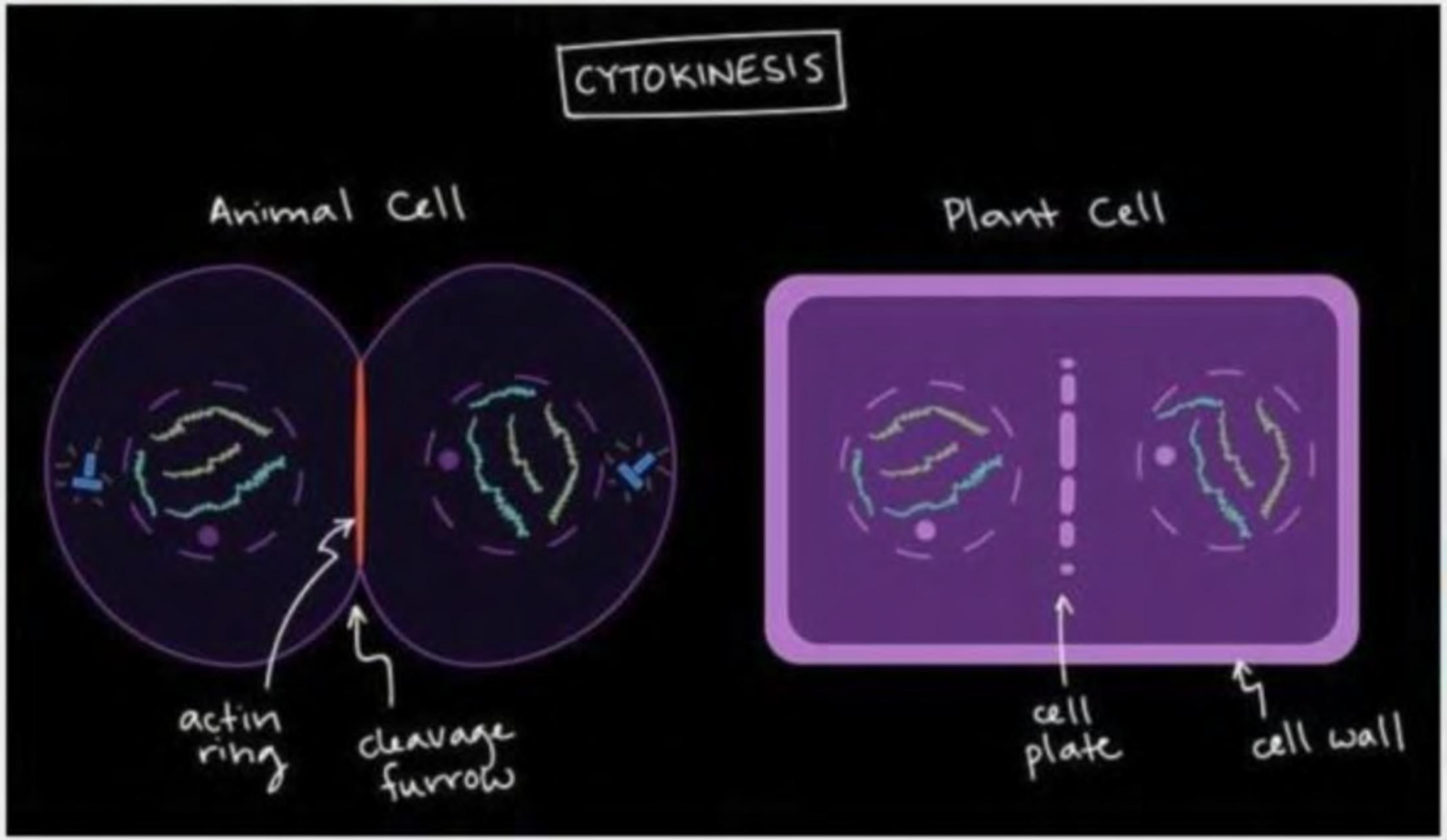
⇓

कोशिका पट्टि

↓

मध्य पट्टिका

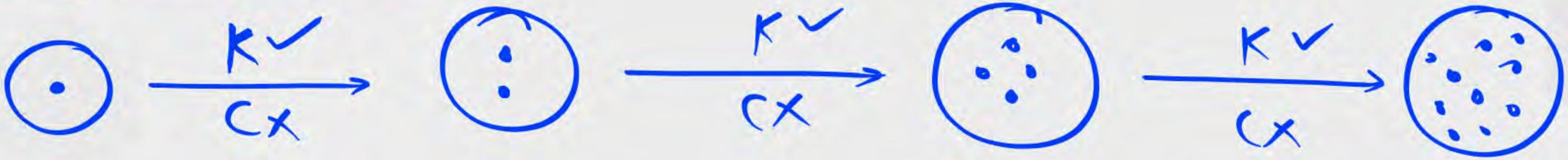
Cytokinesis



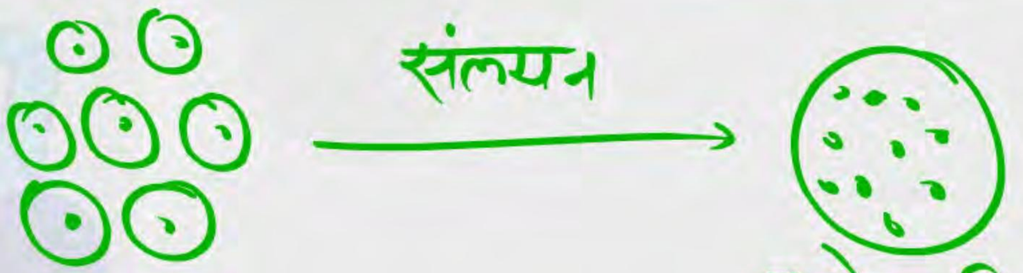
Modification of Mitosis

syncyte cenocyte

① मुक्त केन्द्रकीय विभाजन :→



बहुकेन्द्रकीय अवस्था
(syncyte)



बहुकेन्द्रकीय अवस्था
cenocyte

Ex नारियल का केन्द्रकीय श्रृणपोष

Significants of mitosis

① [zygote (युग्मनज) → भ्रूण → व्यस्क] growth

② Repairing (मरम्मत)

③ नई RBC का निर्माण

④ New hair

⑤ skin cells

100 → 100

100 → 99

100 → 95

100 → 90

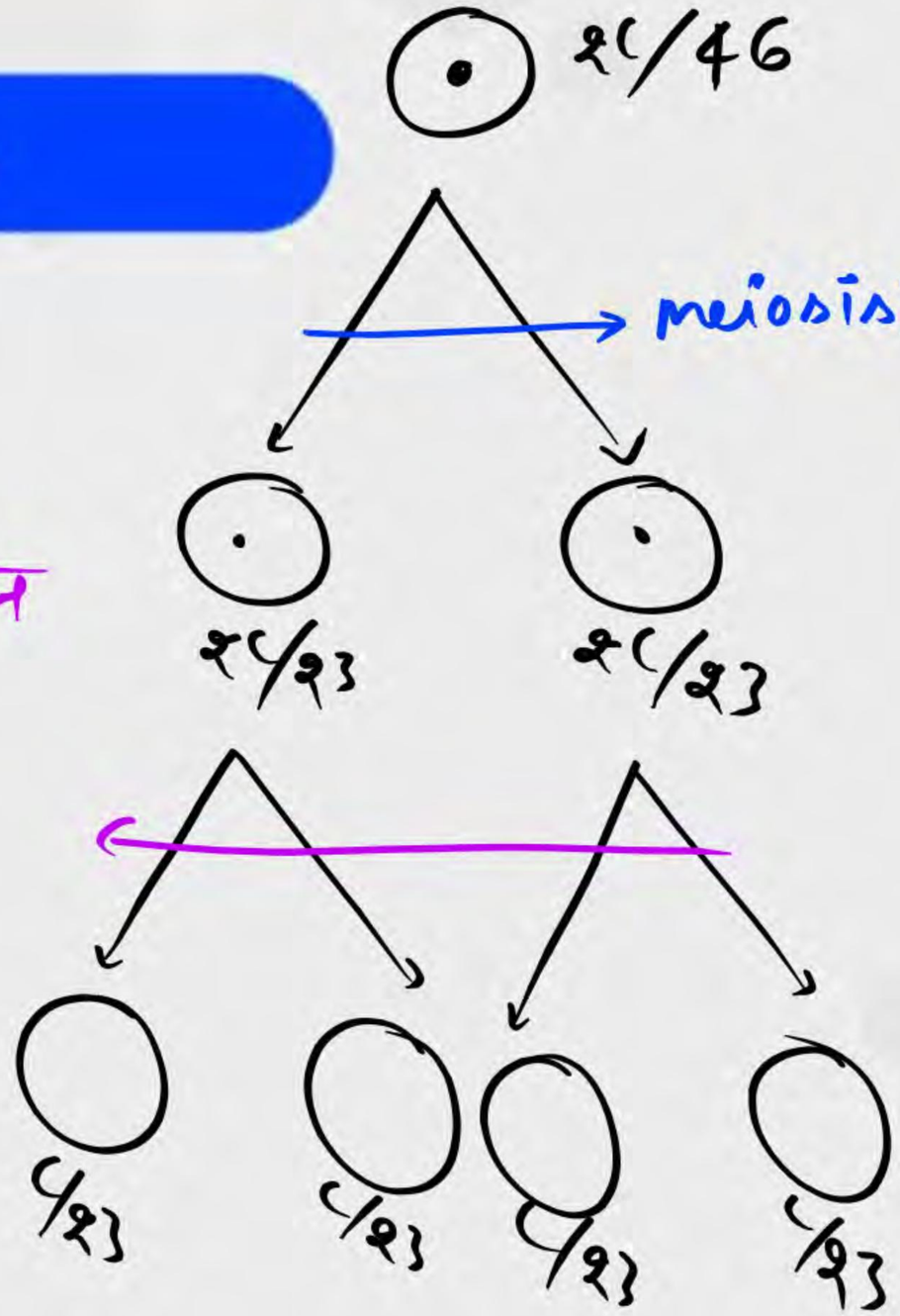
100 → 50

BB

Bb

bb

Meiosis

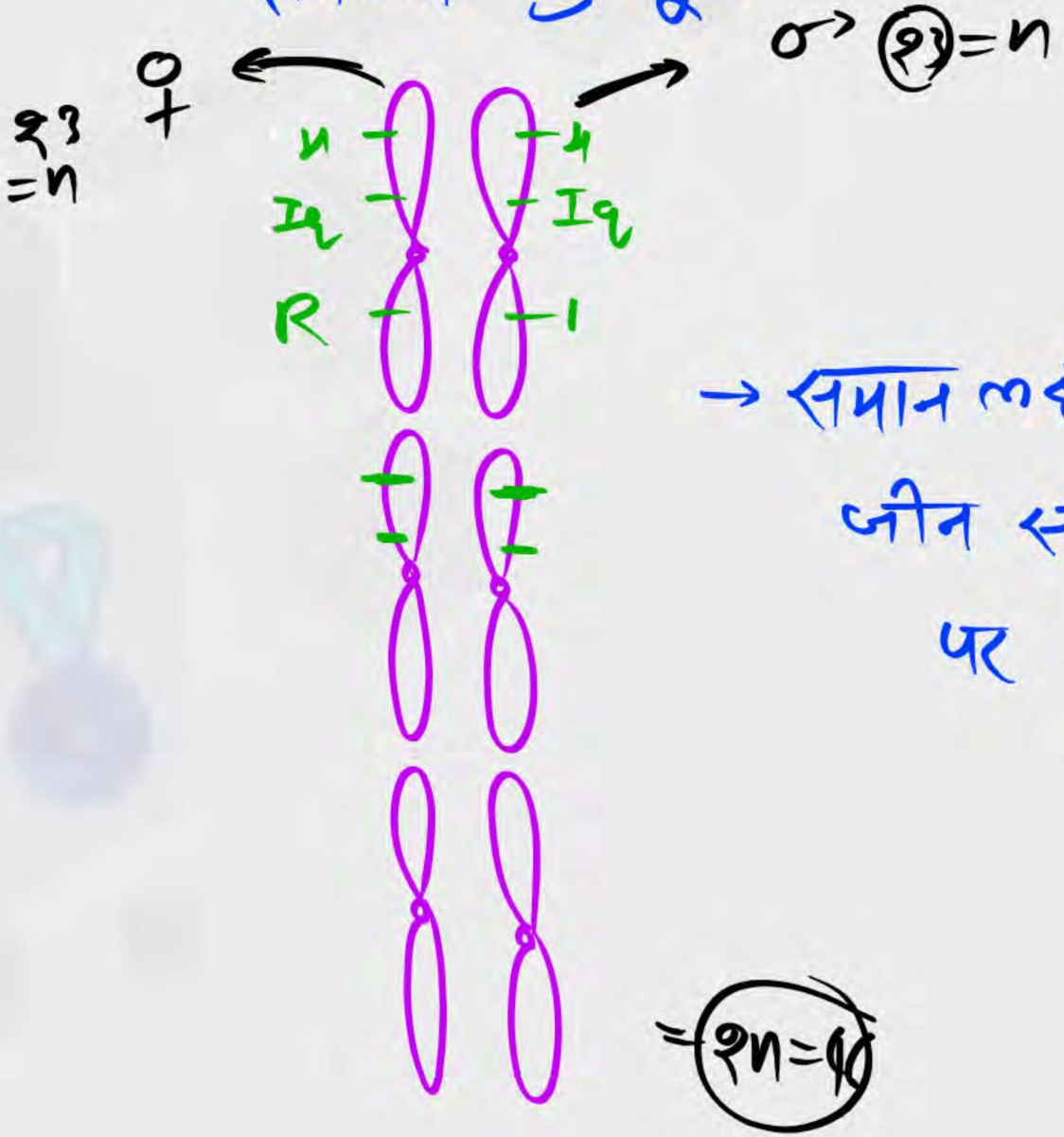


समजात गुणसूत्रों का पृथक्करण (जीन विनिमय के बाद)

अन्यूनकारी विभाजन
meiosis II
[As well as mitosis]

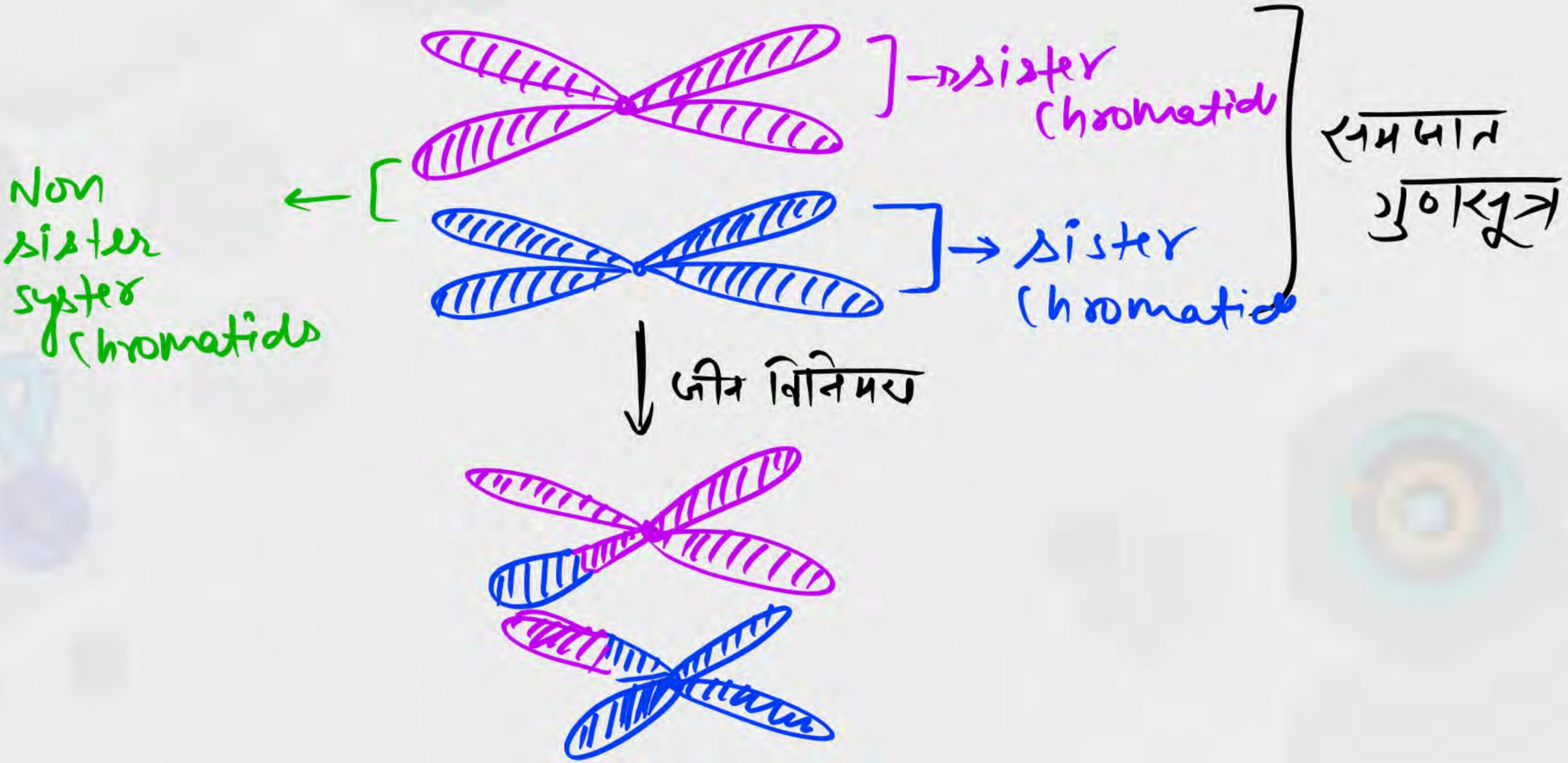
Homologous Chromosome

समजात गुणसूत्र

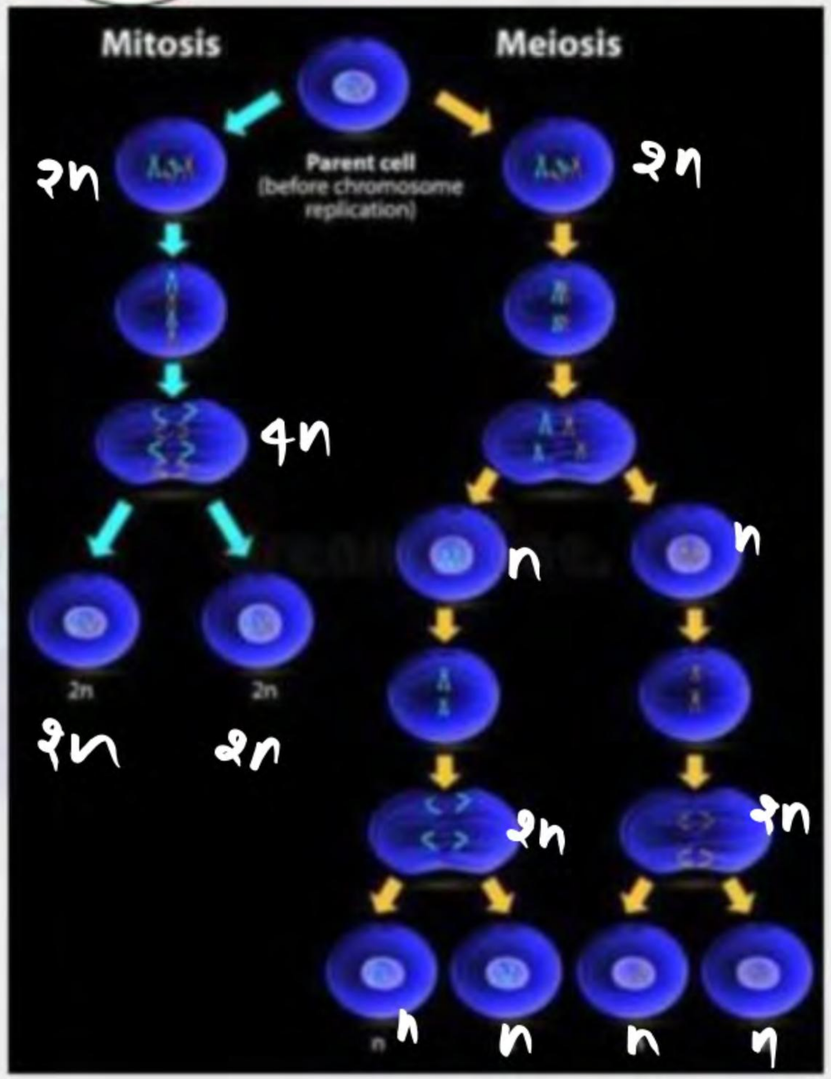


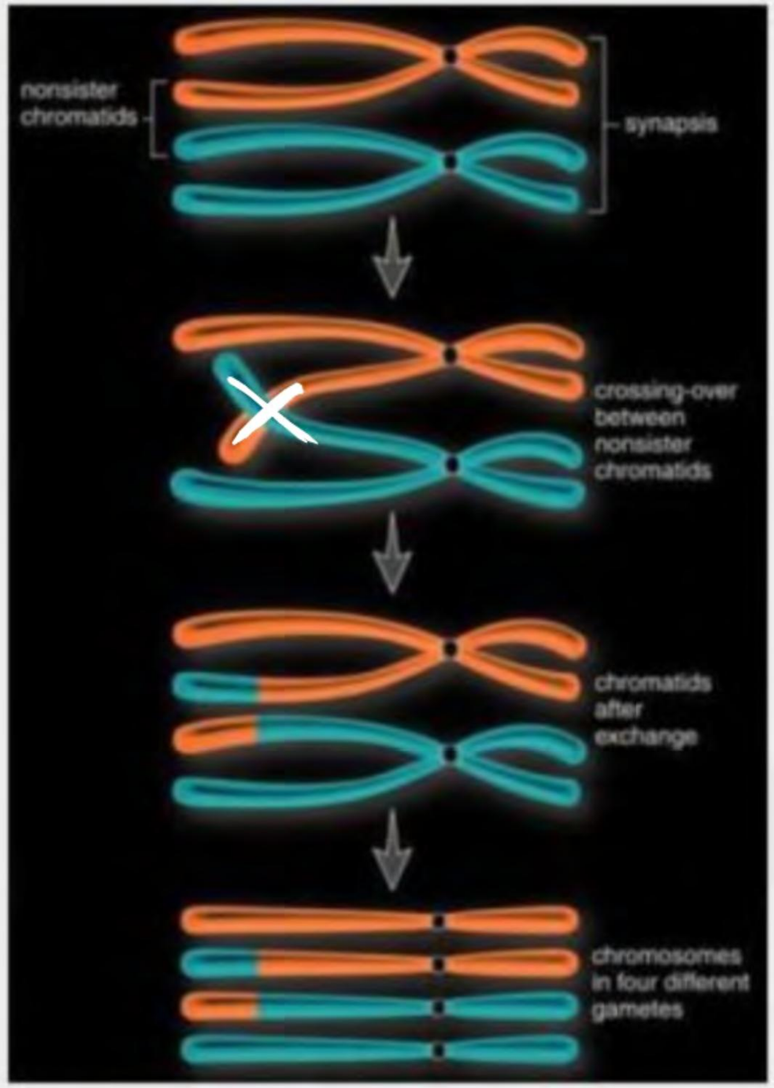
→ समान लक्षणों को जीन समान स्थानों पर उपस्थित होती है।

Crossing over (जीन विनिमय)



Meiosis


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

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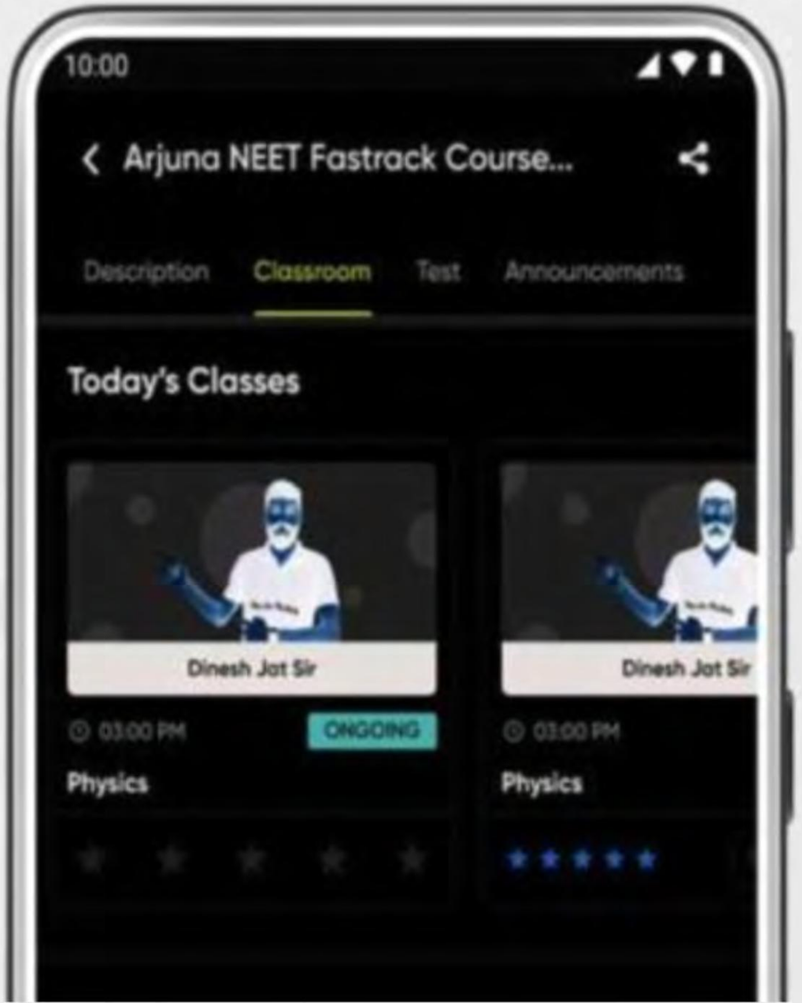
★★★★★

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