पीढ़ी-पीढ़ी → (अनुवांशिकी)

Genetics ← CTET → syllabus, system, MCQs

8

Mothers face

curly hair

Characters (गुण)

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Law of dominance (प्रभाव)

P generation

Parent पिता - माता

TT → tall

tt → short

Pure Hybrid

3 = species

Mendel

30

Filial generation

F_1 generation

TT × tt

50:50

Hybrid

100

50%

Tt

Tall

dominant

recessive

short → dom

all tall

expression of gen

Garden Pea

recessive dom

T → ← t

codominance

self-fertilization

F_2 generation

3 tall : 1 short

3:1

Oil × water → oil water

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	Flower Colour	Plant Height	Seed Color	Seed Shape	Pod Colour	Pod Shape	Flower Position
Dominant Trait	Purple	Tall	Yellow	Round	Green	Inflated (full)	Axial
Recessive Trait	White	Short	Green	Wrinkled	Yellow	Constricted (flat)	Terminal

Mendel → मटर → 7 गुण → फूल, बीज, Pod, Pod, फली, तना

Law of segregation

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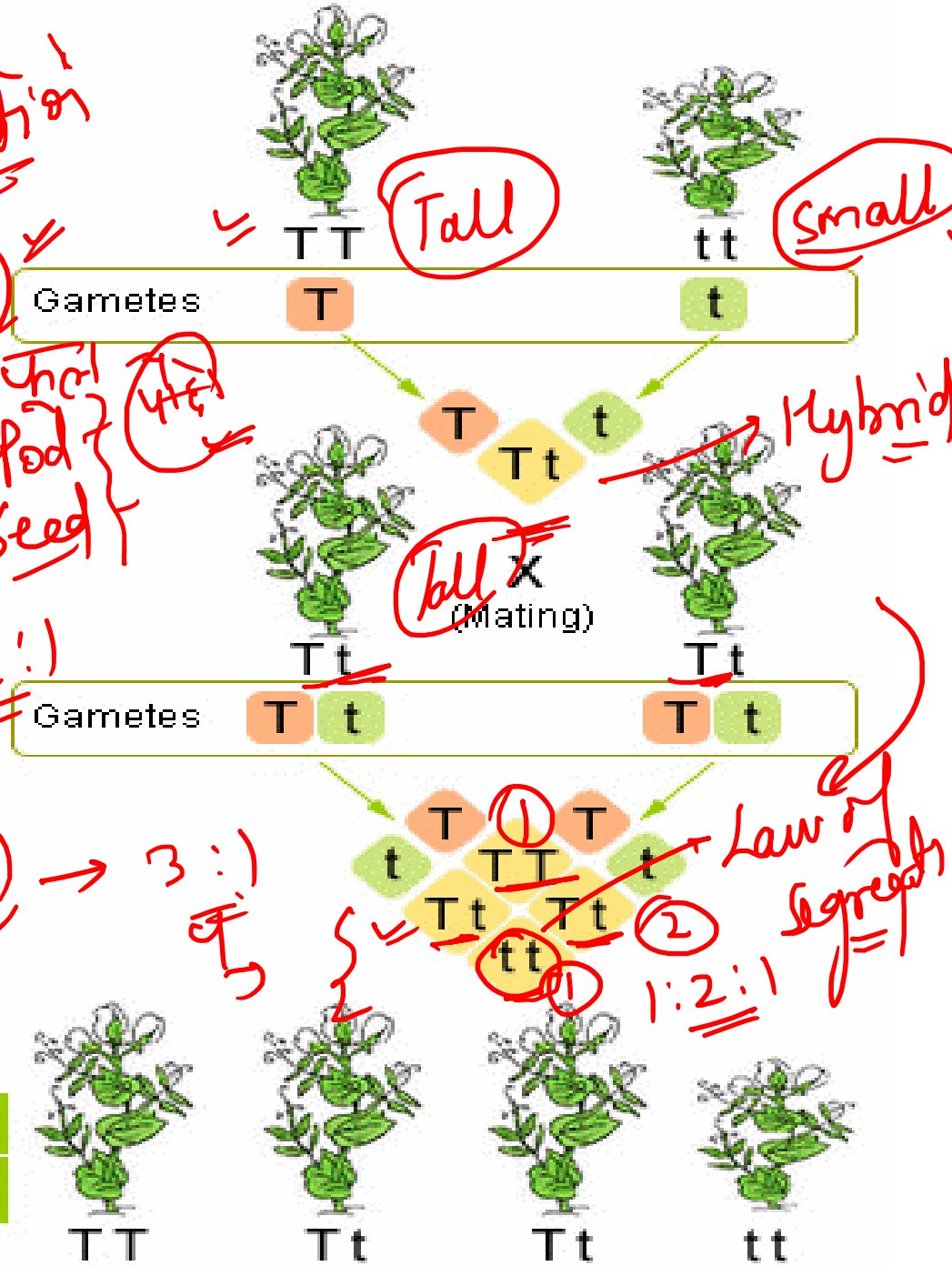
Parental Generation

Dominance | Segregation

Mendel → 7 जोड़ी → फल, पौधे, Seed



F1 Generation

Genotype	All are Tt.
Phenotype	All are tall

Genotype → 1:2:1

Phenotype → लम्बा → 3:1

F2 Generation

Genotype	TT : Tt: : tt = 1 : 2 : 1
Phenotype	Tall:Dwarf 3:1

Exceptions to Mendel Law

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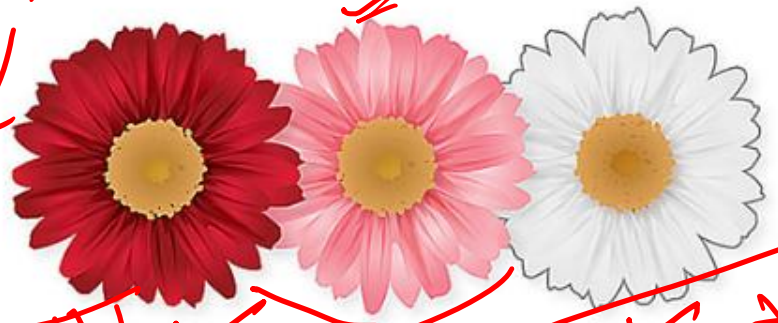
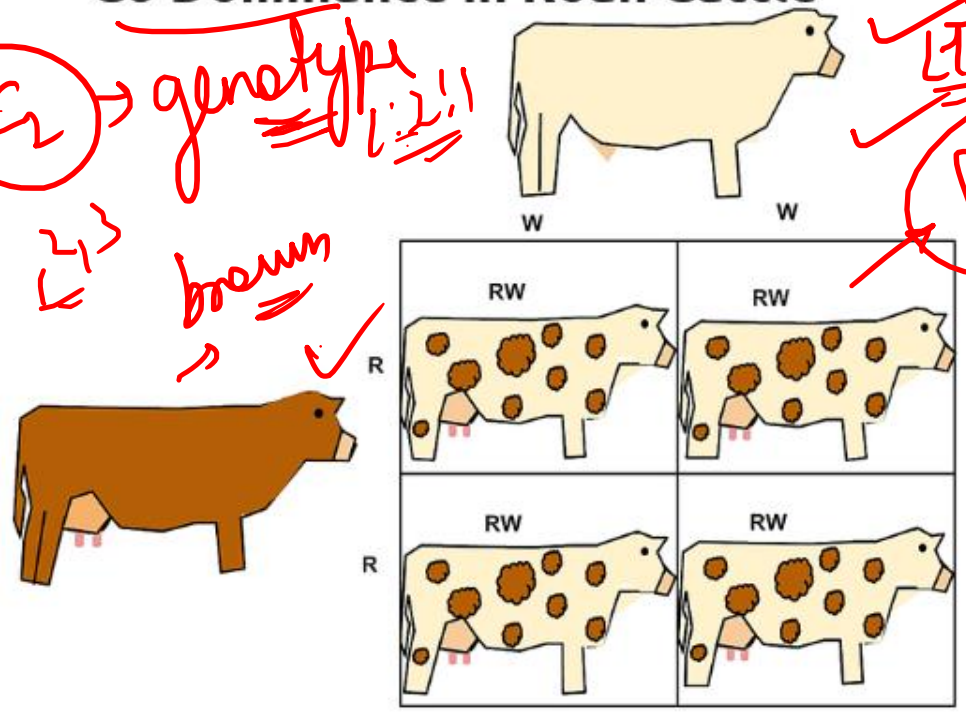
Incomplete Dominance in Mirabilis jalapa



Phenotype	Red	Pink	White
Genotype	RR	Rr	rr

Co Dominance in Roan Cattle



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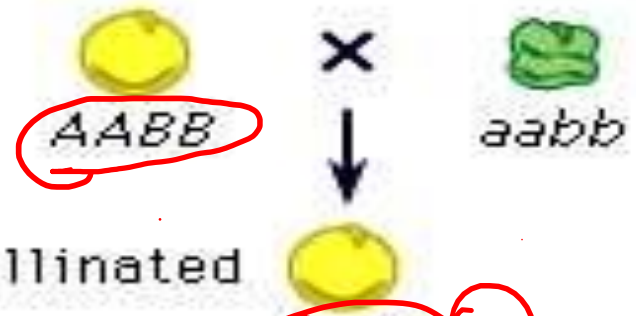

F₁ generation

♀ \ ♂	pollen			
	AB	Ab	aB	ab
ovules: AB	AABB	AABb	AaBB	AaBb
ovules: Ab	AABb	AAbb	AaBb	Aabb
ovules: aB	AaBB	AaBb	aaBB	aaBb
ovules: ab	AaBb	Aabb	aaBb	aabb

F₂ generation

2 → F2 → independent assortment

4 जुड़ा

2 जुड़ा

dominance segregation

दो जुड़ा → 1 color, 2 shape

seed → wrinkled

Punnett Square

9 : 3 : 3 : 1 → Phenotype

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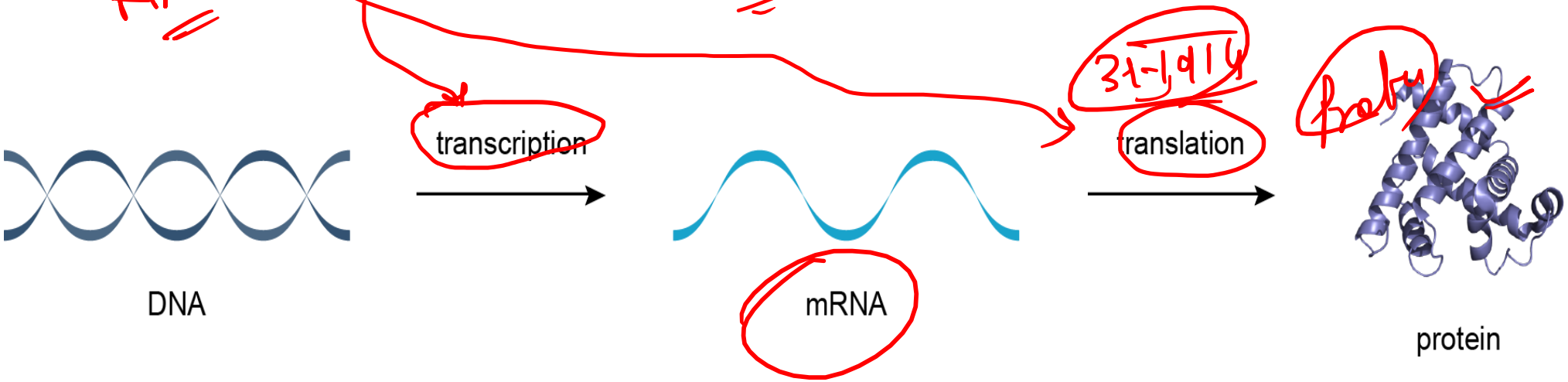
Protein → Ribosome ← mRNA ← DNA ← Mito/ Chloro/ plas
Nucleus



3'-1,9'1'4
Protein

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The Central Dogma of Molecular Biology

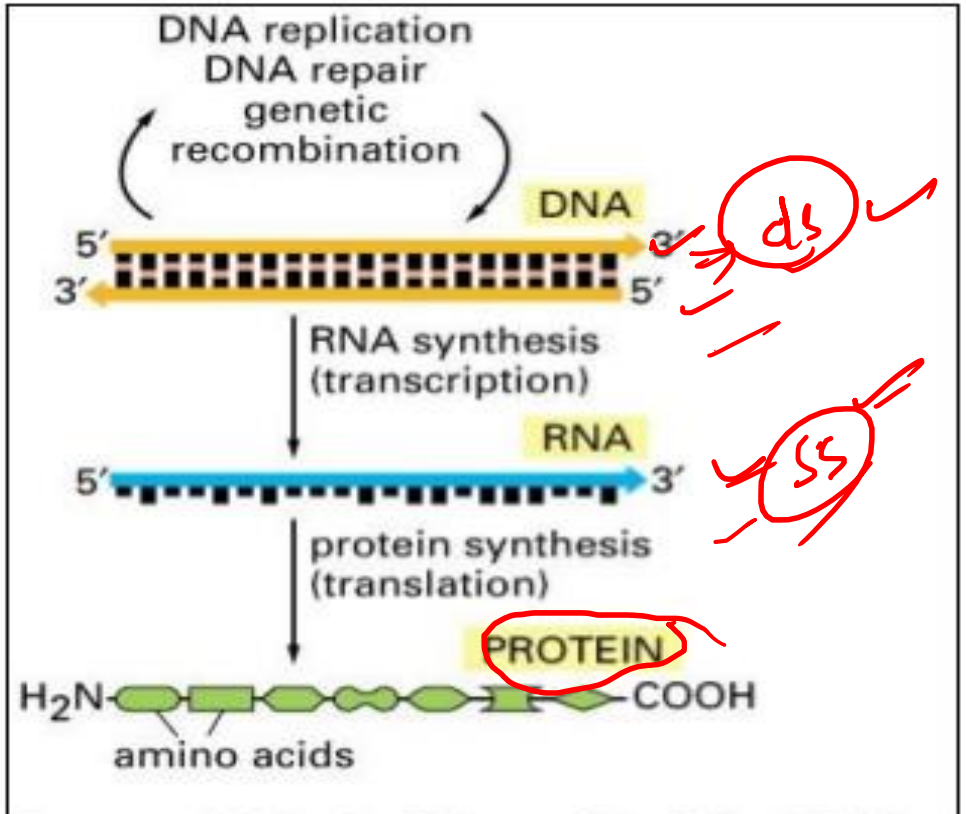

Figure 6–2. Molecular Biology of the Cell, 4th Edition.

DNA Replication

Synthesis of DNA
One DNA double helix …
…two DNA double helices

Transcription

Synthesis of mRNA
A region of DNA is used to…
…produce one mRNA

Translation

Synthesis of protein
One mRNA is used to…
…produce one protein

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Differences between replication and transcription

	replication	transcription
template	double strands	single strand
substrate	dNTP	NTP
primer	yes	no
Enzyme	DNA polymerase	RNA polymerase
product	dsDNA	ssRNA
base pair	A-T, G-C	A-U, T-A, G-C

Alleles and Inheritance
An Allele is an alternative form of a gene (one member of a pair) that is located at a specific position on a specific chromosome.

Alleles are dominant or recessive

Homozygous = two same alleles (purebred)

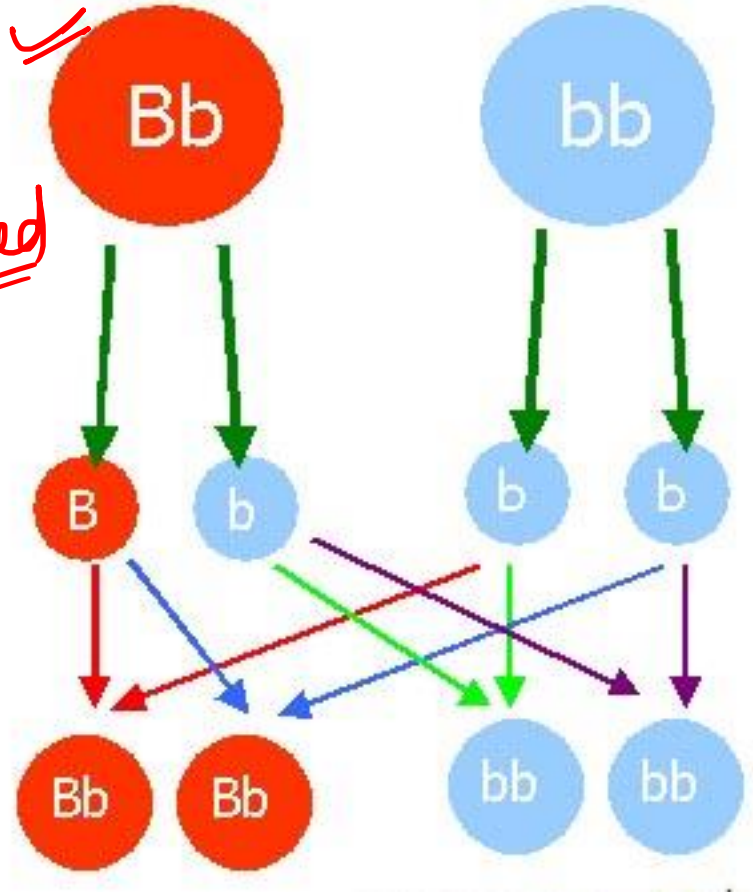
Heterozygous = two different alleles

एलेल्स और इनहेरिटेंस
एलेल जीन का एक वैकल्पिक रूप है (एक जोड़ी का एक सदस्य) जो एक विशिष्ट गुणसूत्र पर एक विशिष्ट स्थिति में स्थित है।

एलेल्स प्रमुख या पुनरावर्ती हैं

Homozygous = दो समान युग्मक (शुद्ध)

हेटेरोज़ीस = दो अलग-अलग एलील



Nucleic acids are made of

1. Nucleotides
2. Nucleosides
3. Amino acids
4. Protein

न्यूक्लिक एसिड से बने होते हैं ?

1. न्यूक्लियोटाइड्स
2. न्यूक्लियोसाइड्स
3. अमीनो एसिड
4. प्रोटीन

Correct Option: A

Gene located at the same locus but having different expression are

1. Multiple alleles
2. Oncogenes
3. Polygenes
4. Codominants

जीन एक ही लोकस पर स्थित है लेकिन अलग अभिव्यक्ति होने कर रहे है

1. कई एलील्स
2. ओन्कोजीन
3. पॉलीजीन
4. कोडोमिनेंट्स

Correct Option: A

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MULTIPLE ALLELES – BLOOD TYPING

- Blood typing alleles:
  - I^A and I^B both are codominant
  - The third allele, i is recessive
- Blood typing genotypes and phenotypes
  - ii yields type O
  - I^AI^B yields type AB
  - I^AI^A or I^Ai yields type A
  - I^BI^B or I^Bi yields type B

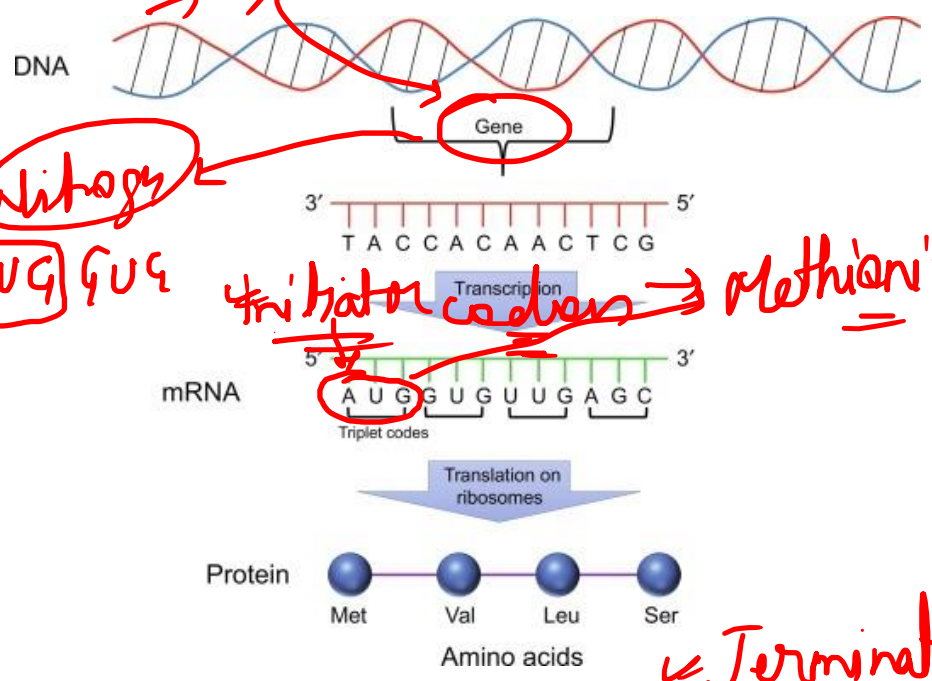
Blood Type	Genotype		Can Receive Blood From:
A	i^Ai i^Ai^A	AA AO	A or O
B	i^Bi i^Bi^B	BB BO	B or O
AB	i^Ai^B	AB	A, B, AB, O
O	ii	OO	O

Experimental evidence to show that the genetic code is a triplet code was provided by

1. George Gamow
2. Watson & Crick
3. Nirenberg and Mathaei
4. None of these

प्रायोगिक सबूत दिखाने के लिए कि आनुवंशिक कोड एक ट्रिपल कोड है द्वारा प्रदान की गई थी

1. जॉर्ज गमो
2. वाटसन और क्रिक
3. निरेनबर्ग और मैथाई
4. इनमें से कोई नहीं



Correct Option: C

Daughter born to haemophiliac father and normal mother could be

1. Normal
2. Carrier
3. Haemophiliac
4. All of these

हीमोफीलिया पिता और सामान्य मां से पैदा हुई बेटी हो सकती है

1. सामान्य
2. रोग संवाहक
3. हीमोफीलियाइन
4. सभी

Correct Option: B

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X-linked

Haemophilia Father

Haemophilia

X^HY × माता

XX

X^HX → carrier संवाहक

X^HX^H → Haemophilic

XY → पुत्र

पुत्रों के Punnett square

	X	X^H	Y
X		X^HX	XY
X		X^HX	XY

3

पुत्रों पुत्री

2

Carrier → 2

Monohybrid ratio of Mendal's cross is / मेंडल के क्रॉस का मोनोहाइब्रिड अनुपात है

1. 9 : 3 : 3 : 1
2. 3 : 1
3. 1: 1
4. 2 : 1

Correct Option: B

TT × tt

Tt × Tt

genotype → 1 : 2 : 1

Homozygous → TT

Heterozygous → Tt

Monohybrid → TT

dihybrid → TTWW

	T	t
T	TT	Tt
t	Tt	tt

Mendel's law apply only when

1. Characters are linked
2. Parents are pure breeding
3. F1 monohybrid ratio shows two type of individuals
4. First pair of contrasting characters is dependent upon other pairs

TT tt

Pure breed

मेंडेल का कानून तभी लागू होता है

1. जब वर्ण जुड़े हुए हैं
2. माता-पिता शुद्ध ब्रीडिंग हैं
3. मोनोहाइब्रिड अनुपात दो प्रकार के व्यक्तियों को दिखाता है
4. विषम पात्रों की पहली जोड़ी अन्य जोड़ों पर निर्भर है

Correct Option: B

Nucleic acid → Nucleotide + Nucleoside

Nucleic acid occur in

1. Viruses
2. Bacteria
3. Mammal
4. All form life

न्यूक्लिक एसिड में होते हैं

1. वायरस
2. बैक्टीरिया
3. स्तनपायी प्राणी
4. सभी फार्म का जीवन

Correct Option: D

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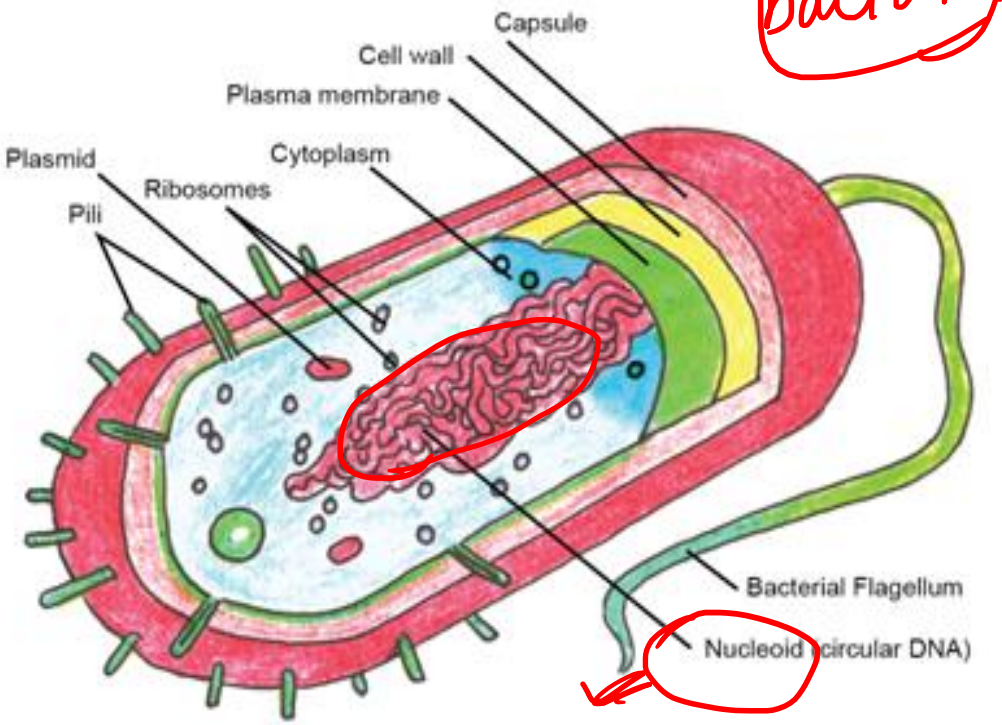
Human → mammal

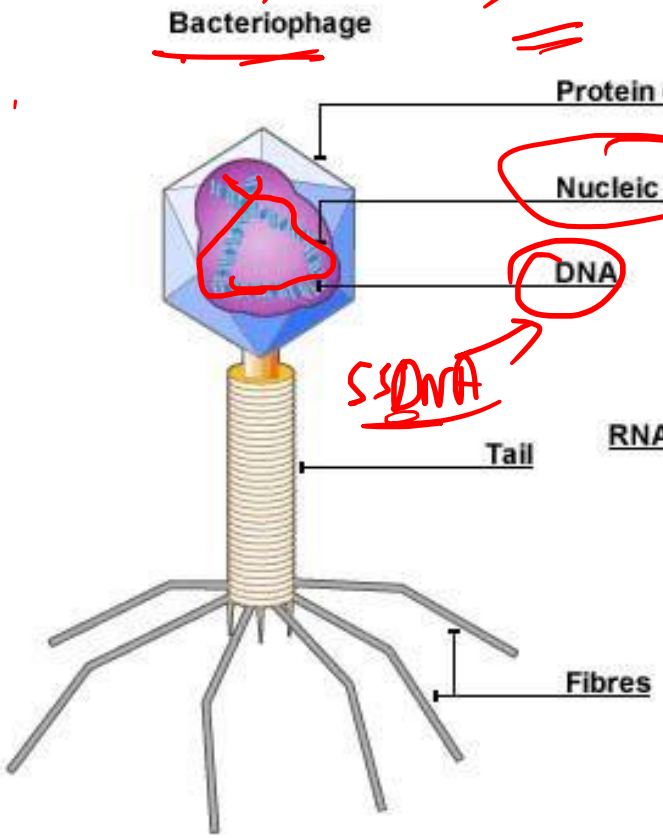
bacteria



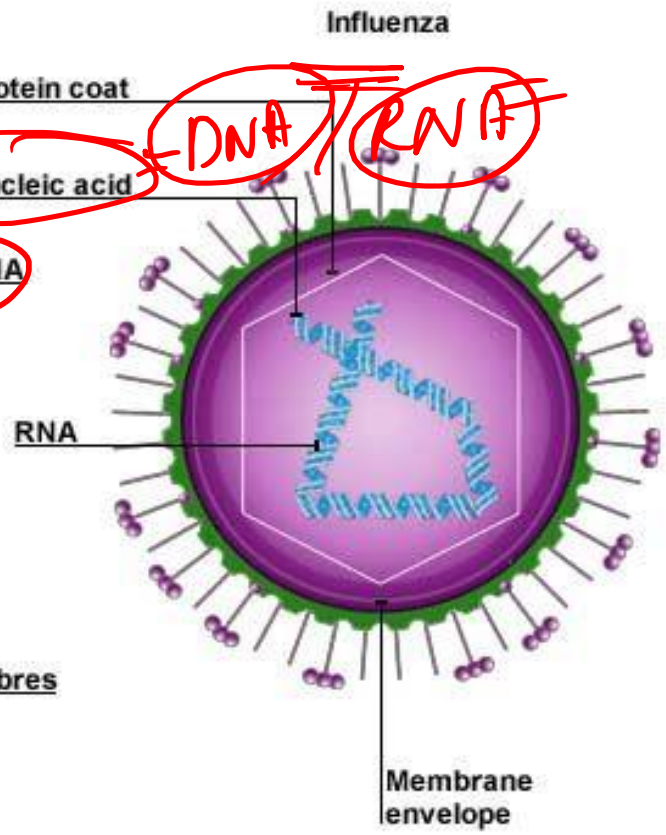
circular DNA

virus

TMV



SSDNA



Mendel's law were rediscovered by

1. Correns
2. Tshermak
3. Devaries
4. All of these

मेंडेल के कानून को फिर से खोजा गया

1. कोरेन्स
2. तेजर्मक
3. देवरी
4. सभी

Correct Option: D

Three Botanists – Hugo DeVries, Carl Correns, and Erich von Tschermak – Independently Rediscovered Mendel's Work* in 1900

[*from the Proceedings of the Natural History Society of Brünn in 1866]

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Nucleosome contains

1. Only histones
2. Both DNA and histones
3. Only DNA
4. Both DNA and RNA

न्यूक्लियोसोम में होता है
1. केवल हिस्टन
2. डीएनए और हस्टन दोनों
3. केवल डीएनए
4. डीएनए और आरएनए दोनों

Correct Option: B

Nucleic acid

DNA

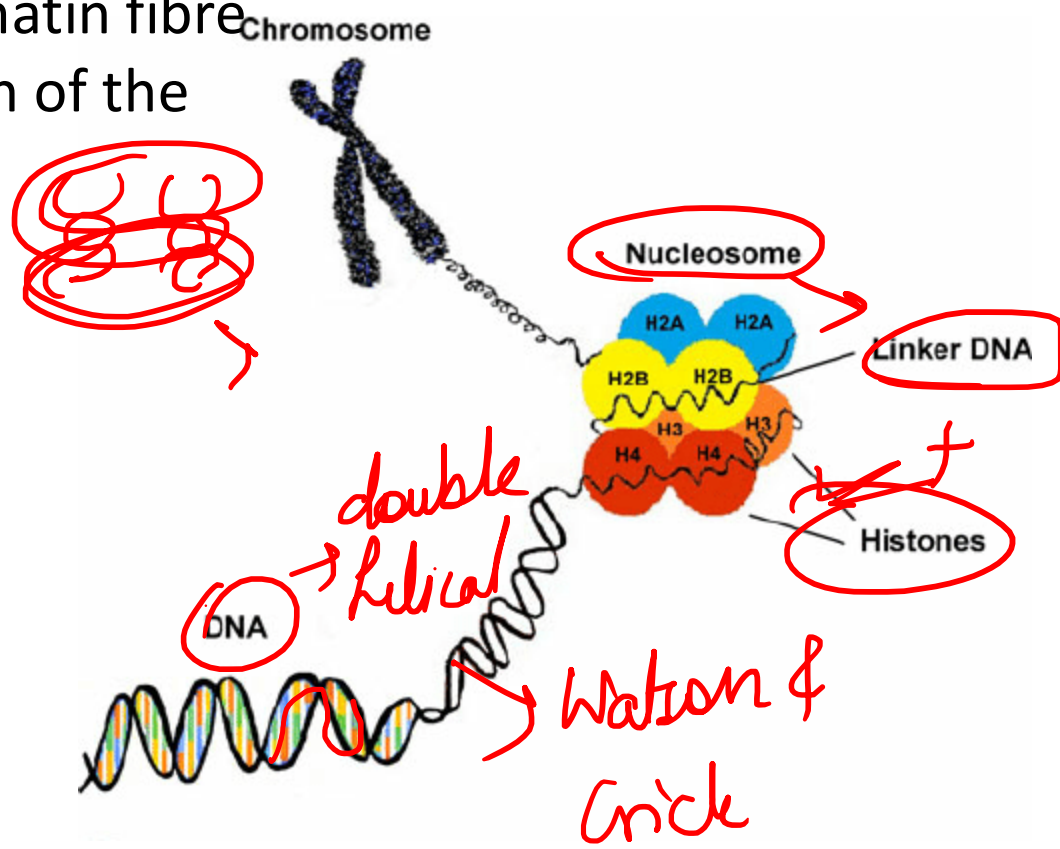
Histone → Protein

- The structure of a nucleosome consists of a segment of DNA wound around eight histone proteins and resembles thread wrapped around a spool.
- The nucleosome is the fundamental subunit of chromatin fibre
- Each histone octamer is composed of two copies each of the histone proteins H2A, H2B, H3, and H4.

Chromosome → Nucleus

35-1

Histone protein = DNA



In humans, height shows a lot of variation. It is an example of

1. Multiple allles
2. Pleiotropic inheritance
3. Polygenic Inheritance
4. Pseudoalleles

blood group

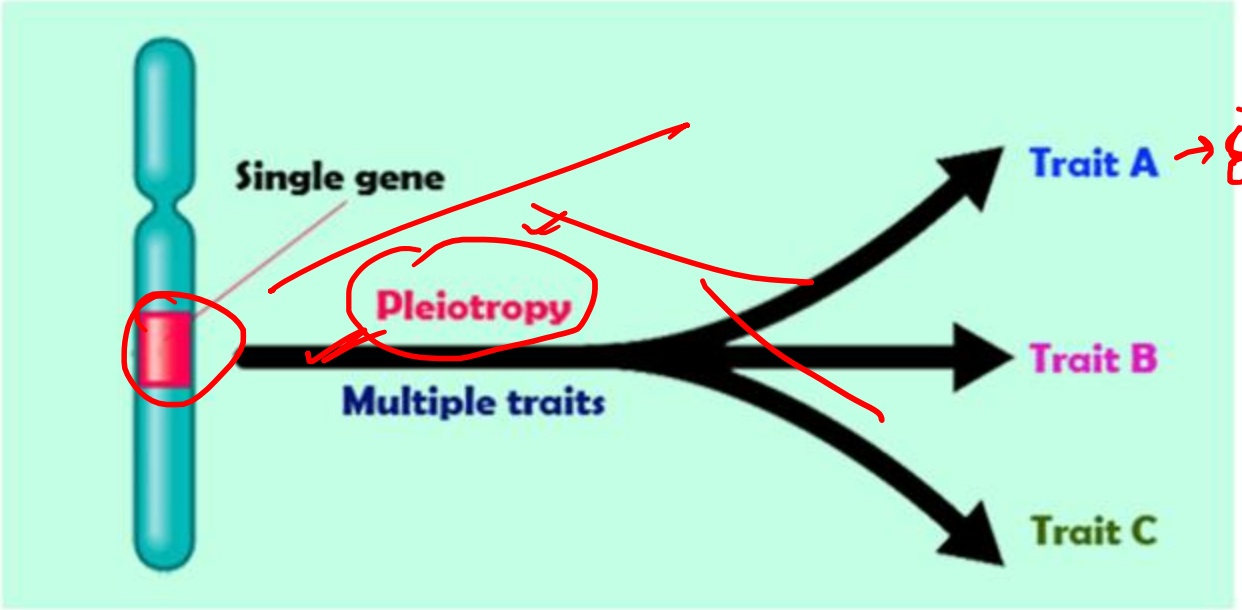
A B AB O

4 gene

मनुष्यों में, ऊंचाई बहुत भिन्नता दिखाती है। यह एक उदाहरण है

1. कई एलील्स
2. प्लियोट्रॉपिक विरासत
3. पॉलीजेनिक विरासत
4. छद्म एलील्स

Correct Option: C



1 chain multiple effect

Polygeny

Milk → सफेद → Gene

→ पीले → Gene

Trait A → हार्ट → ज्यादा → Gene

→ कम → Gene

→ सामान्य → Gene

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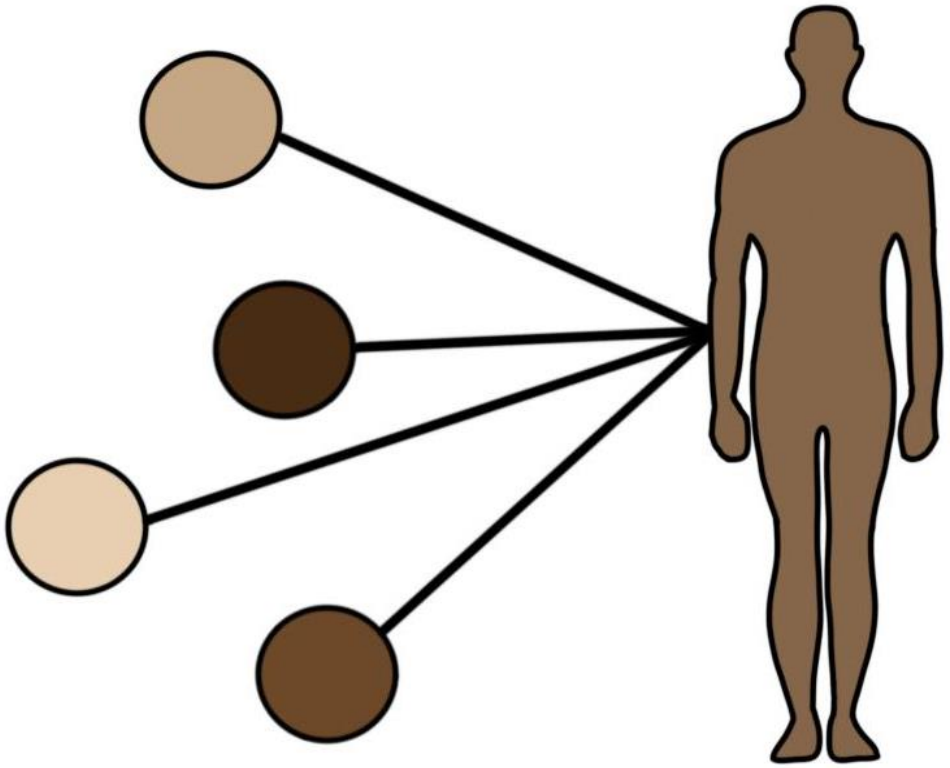
Polygenic traits are controlled by more than 1 gene.

Instead, several genes contribute to the final phenotype of a given trait.



Many genes contribute to skin color.

लेकिन एक जीन अलग

Pseudoalleles → Drosophila

- Pseudoalleles are the closely linked and functionally related genes.
- A cluster of pseudoalleles -"pseudoallelic series“ a complex locus", or an "allelic region"
- Pseudoalleles are believed to result from mutations which are allelic (similar or related) in a functional sense, but not in a structural sense.

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The process of transfer of genetic information from DNA to RNA of formation of RNA from DNA is

1. Transversion
2. Transcription
3. Translatoin
4. Translocation

DNA ← DNA → mRNA → Protein
Replication Transcription Translation

डीएनए से आरएनए के गठन के आरएनए के लिए आनुवांशिक जानकारी के हस्तांतरण की प्रक्रिया

1. ट्रांसवर्स
2. ट्रांसक्रिप्शन
3. ट्रांसलेशन
4. ट्रांस लोकेशन

Correct Option: B

Understandings

Introduction to molecular biology of the cell

DNA → mRNA → protein

The Central Dogma of Molecular Biology

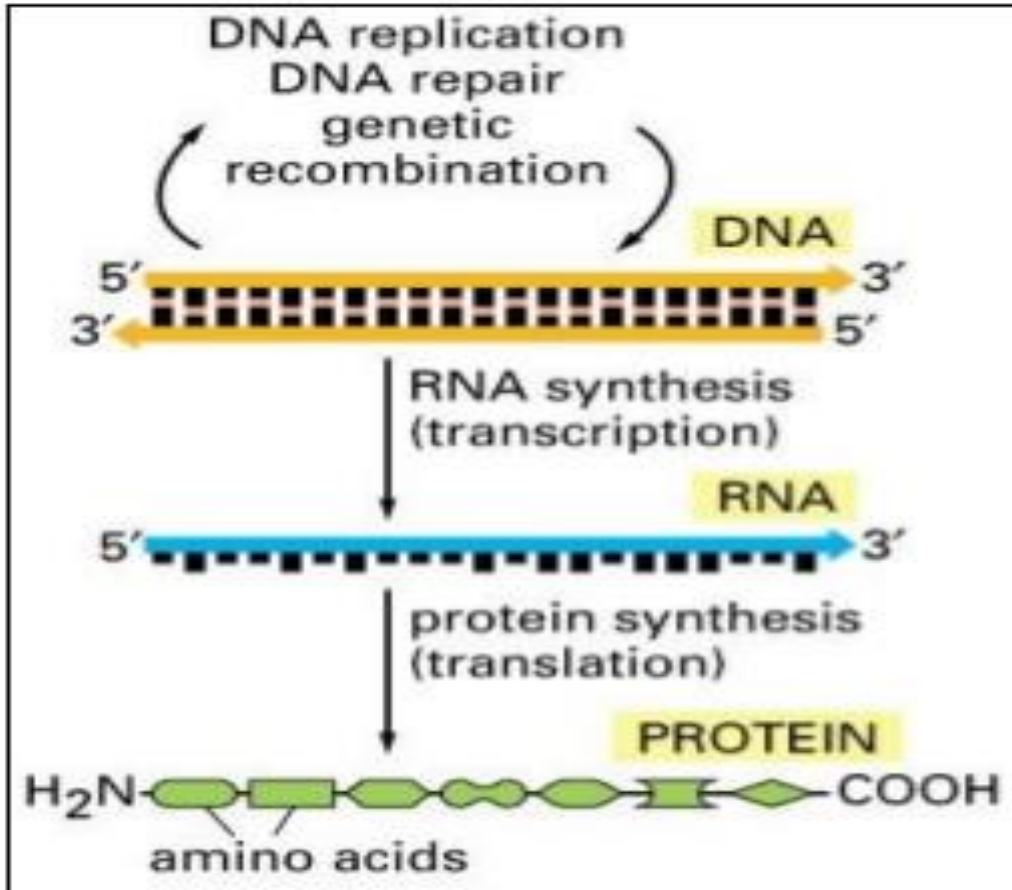

Figure 6–2. Molecular Biology of the Cell, 4th Edition.

DNA Replication

Synthesis of DNA
One DNA double helix …
…two DNA double helices

Transcription

Synthesis of mRNA
A region of DNA is used to…
…produce one mRNA

Translation

Synthesis of protein
One mRNA is used to…
…produce one protein

Gene are made up of

1. DNA
2. RNA
3. DNA & RNA
4. Protein

जीन से बने हैं

1. डीएनए
2. आरएनए
3. डीएनए और आरएनए
4. प्रोटीन

Correct Option: A

Number of chromosome in a normal human body cell is / एक सामान्य मानव शरीर कोशिका में गुणसूत्र की संख्या होती है

1. 43
2. 44
3. 45
4. 46

Correct Option: D

Find out the mismatched

1. Klinefelter's syndrome - XO
2. Haemophilia - Sex linked
3. Down's syndrome - Autosomal aneuploidy
4. Turner's syndrome - female with retarted sexual development.

बेमेल का पता लगाएं

1. क्लाइनफेल्टर सिंड्रोम - एक्सओ
2. हीमोफिलिया - सेक्स जुड़ा हुआ
3. डाउन सिंड्रोम - ऑटोसोमल एन्युप्लोइड
4. टर्नर सिंड्रोम - महिला कम यौन विकास के साथ है।

Correct Option: A

Assertion (A) : Insect resistance transgenic cotton has been produced by inserting Bt gene.
Reason (R) : The Bt gene is derived from a bacterium.
Code
1. Both A and R are true and R is the Correct explanation of A.
2. Both A and R are true but R is not the correct explanation of A.
3. A is true but R is false.
4. A is false but R is true

अभिकथन (ए): बीटी जीन डालकर कीट प्रतिरोध ट्रांसजेनिक कपास का उत्पादन किया गया है।
कारण (R): बीटी जीन एक जीवाणु से प्राप्त होता है।
कोड
1. A और R दोनों सत्य हैं और R, A की सही व्याख्या है।
2. A और R दोनों सत्य हैं लेकिन R, A की सही व्याख्या नहीं है।
3. A सत्य है लेकिन R असत्य है।
4. A गलत है लेकिन R सत्य है।

Correct Option: B

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