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S Strain (S菌株): A strain of bacteria with a smooth (S) appearance due to a polysaccharide capsule, often virulent and pathogenic.
因多糖荚膜而具有光滑外观的细菌菌株，通常具有致病性.

Virulent (毒性): The ability of a microorganism to cause disease or harm to its host.
微生物对宿主引发疾病或损害的能力.

Bacteriophages (噬菌体): Viruses that infect and replicate within bacteria.
感染并在细菌中复制的病毒.

DNA - Phosphorus (DNA中的磷): DNA contains phosphorus as part of its phosphate backbone, which forms the structural framework of the molecule.
DNA含有磷，是其磷酸骨架的一部分，构成分子的结构框架.

Protein - Sulfur (蛋白质中的硫): Proteins contain sulfur in amino acids like cysteine and methionine, essential for their structure and function.
蛋白质中含有硫，存在于半胱氨酸和蛋氨酸等氨基酸中，是其结构和功能的重要组成部分.

Chargaff's Rules (查加夫法则): Rules stating that in DNA, the amount of adenine equals thymine, and the amount of guanine equals cytosine.
DNA中腺嘌呤的含量等于胸腺嘧啶，鸟嘌呤的含量等于胞嘧啶的规则.

Rosalind Franklin (罗莎琳·富兰克林): A scientist who used X-ray diffraction to discover the helical structure of DNA.
利用X射线衍射发现DNA螺旋结构的科学家.

Watson and Crick (沃森和克里克): The scientists who proposed the double helix model of DNA structure.
提出DNA双螺旋结构模型的科学家.

Antiparallel (反向平行): The orientation of the two strands of DNA running in opposite directions.
DNA双链的方向相反.

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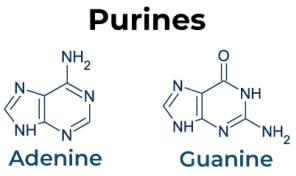
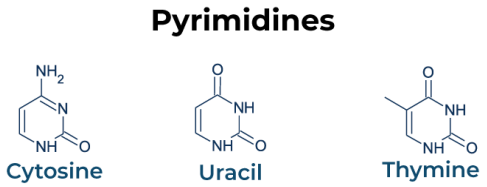
Purine Bases (嘌呤碱基): Adenine (A) and guanine (G), nitrogenous bases with a two-ring structure in DNA and RNA.

腺嘌呤（A）和鸟嘌呤（G），DNA和RNA中具有双环结构的含氮碱基.



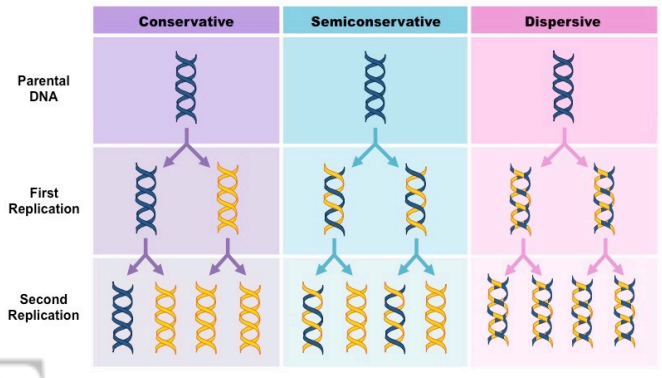
Pyrimidine Bases (嘧啶碱基): Thymine (T), cytosine (C), and uracil (U), nitrogenous bases with a single-ring structure.

胸腺嘧啶（T）、胞嘧啶（C）和尿嘧啶（U），具有单环结构的含氮碱基.



Semiconservative Model (半保留模型): The method of DNA replication where each new DNA molecule has one original strand and one new strand.

DNA复制的方法，每个新DNA分子含有一条原链和一条新链.

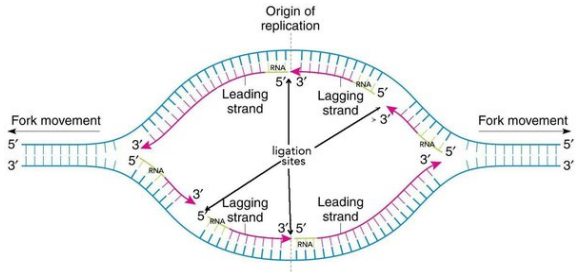


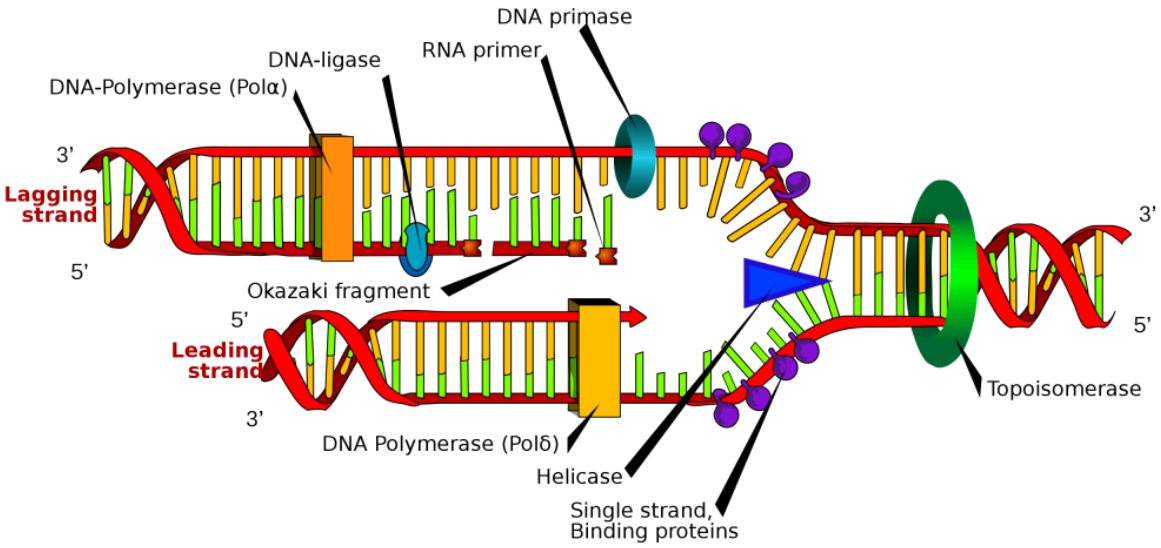
Origins of Replication (复制起点): Specific sequences in the DNA where replication begins.

DNA中复制开始的特定序列.

Replication Bubble (复制气泡): The region of DNA unwinding during replication, forming a "bubble" shape.

在复制过程中DNA解开的区域，形成“气泡”形状.





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Replication Fork (复制叉): The Y-shaped structure formed during DNA replication where the DNA is unwound.
DNA复制过程中形成的Y形结构，DNA在此处解开.

Single-Strand Binding Proteins (单链结合蛋白): Proteins that bind to single-stranded DNA to prevent reannealing during replication.
结合到单链DNA以防止其重新退火的蛋白质.

Topoisomerase (拓扑异构酶): An enzyme that prevents supercoiling in DNA during replication by cutting and rejoining strands.
通过切割和重新连接DNA链以防止复制过程中DNA超螺旋的酶.

Helicase (解旋酶): An enzyme that unwinds the DNA double helix during replication.
在复制过程中解开DNA双螺旋的酶.

RNA Primer (RNA引物): A short RNA sequence that provides a starting point for DNA synthesis.
为DNA合成提供起始点的短RNA序列.

DNA Polymerase I (DNA聚合酶I): An enzyme that replaces RNA primers with DNA nucleotides during replication.
在复制过程中用DNA核苷酸替换RNA引物的酶.

DNA Polymerase III (DNA聚合酶III): The main enzyme that synthesizes new DNA strands in prokaryotes.
在原核生物中合成新DNA链的主要酶.

Leading Strand (前导链): The DNA strand synthesized continuously in the 5’ 3′ direction during replication.
在复制过程中以5′→3′方向连续合成的DNA链.

Lagging Strand (滞后链): The DNA strand synthesized discontinuously in short fragments during replication.
在复制过程中以短片段不连续合成的DNA链.

Okazaki Fragment (冈崎片段): Short DNA fragments synthesized on the lagging strand during replication.
在复制过程中滞后链上合成的短DNA片段.

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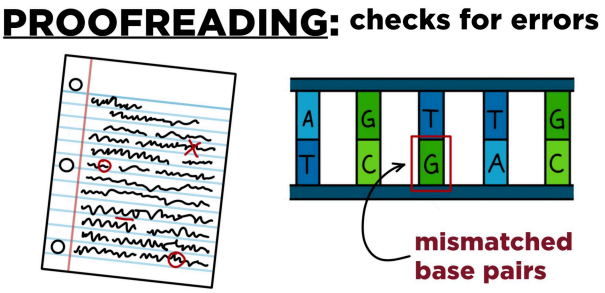
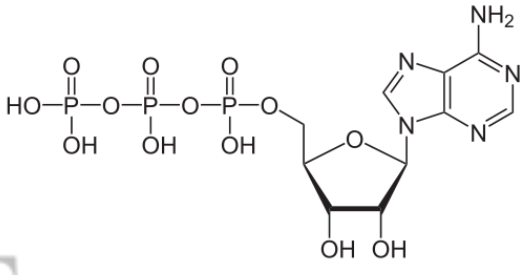
DNA Ligase (DNA连接酶): An enzyme that joins Okazaki fragments on the lagging strand.
连接滞后链上冈崎片段的酶.

Telomere (端粒): Protective caps at the ends of chromosomes that prevent degradation.
染色体末端的保护帽，防止降解.

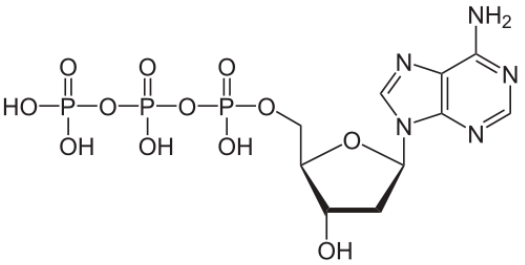


Proofreading (校对): The process by which DNA polymerase checks and corrects errors during replication.
DNA聚合酶在复制过程中检查和纠正错误的过程.

dATP (脱氧腺苷三磷酸): A deoxyribonucleotide used as a building block for DNA synthesis, containing adenine.
用于DNA合成的脱氧核苷酸，含有腺嘌呤.

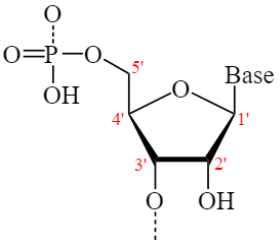


dTTP (脱氧胸苷三磷酸): A deoxyribonucleotide used as a building block for DNA synthesis, containing thymine.
用于DNA合成的脱氧核苷酸，含有胸腺嘧啶.



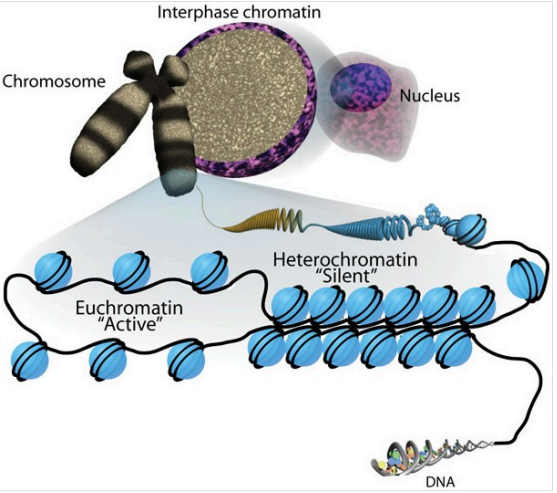
dGTP (脱氧鸟苷三磷酸): A deoxyribonucleotide used as a building block for DNA synthesis, containing guanine.
用于DNA合成的脱氧核苷酸，含有鸟嘌呤.

dCTP (脱氧胞苷三磷酸): A deoxyribonucleotide used as a building block for DNA synthesis, containing cytosine.
用于DNA合成的脱氧核苷酸，含有胞嘧啶.



Euchromatin (常染色质): Loosely packed chromatin that is transcriptionally active.
结构松散且具有转录活性的染色质.

Heterochromatin (异染色质): Tightly packed chromatin that is transcriptionally inactive.
结构紧密且无转录活性的染色质.



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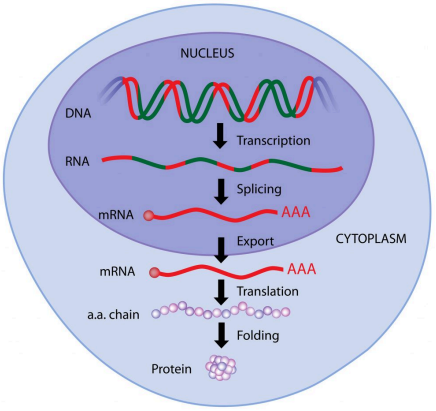
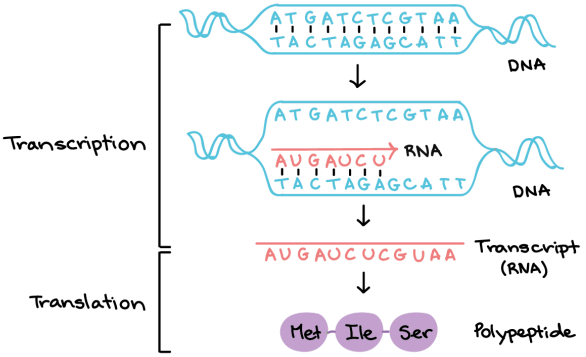
Gene Expression (基因表达): The process by which genetic information is used to produce proteins.
通过遗传信息生成蛋白质的过程.



Protein Synthesis (蛋白质合成): The creation of proteins based on genetic instructions.
根据遗传指令生成蛋白质的过程.

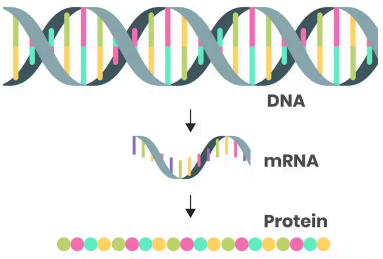
Transcription (转录): The process of copying a gene's DNA sequence into an RNA molecule.
将基因的DNA序列复制为RNA分子的过程.



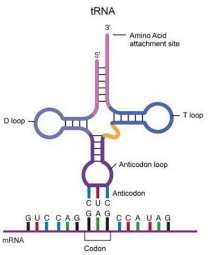
Translation (翻译): The process where the genetic code in mRNA is used to assemble proteins at the ribosome.
在核糖体上使用mRNA中的遗传密码组装蛋白质的过程.

Neurospora (红曲霉): A type of fungus used as a model organism in genetic research.
一种用于遗传研究的模式生物真菌.

mRNA (信使RNA): Messenger RNA that carries genetic information from DNA to the ribosome for protein synthesis.
从DNA携带遗传信息到核糖体进行蛋白质合成的信使RNA.

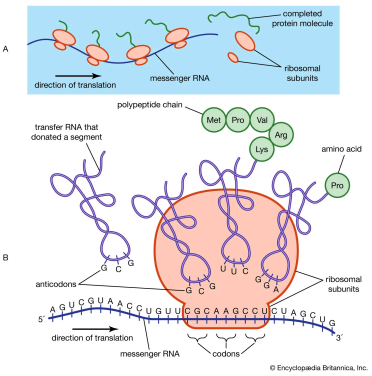


tRNA (转运RNA): Transfer RNA that brings amino acids to the ribosome during protein synthesis.
在蛋白质合成过程中将氨基酸带到核糖体的转运RNA.



rRNA (核糖体RNA): Ribosomal RNA, a structural and functional component of the ribosome.
核糖体的结构和功能成分——核糖体RNA.

Primary Transcript (初级转录本): The initial RNA transcript synthesized from a DNA template.
从DNA模板合成的初始RNA转录本.



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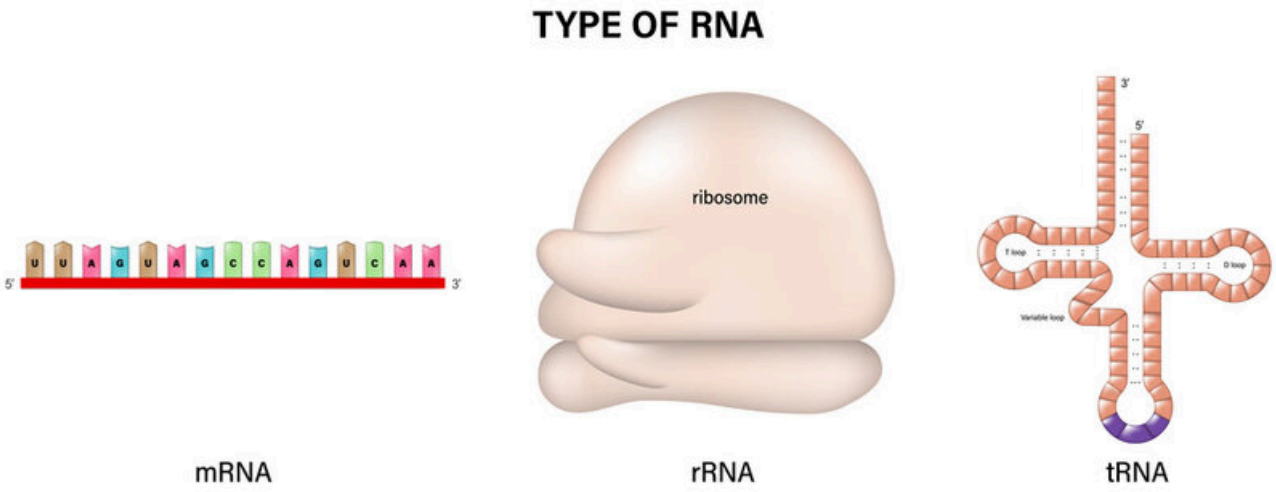


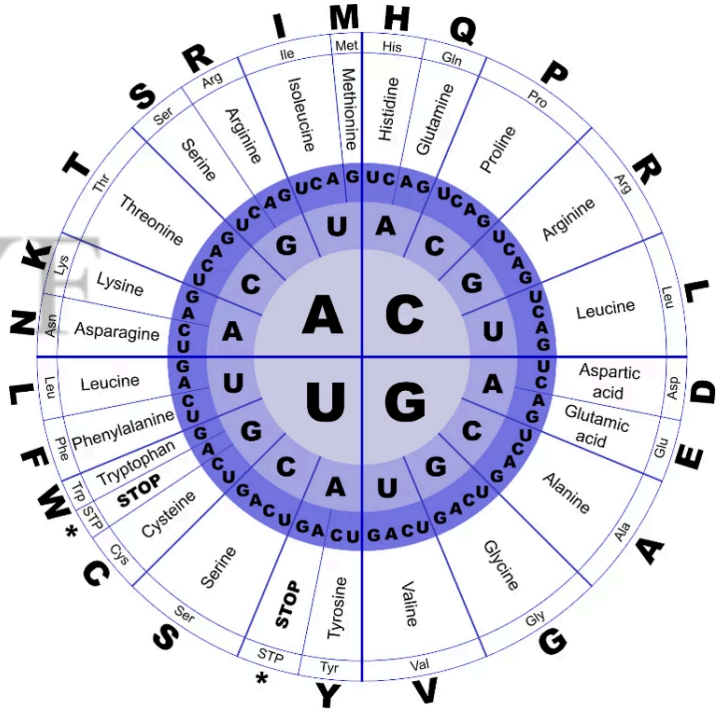
Central Dogma (中心法则): The principle that genetic information flows from DNA to RNA to protein.
遗传信息从DNA到RNA再到蛋白质的原则.

Genetic Code (遗传密码): The set of rules by which nucleotide sequences in RNA are translated into amino acids.
将RNA中的核苷酸序列翻译为氨基酸的规则集合.

Triplet Code (三联密码): A three-nucleotide sequence in mRNA that specifies an amino acid.
mRNA中指定氨基酸的三核苷酸序列.

Template Strand (模板链): The DNA strand that serves as a template for RNA synthesis.
作为RNA合成模板的DNA链.

Codons (密码子): Three-nucleotide sequences in mRNA that correspond to specific amino acids.
mRNA中对应特定氨基酸的三核苷酸序列.



Second letter

First letter	U	C	A	G	Third letter
U	UUU, UUC Phe; UUA, UUG Leu	UCU, UCC, UCA, UCG Ser	UAU, UAC Tyr; UAA Stop; UAG Stop	UGU, UGC Cys; UGA Stop; UGG Trp	U C A G
C	CUU, CUC, CUA, CUG Leu	CCU, CCC, CCA, CCG Pro	CAU, CAC His; CAA, CAG Gln	CGU, CGC, CGA, CGG Arg	U C A G
A	AUU, AUC, AUA Ile; AUG Met	ACU, ACC, ACA, ACG Thr	AAU, AAC Asn; AAA, AAG Lys	AGU, AGC Ser; AGA, AGG Arg	U C A G
G	GUU, GUC, GUA, GUG Val	GCU, GCC, GCA, GCG Ala	GAU, GAC Asp; GAA, GAG Glu	GGU, GGC, GGA, GGG Gly	U C A G

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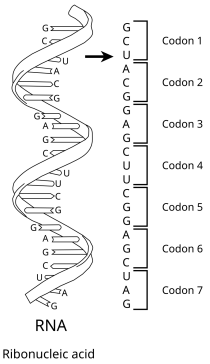
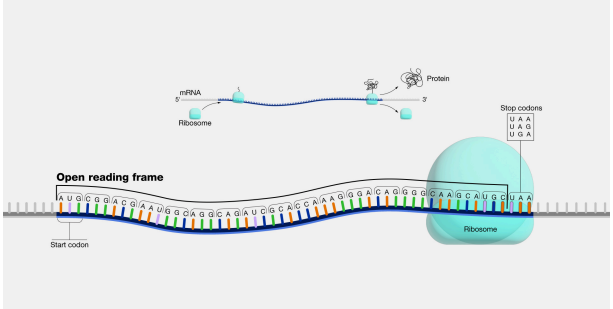
Anticodons (反密码子): Three-nucleotide sequences in tRNA complementary to codons in mRNA.
tRNA中与mRNA密码子互补的三核苷酸序列.



Coding Strand (编码链): The DNA strand whose sequence matches the RNA transcript (except T is replaced with U).
序列与RNA转录本匹配（除了T被U替换）的DNA链.

Reading Frame (阅读框架): The way nucleotides in mRNA are grouped into codons during translation.
mRNA中核苷酸在翻译过程中分组为密码子的方式.



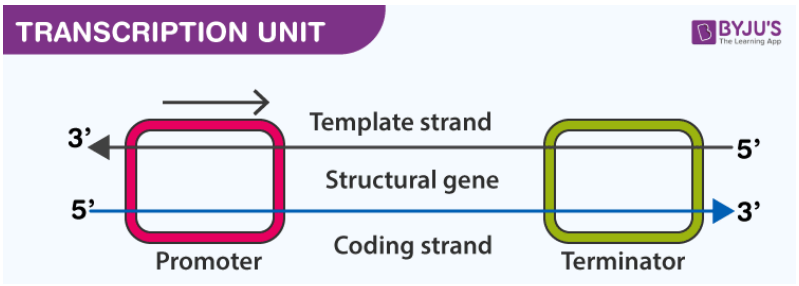
RNA Polymerase (RNA聚合酶): The enzyme that synthesizes RNA from a DNA template during transcription.
在转录过程中从DNA模板合成RNA的酶.

Pre-mRNA Transcript (前信使RNA转录本): The unprocessed RNA transcript that includes both introns and exons.
包括内含子和外显子的未加工RNA转录本.

Promoter (启动子): A DNA sequence where RNA polymerase binds to initiate transcription.
RNA聚合酶结合以启动转录的DNA序列.

Terminator (终止子): A DNA sequence that signals the end of transcription.
指示转录结束的DNA序列.

Transcription Unit (转录单位): A segment of DNA transcribed into RNA, including a promoter, coding sequence, and terminator.
转录为RNA的DNA片段，包括启动子、编码序列和终止子.



Initiation (起始): The first step in transcription or translation where the machinery assembles and starts the process.
转录或翻译的第一步，机器组装并开始过程.

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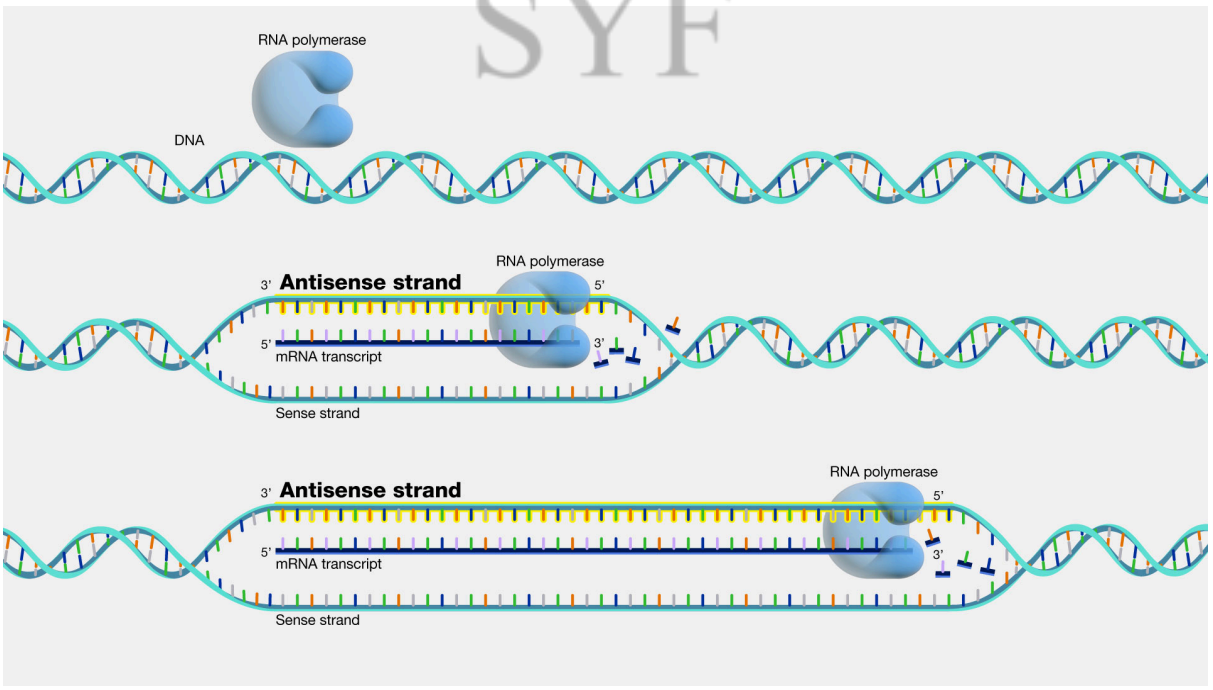
Elongation (延伸): The stage of transcription or translation where the RNA or protein chain is extended.
转录或翻译过程中延伸RNA或蛋白质链的阶段.

Termination (终止): The final step of transcription or translation where the process ends and the product is released.
转录或翻译的最后一步，过程结束并释放产物.

TATA Box (TATA盒): A DNA sequence in promoters crucial for the formation of the transcription initiation complex.
启动子中对转录起始复合体形成至关重要的DNA序列.

Antisense Strand (反义链): The DNA strand that serves as the template for RNA synthesis.
作为RNA合成模板的DNA链.

Sense Strand (正义链): The DNA strand whose sequence matches the RNA transcript.
其序列与RNA转录本匹配的DNA链.



RNA Processing (RNA加工): The modification of pre-mRNA to form mature mRNA, including splicing, capping, and tailing.
将前体mRNA修饰为成熟mRNA的过程，包括剪接、加帽和加尾.

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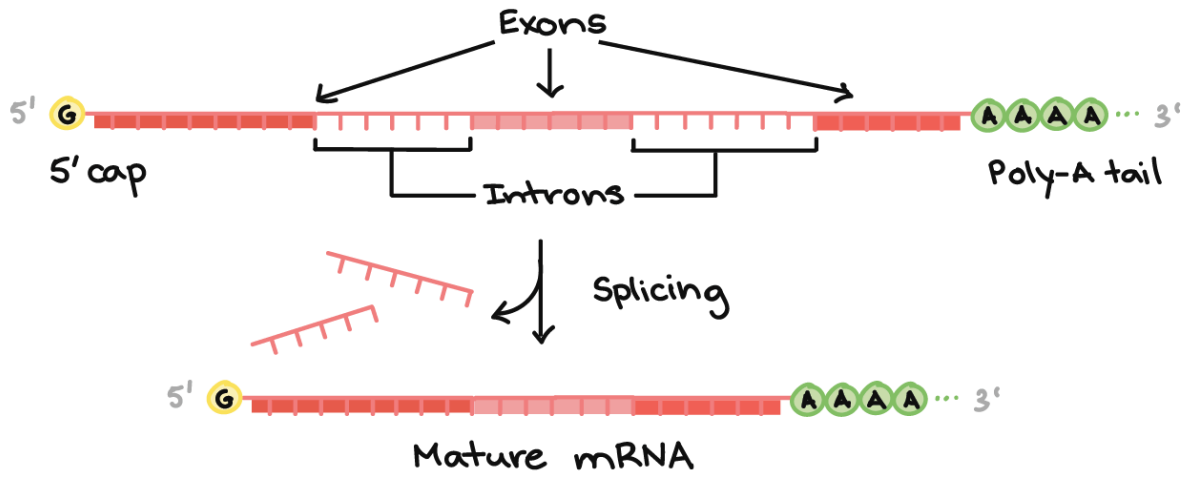

Poly-A Tail (多聚A尾): A stretch of adenine nucleotides added to the 3' end of mRNA for stability and translation.

mRNA 3' 末端加上的一段腺嘌呤核苷酸，提高稳定性和翻译效率.

GTP Cap (GTP帽): A modified guanine nucleotide added to the 5' end of mRNA for protection and translation.

mRNA 5' 末端加上的修饰鸟嘌呤核苷酸，用于保护和翻译.

RNA Splicing (RNA剪接): The removal of introns and joining of exons in pre-mRNA to form mature mRNA.

从前体mRNA中去除内含子并连接外显子以形成成熟mRNA的过程.

Introns (内含子): Non-coding sequences in RNA that are removed during splicing.

在剪接过程中被移除的RNA非编码序列.

Exons (外显子): Coding sequences in RNA that are joined together during splicing.

在剪接过程中连接在一起的RNA编码序列.

Spliceosomes (剪接体): A complex of RNA and protein molecules that removes introns from a transcribed pre-mRNA segment, allowing the remaining exons to be joined together during RNA splicing.

由RNA和蛋白质分子组成的复合体，在RNA剪接过程中去除转录后的前mRNA片段中的内含子，使剩余的外显子连接在一起.

Ribozymes (核糖酶): RNA molecules that have catalytic properties, capable of catalyzing specific biochemical reactions, similar to protein enzymes.

一种具有催化特性的RNA分子，能够催化特定的生化反应，类似于蛋白酶.

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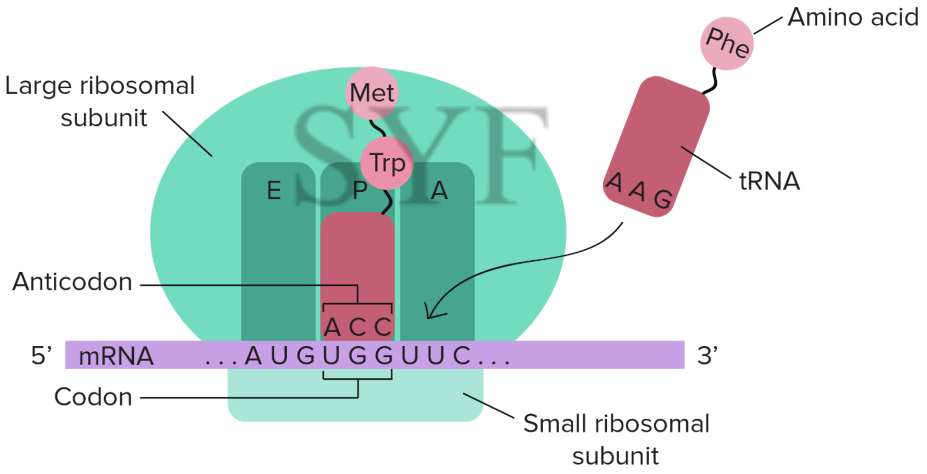
DNA Methylation (DNA甲基化): The addition of a methyl group (CH_3) to the DNA molecule, often at the cytosine base, which can affect gene expression without changing the sequence of the DNA.
向DNA分子中添加甲基基团（CH_3），通常发生在胞嘧啶碱基上，这种变化可以影响基因表达，而不改变DNA的序列.

Aminoacyl-tRNA Synthetase (氨基酰tRNA合成酶): An enzyme that catalyzes the attachment of an amino acid to its corresponding tRNA molecule, which is crucial for protein synthesis.
一种酶，催化氨基酸与相应的tRNA分子结合，这对于蛋白质合成至关重要.

Wobble (摆动): The flexibility in the base pairing between the third codon position in mRNA and the corresponding anticodon in tRNA, allowing some degree of mismatch in protein synthesis.
mRNA中第三个密码子位置与tRNA中相应反密码子之间的碱基配对灵活性，允许在蛋白质合成过程中存在一定的错配.



A Site (A位点): The ribosomal site where the aminoacyl-tRNA binds during translation, bringing in the amino acid to be added to the growing polypeptide chain.
翻译过程中，氨基酰tRNA结合的核糖体位点，将氨基酸带入并加入到正在增长的多肽链中.

P Site (P位点): The ribosomal site where the tRNA holding the growing polypeptide chain is located during translation.
翻译过程中，持有正在增长的多肽链的tRNA所在的核糖体位点.

E Site (E位点): The ribosomal site where tRNA, after releasing its amino acid, exits the ribosome.
翻译过程中，tRNA在释放其氨基酸后从核糖体退出的核糖体位点.

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Insertions (插入突变): Mutations involving the addition of one or more nucleotide bases into the DNA sequence, which can alter gene function.

发生在DNA序列中的一个或多个核苷酸碱基的插入突变，可能会改变基因功能.

Deletions (缺失突变): Mutations where one or more nucleotide bases are removed from the DNA sequence, potentially disrupting gene function.

发生在DNA序列中的一个或多个核苷酸碱基的缺失突变，可能会干扰基因功能.

CRISPR-Cas9 (CRISPR-Cas9基因编辑技术): A revolutionary gene-editing technology that uses a guide RNA and the Cas9 enzyme to cut DNA at specific locations, enabling targeted modifications of genes.

一种革命性的基因编辑技术，通过使用引导RNA和Cas9酶在特定位置切割DNA，实现对基因的定向修改.