

Review 16

Hereditary Factors: Where are they? IN NUCLEUS OF CELL
 What are they? PROTEIN OR NUCLEIC ACID?
 How do they work?
 How do they get passed on?

DNA:

✓2 anti-parallel strands with bases pairing in the middle

✓base pairing rules:

A = T (IN DNA) A = U (IN RNA) G = C (IN BOTH DNA & RNA)

Replication:

DNA double strand opens up

DNA nucleotides align themselves according to the base pairing rules

Enzymes connect nucleotides to form new strands

Using information in DNA to direct the assembly of proteins in the cell:

- Proteins are linear sequences of amino acids (primary structure)
- Information of DNA is found in the linear sequence of bases

e.g.:

--- A - A - C - G - T - T - T - G - G - A - G - T - C - C ---
--- T - T - G - C - A - A - A - C - C - T - C - A - G - G ---

- How to translate a linear sequence of bases into a linear sequence of amino acids?
- ✓Gene is the basic unit of information--a short segment of DNA that contains the information needed to form a protein
- ✓Each protein has a unique primary structure (sequence of AA's)
- ✓Genetic code based on groupings of three adjacent nucleotides (triplets) CODON = 3 adjacent nucleotides of mRNA (or sense strand of DNA) molecule which code for one particular amino acid (see table of genetic code--based on mRNA); includes punctuation (start with UAG = Methionine; stop with UAA, UAG, UGA)

PROBLEM: how to use information, which is a linear sequence of codons in the DNA, to direct formation of protein, which is linear sequence of amino acids

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RNA is intimately involved in making proteins

mRNA

- complementary copy of *anti-sense (template)* strand of DNA
- carries info from DNA into cytoplasm where proteins made
- contains sequence of codons, as specified by the DNA
 - 64 codons; each codon specifies one AA or STOP signal
- made specifically when that particular protein needed in cell

tRNA

- used to “decode” or “translate” the information into proteins
- anti-codon at one end (complementary to mRNA codon)
- specific amino acid at other end--each tRNA carries its own specific amino acid