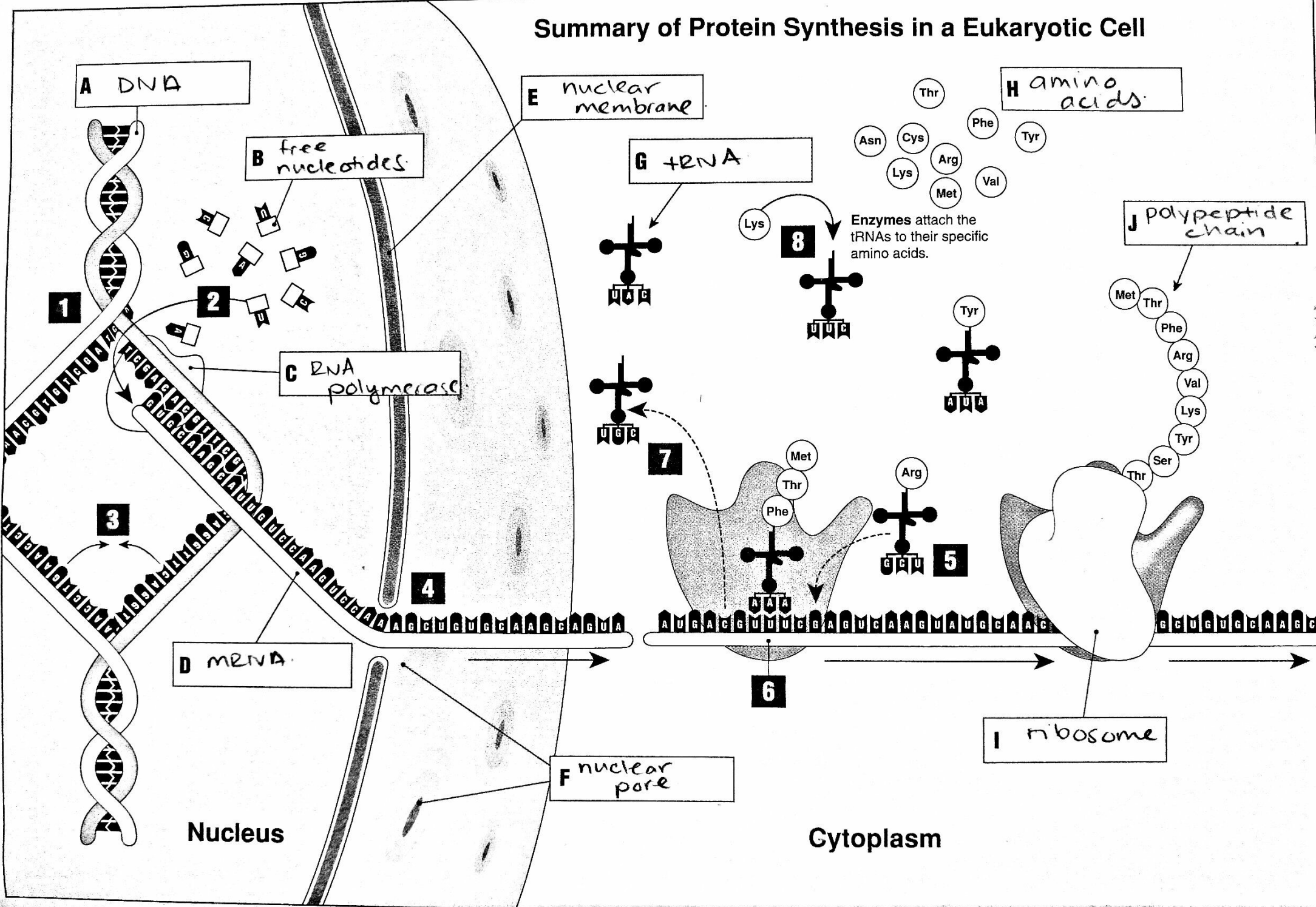


Summary of Protein Synthesis in a Eukaryotic Cell



The diagram opposite shows an overview of the process of protein synthesis. Each of the structures involved is labeled with a letter (A-J), while the major steps in the process are identified with numbers (1-8).

1. Using the word list provided below, identify each of the structures marked with a letter. Write the name of that structure in the spaces provided on the diagram.

~~DNA, nuclear pore, free nucleotides, tRNA, RNA polymerase enzyme, amino acids, mRNA, ribosome, nuclear membrane, polypeptide chain~~

2. Match each of the processes (identified on the diagram with numbers 1-8) to the correct summary of the process provided below. Write the process number next to the appropriate sentence.

- 8 tRNA molecule is recharged with another amino acid of the same type, ready to take part in protein synthesis
- 5 tRNA molecule brings in the correct amino acid to the ribosome
- 1 Unwinding the DNA molecule
- 3 DNA rewinds into double helix structure
- 6 Anti-codon on the tRNA matches with the correct codon on the mRNA and drops off the amino acid
- 7 tRNA leaves the ribosome
- 4 mRNA moves through nuclear pore in nuclear membrane to the cytoplasm
- 2 mRNA synthesis: nucleotides added to the growing strand of messenger RNA molecule

DNA → mRNA → tRNA

3. Explain the purpose of protein synthesis: Produce polypeptides using the instructions contained in DNA.

4. Name the three different types of RNA involved in protein synthesis: mRNA, tRNA, rRNA + (snRNA)

5. Outline three structural or functional differences between RNA and DNA:

- (a) Uracil in RNA / thymine in DNA.
- (b) RNA is single stranded, DNA is double.
- (c) RNA - many diverse functions. DNA's function is storage of genetic info

6. How are nucleic acids attached to tRNA? complementary pairing (anticodon / codon)

7. (a) Name the general process taking place in the nucleus: transcription

(b) Name the general process taking place in the cytoplasm: translation

8. Consult the mRNA-amino acid table earlier in this workbook. Explain the result of a point mutation involving a change to the third base in a nucleotide as follows:

(a) ^{Phe}UUU changes to ^{Phe}UUC: No change to polypeptide. Codon still produces Phe.

(b) ^{Phe}UUU changes to ^{Leu}UUA: Leucine will be incorporated instead of Phe.

(c) Which of these mutations is likely to result in a change to the protein produced? 2nd one