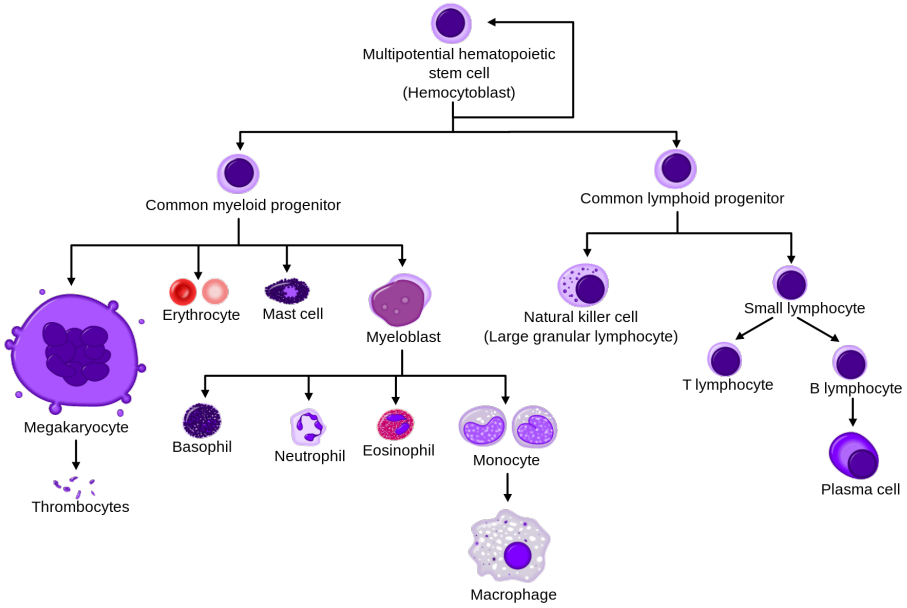
CONCEPT: CONTROL OF GENE EXPRESSION BASICS

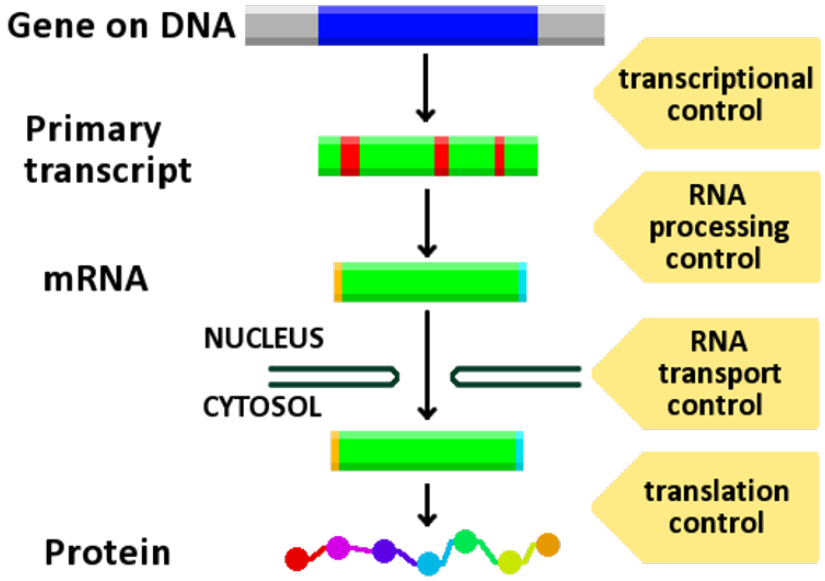
- **Gene expression** is the process through which cells selectively _____ to express some genes and not others
  - □ Every cell in an organism is a **clone** because they all contain an identical copy of DNA
    - Different appearances and function depends on selectively expressing certain genes and not others
  - □ Gene expression controls the expression of proteins and RNAs
  - □ Cell **differentiation** is the process by which a cell becomes _____ for a particular function
    - Differentiation is entirely directed by gene expression control
    - Allows for the development of multicellular organisms with diverse cell types

EXAMPLE: Differentiation of a stem cell into many different blood cell types



- Gene expression can be _____ at various steps in the DNA to RNA to Protein pathways
  - □ Gene expression can be controlled by external signals
    - One example is through hormones
  - □ **Housekeeping genes** are genes expressed in every cell because they are critical for cellular life
    - Examples include: Ribosomal genes, RNA polymerase genes, DNA repair genes

EXAMPLE: The many ways gene expression can be controlled



PRACTICE:

1. Gene expression is defined as which of the following?
    a. Genes are expressed because each cell contains a different set of genes
    b. Choosing which genes are expression by regulating only transcription
    c. Choosing which genes are expression because on only internal signals
    d. Cells choosing to express some genes and not others at many steps in the DNA to protein pathway

2. True or False: Every gene is regulated differently in each cell type.
    a. True
    b. False