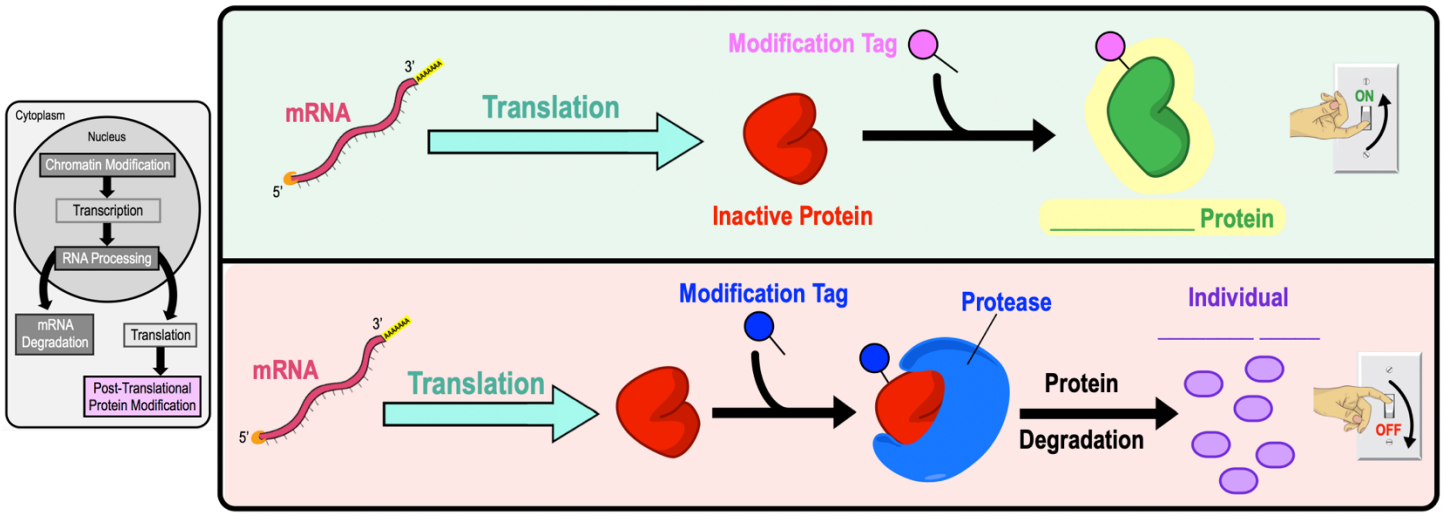
CONCEPT: EUKARYOTIC POST-TRANSLATIONAL REGULATION

- Eukaryotes regulate expression at the post-_____ by controlling activity of the expressed protein.
  - □ *Recall: Post-translational modifications (PTMs)* are covalent modifications to proteins _____ translation.
- *PTMs* can activate/inactivate a protein or "_____" the protein for degradation by **Proteases.**
  - □ _____: enzymes that degrade proteins by breaking *polypeptide bonds* making single amino acids.

EXAMPLE: Protein activity can be controlled by post-translational modifications or degradation by proteases.



PRACTICE: Protein degradation is one strategy to control gene expression and is considered _____.

a) Transcriptional control.
b) Post-transcriptional control.
c) Translation initiation control.
d) Post-translational control.
e) Chromatin remodeling.

PRACTICE: Post-translational modifications of proteins can affect which of the following?

a) Protein function.
b) Protein location within the cell.
c) Protein activation or inactivation.
d) Protein degradation.
e) All of the above.

CONCEPT: EUKARYOTIC POST-TRANSLATIONAL REGULATION

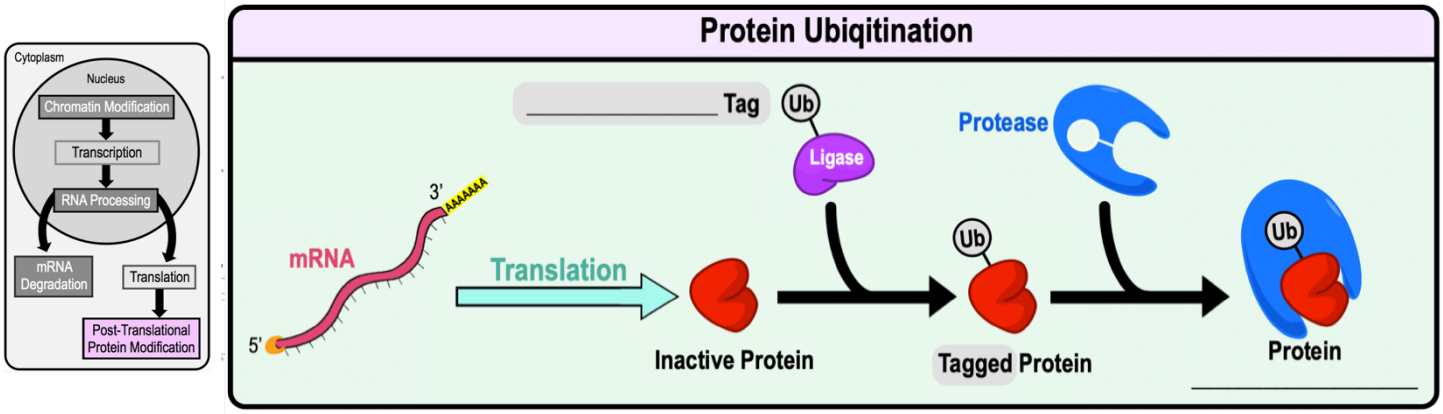
Protein Ubiquitination

●Eukaryotes need a way to _____ which proteins in a cell are no longer needed & can removed.

●Cells utilize PTMs to "tag" specific proteins in a cell to be _____ by cellular *proteases*.

- □ _____: small peptide used by Eukaryotic cells to mark proteins for degradation.
- □ **Ubiquitin** _____: cellular enzyme that adds the *ubiquitin* peptide to the target protein.

EXAMPLE: Ubiquitin ligase adds a ubiquitin peptide to a mis-folded or non-functioning protein.



PRACTICE: A hormone signal reaches a cell and causes the cell to produce a large quantity of Protein X. After some time, the hormone signal disappears and the cell no longer needs a large quantity of Protein X. How will the cell remove the excess protein?

a) The repressor protein for the Protein X gene will stop the transcription of the gene.
b) The excess Protein X will be tagged with ubiquitin proteins and degraded over time.
c) The Protein X mRNA will be bound by a microRNA blocking its translation.
d) Over time the excess Protein X will diffuse out of the cell.