

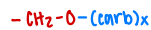
## SI SESSION 14

### 10/27/25

- What is a post-translational modification?  
Any covalent modification of an amino acid after translation into a polypeptide

- Define glycosylation  
When a sugar is added to a protein and increases the specificity of the protein.  
This occurs in the golgi apparatus.

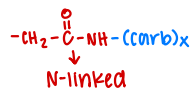
- What amino acids are glycosylated? Added Where?  
1) Serine



#### 2) Threonine



#### 3) Asparagine



- What is a glycosylated atom at the -OH group called?  
O-linked
- What is a glycosylated atom at the -NH<sub>2</sub> group called?  
N-linked

- Which amino acids are N/O linked?

Serine and threonine are O-linked

Asparagine is N-linked

- What are glycoproteins?

Proteins with sugar attached via covalent bond

Proteins that have been glycosylated

- Define phosphorylation

Addition of phosphate group to a protein

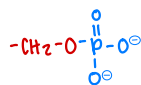
Negative charges change conformation

- What are all of the possible sources of phosphates that were discussed in class?

ATP, GTP, Inorganic phosphate or creatine

- What amino acids can be phosphorylated?

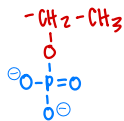
1) Serine



2) Tyrosine



3) Threonine



- What enzymes add phosphates to a protein?

Kinases

- What enzymes remove phosphates from a protein?

Phosphatases

- What is a prosthetic group?

Groups that are added to a protein that are essential for that proteins function

- Define apoprotein

Inactive form of a protein that must bind to its prosthetic group to become active  
Occurs after translation

- Define Holoprotein

Active form of an apoprotein, now has a prosthetic group bound to it

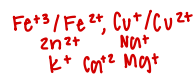
- Define cofactor and coenzyme

Cofactor: generally small, inorganic molecules

Coenzymes: generally organic molecular groups or organic molecules

- What is a metalloprotein? Give some examples

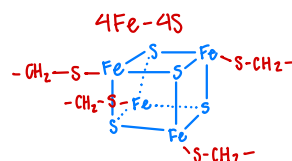
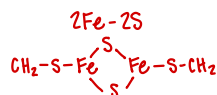
Metal ions bound to proteins



- What are non-heme proteins? Give some examples

Any protein that doesn't have a heme group but still contains Fe (Iron)

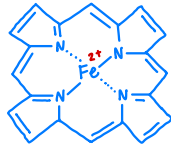
\*Iron-sulfide clusters are common in redox reactions\*



- What amino acid do iron-sulfide clusters interact with? Draw it!

cysteine

- What are hemoproteins? Draw an example!  
A protein containing at least one heme group



- What are the requirements/characteristics of vitamins?
  - 1) Required for metabolism (essential for some metabolic function)
  - 2) Cannot be synthesized from basic components (must be consumed and altered into correct form)
  - 3) Required in small amounts