

Benha University
Faculty of Science
Department of Zoology



PROTEOMICS LECTURE 2

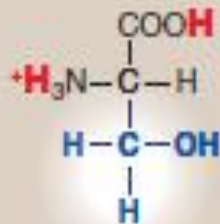
إعداد

د. دعاء صبرى إبراهيم
أستاذ مساعد بقسم علم الحيوان

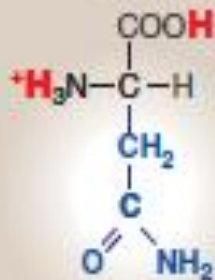
Chemical classification of amino acids

2. Amino acids with uncharged polar side chains:

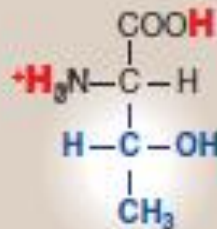
These amino acids have zero net charge at neutral pH



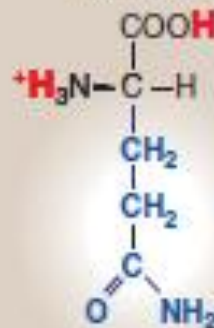
Serine



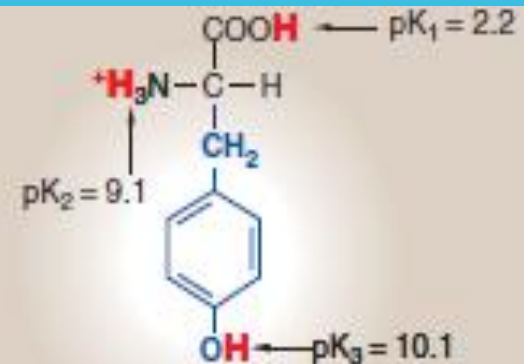
Asparagine



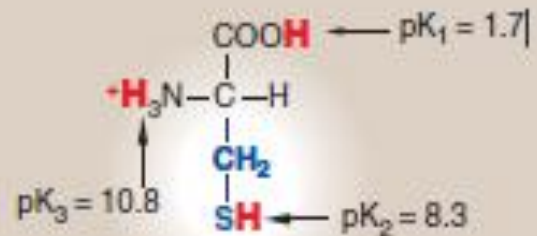
Threonine



Glutamine



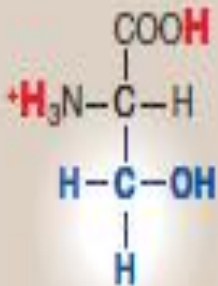
Tyrosine



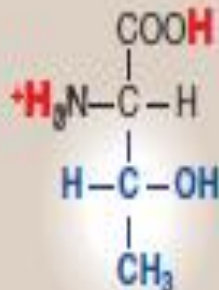
Cysteine

Chemical classification of amino acids

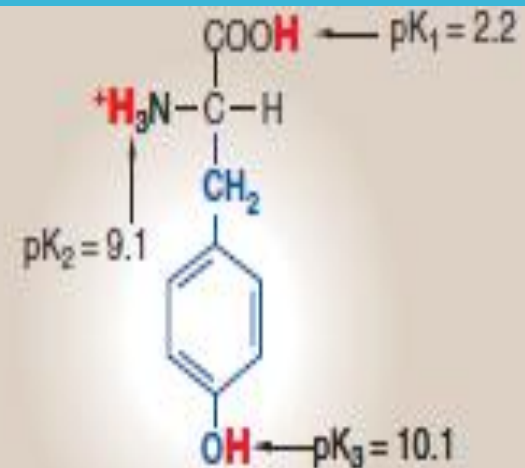
Serine, threonine, and tyrosine each contain a polar hydroxyl group that can participate in hydrogen bond formation.



Serine



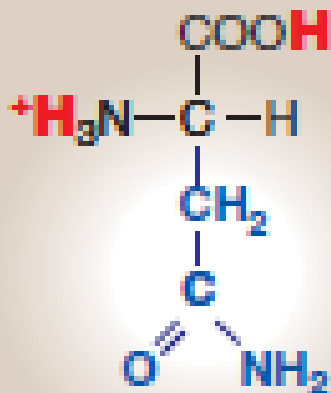
Threonine



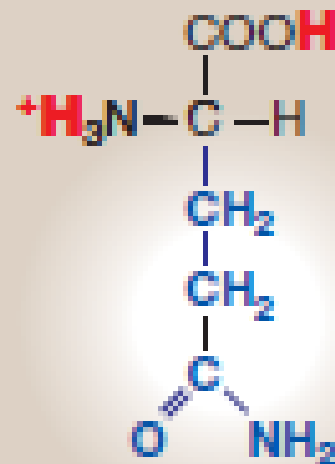
Tyrosine

Chemical classification of amino acids

The side chains of asparagine and glutamine each contain a carbonyl group and an amide, both of which can also participate in hydrogen bonds.



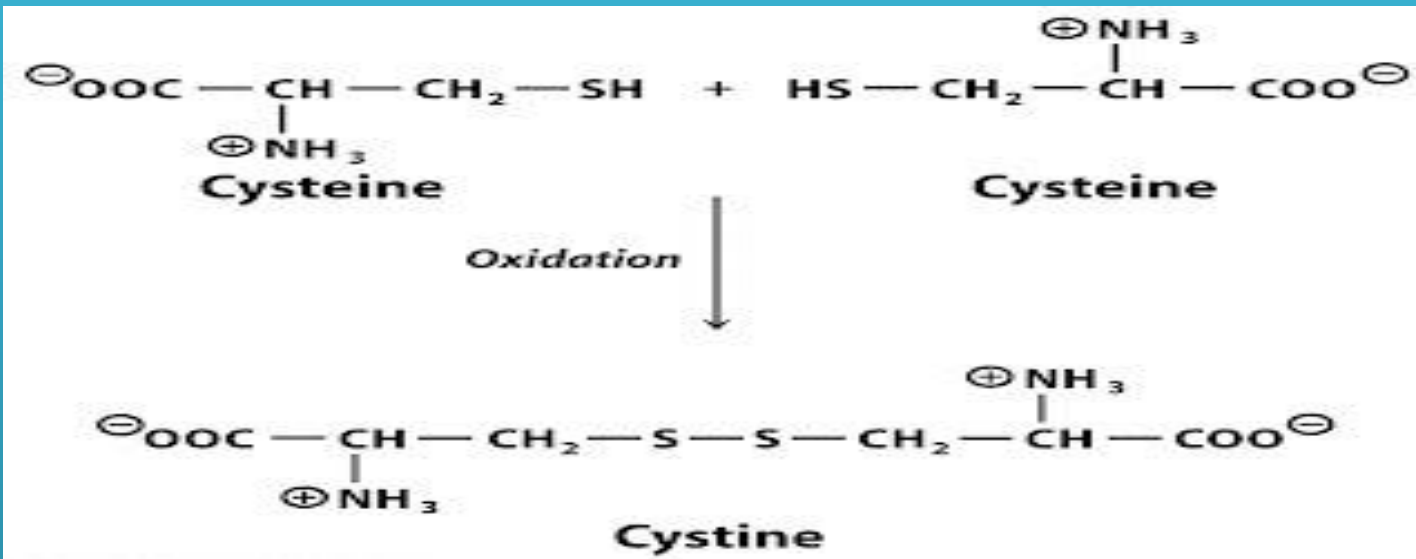
Asparagine



Glutamine

Chemical classification of amino acids

- **Cysteine** contains a sulfhydryl group (–SH), which is an important component of the active site of many enzymes.
- In proteins, the –SH groups of two cysteines can become oxidized to form cystine (disulfide bond).



Chemical classification of amino acids

Side chains as sites of attachment for other compounds:

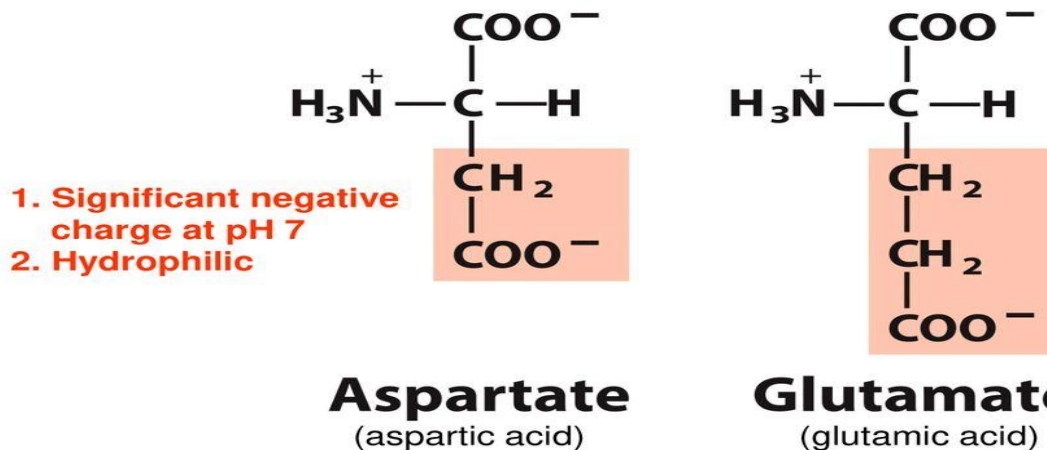
- The polar **hydroxyl group** of serine, threonine, and, rarely, tyrosine, can serve as a site of attachment for structures such as a **phosphate group**.
- The **amide group** of asparagine, as well as the **hydroxyl group** of serine or threonine, can serve as a site of attachment for oligosaccharide chains in **glycoproteins**.

Chemical classification of amino acids

3. Amino acids with acidic side chains:

The amino acids aspartic and glutamic acid are proton donors. At physiologic pH, the side chains of these amino acids are fully ionized, containing a negatively charged carboxylate group ($-\text{COO}^-$).

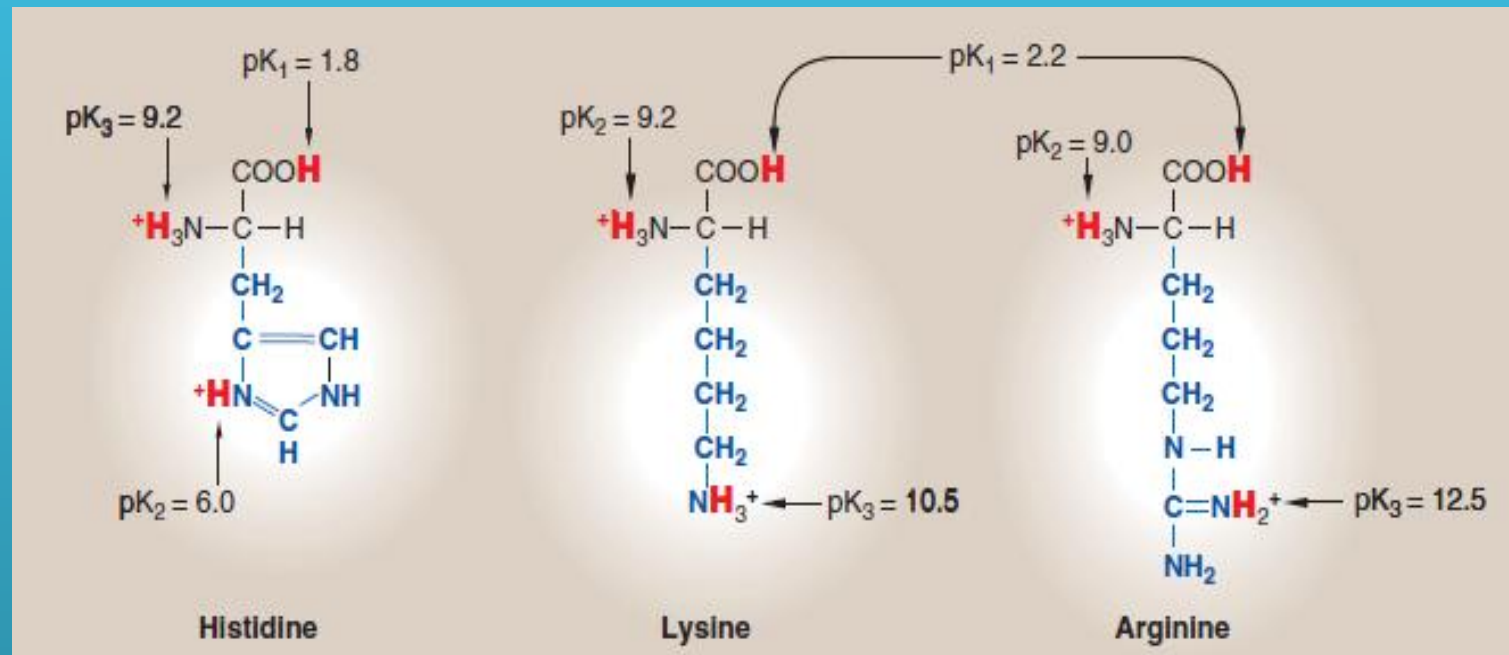
Negatively charged R groups



Chemical classification of amino acids

4. Amino acids with basic side chains:

The side chains of the basic amino acids accept protons.





مع تمنياتي لكم بالنجاح والتوفيق

لمزيد من المعلومات

<http://www.bu.edu.eg/staff/doaamohamed7-courses>