**CHEM121 – BIOCHEMISTRY FOR NURSES**

**Lesson 7 – Worksheet**

1. Use your knowledge of protein functions to fill in the blank spaces below.

(a) **Antibodies** are specialized \_\_\_\_\_\_\_\_\_\_\_\_ involved in defending the body from \_\_\_\_\_\_\_\_\_\_\_\_ (foreign invaders). They travel through the \_\_\_\_\_\_\_\_\_\_\_\_ stream and are utilized by the immune system to identify and defend against \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, and other foreign intruders. One way antibodies destroy antigens is by immobilizing them so that they can be destroyed by white blood cells.

(b) **Structural Proteins** - are fibrous and stringy and provide \_\_\_\_\_\_\_\_\_\_\_\_. Examples include keratin, collagen, and \_\_\_\_\_\_\_\_\_\_\_\_. Keratins strengthen protective coverings such as hair, quills, feathers, horns, and beaks. Collagens and elastin provide support for [\_\_\_\_\_\_\_\_\_\_\_\_ tissues](http://biology.about.com/library/weekly/aa011801a.htm) such as tendons and ligaments.

(c) **Transport Proteins** - are \_\_\_\_\_\_\_\_\_\_\_\_ proteins which move molecules from one place to another around the body. Examples include \_\_\_\_\_\_\_\_\_\_\_\_ and cytochromes. Hemoglobin transports \_\_\_\_\_\_\_\_\_\_\_\_ through the blood. Cytochromes operate in the [electron transport](http://biology.about.com/library/weekly/aa090601a.htm) chain as electron carrier proteins.

2. Draw and label the general structure of an amino acid.

3. Use your knowledge of amino acids to complete the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Amino Acid** | **Three Letter Abbreviation** | **Structure (Circle the R Group)** | **Classification Based on R Group** |
| Alanine |  |  |  |
| Arginine |  |  |  |
| Asparagine |  |  |  |
| Aspartate |  |  |  |
| Cysteine |  |  |  |
| Glutamic acid |  |  |  |
| Glutamine |  |  |  |
| Glycine |  |  |  |
| Histidine |  |  |  |
| Isoleucine |  |  |  |
| Leucine |  |  |  |
| Lysine |  |  |  |
| Methionine |  |  |  |
| Phenylalanine |  |  |  |
| Proline |  |  |  |
| Serine |  |  |  |
| Threonine |  |  |  |
| Tryptophan |  |  |  |
| Tyrosine |  |  |  |
| Valine |  |  |  |

**Multiple Choice Questions**

1. Which of the following amino acids has a net negative charge at physiologic pH (~7.4)?

(A) Lysine

(B) Glutamic Acid

(C) Asparagine

(D) Histidine

2. A polypeptide with a net positive charge at physiologic pH (~7.4) most likely contains amino acids with R groups of what type?

(A) Aromatic R groups

(B) Basic R groups

(C) Aliphatic R groups

(D) Acidic R groups