NAME: OLOKOOBA ADEKUNLE **MAT NO:** 18/MHS01/290
DEPARTMENT: ANATOMY **COURSE:** MEDICAL BIOCHEMISTRY
COURSE CODE: BCH 204

ASSIGNMENT: NUTRITION.

1. What do you understand by the term "**BIOLOGICAL VALUE OF PROTEINS":**

ANS: Biological value of protein is a measure of the proportion of absorbed protein from a food which becomes incorporated into the organism's body. It captures how readily the digested protein can be used in protein synthesis in the cells of the organism.

2. List and explain the various methods of assessment of protein quality.

ANS: a. BIOLOGICAL VALUE:
b. NET PROTEIN UTILIZATION (NPU):
c. AMINO ACID SCORE:
d. CRITIQUE:
e. PROTEIN EFFICIENCY RATIO (PER):
f. NET PROTEIN RATION:

A. BIOLOGICAL VALUE: This is a measure of the proportion of absorbed protein from a food which becomes incorporated into the organism's body. It has been defined as percentage nitrogen retained in the body and a complete evaluation of the dietary protein includes measurement of the biological value and the digestibility. These values are obtained by measuring the fecal and urinary nitrogen- free diet is fed. True4 digestibility is defined as the percentage of food nitrogen absorbed from the gut.

B. NET PROTEIN UTILIZATION (NPU): Like biological value, NPU estimates nitrogen retention but in this case by determining the difference between the body nitrogen content of animals fed no protein and those fed a test protein. This value is divided by the amount of protein consumed is the NPU which is defined as the percentage of the dietary protein retained. Since both NPU and BV are based on estimates of retained nitrogen, they should measure the same thing except that in the calculation of NPU the denominator is the total protein eaten whereas in the calculation of BV, it is the nitrogen lost owing to lack of digestibility (lack of absorption).

C. AMINO ACID SCORE: Since all amino acids must be present at the site of protein synthesis in adequate amounts, if protein synthesis is to proceed, a comparable deficit of any amino acid would limit protein synthesis to the same degree. Thus, they suggested that if the composition of an "ideal protein" was known I.e a protein which contained every essential amino acid in sufficient amounts to meet requirements without any excess, then it should be possible to compute the nutritive value of a protein by calculating the deficit of each essential amino acid in the test from the amount in the "ideal protein". The "most limiting amino acid", the one in the greatest deficit, would presumably

determine the nutritive value. Amino acids scores have been widely used since. They have been calculated as "the percentage of adequacy" rather than as deficits.

D. CRITIQUE: Is the use of estimates of protein quality to calculate the amount of protein needed to meet requirements when different diets are consumed requires that the estimates of quality vary in some known fashion, preferably in linear fashion, from zero to 100% utilization.

E. PROTEIN EFFICIENCY RATIO (PER): PER has been the method most widely used because of its simplicity. Osborne, Mendel and Ferry observed that young rats fed certain proteins gained little weight and ate little protein whereas those which were fed better quality proteins gained more weight and consumed more protein. In an attempt to compensate for the difference in food intake, they calculated the gain in weight per gram of protein eaten and this has been called PER. It is known that the PER for any protein is dependent upon the amount of protein incorporated in the test diet. It is clear that the PER is not proportional to the nutritive quality of the proteins tested and, for example, a protein which demonstrates a PER OF 1.5 cannot necessarily be assumed to have 50% of the value of a protein showing a OER of 3.0.

F. NET PROTEIN RATION (NPR): A major criticism of the PER has been that it does not take into account the protein required for maintenance since only gain in weight is used in the calculation. Net Protein Ration was then calculated as the overall difference in gain (gain in weight of the test group plus loss in weight of the protein-free group) divided by the protein eaten. It is apparent that if the body composition is constant, this procedure is identical to NPU except that it is expressed in arbitrary units which are less useful than the percentage of protein utilized. The weaknesses are of course, identical with those discussed under NPU.