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PHARMACOLOGY

1. Biological value (BV) is a measure of the proportion of absorbed protein from a food which becomes incorporated into the proteins of the organism's body. It captures how readily the digested protein can be used in protein synthesis in the cells of the organism. Proteins are the major source of nitrogen in food. BV assumes protein is the only source of nitrogen and measures the proportion of this nitrogen absorbed by the body which is then excreted. Unlike some measures of protein usability, biological value does not take into account how readily the protein can be digested and absorbed (largely by the small intestine). This is reflected in the experimental methods used to determine BV.

Biological value uses two similar scales:

* The true percentage utilization (usually shown with a percent symbol).
* The percentage utilization relative to a readily utilizable protein source, often egg (usually shown as unitless).

The biological value (BV) of a protein is an expression of a number of the nutritional characteristics of the food. These include (1) the digestibility, (2) the availability of the digested products, and (3) the presence and amounts of the various essential amino acids. It can be calculated by determining the nitrogen of the food intake minus the urinary and fecal nitrogen excretions by the formula:

BV= Dietary N – (Urinary N + Fecal N) \*100

Dietary N – Fecal N

1. VARIOUS METHODS OF ASSESSMENT OF PROTEIN QUALITY.

* Net Protein Utilization (NPU)

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 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 upon 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 amount absorbed.

* Protein Efficiency Ratio (PER)

Protein Efficiency Ratio (PER) has been the method most widely used because of its simplicity. It is known that the PER for any protein is dependent upon the amount of protein incorporated in the test diet. PER also has the disadvantage that even under standardized conditions it is not reproducible in different laboratories (31). It is of interest that in the collaborative study corrected PER values showed larger differences between laboratories than the uncorrected values indicating that this correction was not appropriate and of no advantage.

* 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. Bender and Doell (36) suggested that this criticism could be avoided by the inclusion in each test of a group of animals fed a protein-free diet. Net Protein Ratio (NPR) 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 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.