1. **WHAT DO YOU UNDERSTAND BY THE TERM ''BIOLOGICAL VALUE OF PROTEINS":**

**Biological value** (**BV**) is a measure of the proportion of absorbed [protein](https://en.wikipedia.org/wiki/Protein%22%20%5Co%20%22Protein) 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](https://en.wikipedia.org/wiki/Protein_biosynthesis%22%20%5Co%20%22Protein%20biosynthesis) in the [cells](https://en.wikipedia.org/wiki/Cell_%28biology%29%22%20%5Co%20%22Cell%20%28biology%29) of the organism. Proteins are the major source of [nitrogen](https://en.wikipedia.org/wiki/Nitrogen%22%20%5Co%20%22Nitrogen)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. The remainder must have been incorporated into the proteins of the organisms body.

1. **LIST AND EXPLAIN THE VARIOUS METHODS OF ASSESSMENT OF PROTEIN QUALITY:**
* **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 divided by the amount of protein consumed is the NPU which is defined as the "percentage of the dietary protein retained". Miller (12) proposed a procedure which involved replicate groups of 4 weanling rats housed in group cages which were fed either the "protein-free" or the "test" diet for 10 days. These conditions were chosen empirically and the particular merits of these conditions remain to be demonstrated. Since in young animals there is a high correlation between body nitrogen and body water content (13-16), the substitution of body water measurements for body nitrogen measurements has been widely used. Indeed, measurement of body water may be more accurate than measurement of body nitrogen because sampling errors are eliminated; also, it is much more convenient and less expensive.

* **AMINO ACID SCORE**

Amino acid score, in combination with protein digestibility, is the method used to determine if a protein is complete. PDCAAS and DIAAS are the two major protein standards which determine the completeness of proteins by their unique composition of essential amino acids.

### Protein Efficiency Ratio

Protein efficiency ratio (PER) is the easiest method of assessing the quality of proteins. Generally accepted is the idea that the rate of growth of weanling rats under standardized conditions provides a reliable measure of the value of [dietary protein](https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/protein-intake%22%20%5Co%20%22Learn%20more%20about%20Protein%20Intake%20from%20ScienceDirect%27s%20AI-generated%20Topic%20Pages); thus PER is the gain in body weight divided by the amount of protein consumed:

Such factors as the age of the rats, length of the experimental period, level of protein, and the sex of the rat affect the PER assay. Optimum standardized conditions such as a four-week experimental feeding period, diets containing a 10% level of protein with sufficient amounts of all other essential nutrients, male rats, and ad libitum feeding schedule have been demonstrated by several laboratories to yield reproducible results.

The PER determination has been criticized on the basis that (1) gain in body weight may not be constant in tissue composition on diets containing different proteins, (2) results may vary with protein level, and (3) the determination makes no allowance for the maintenance requirement.