



HEALTH EFFECTS OF PROTEIN

PHAR-432

LECTURE: 10

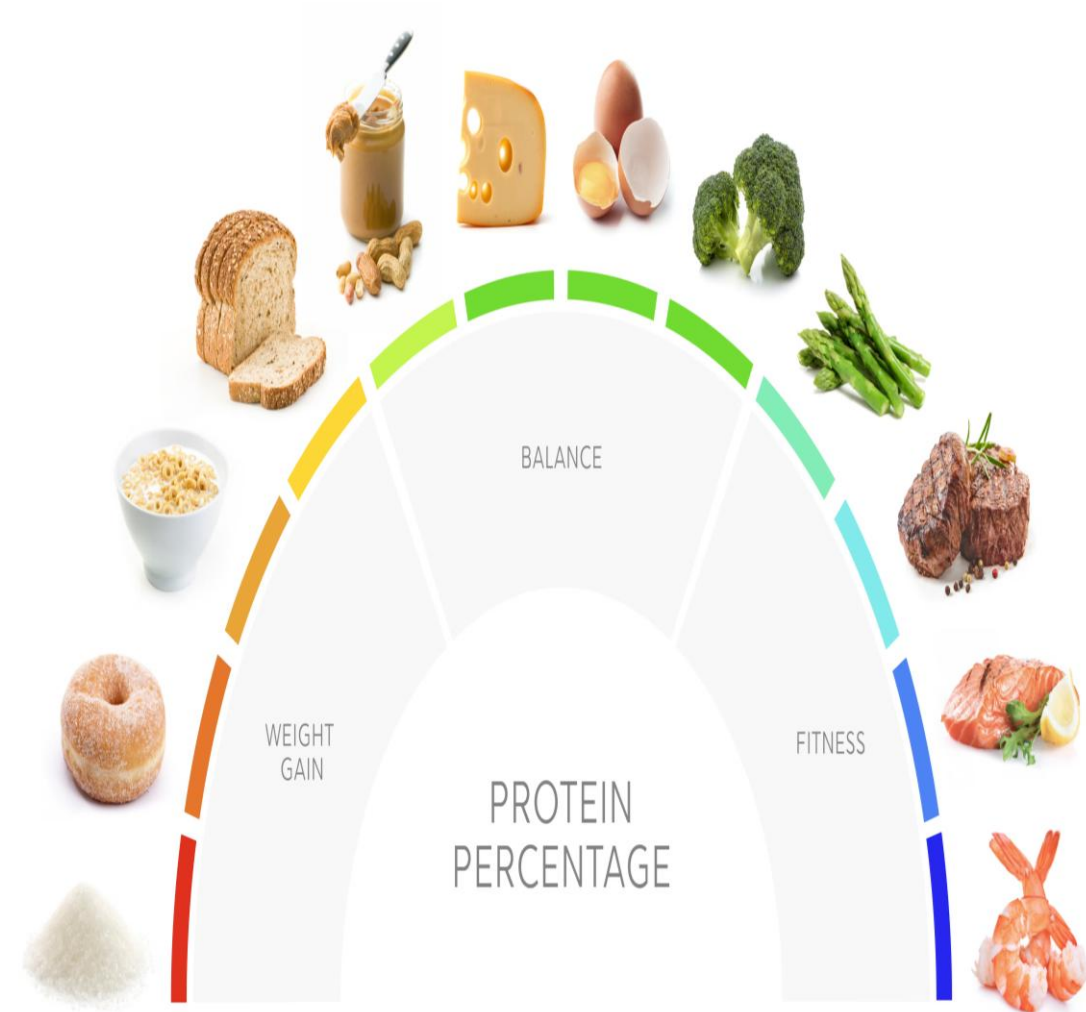
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Spring Semester (2025-2026)

Outlines

- Protein effect on disease
- Nutritional deficiency of protein



Protein and Amino Acid Needs in Disease

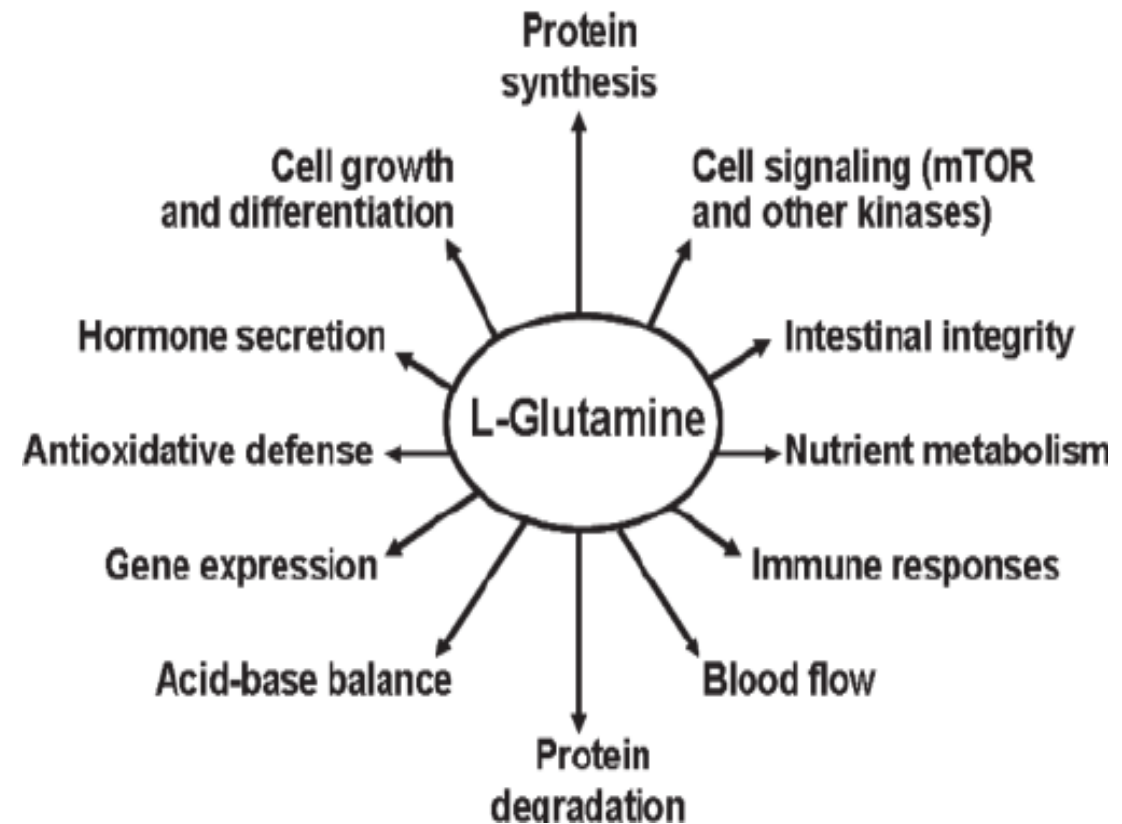
- When metabolic rate rises, body protein is mobilized for use as a fuel (amino acid oxidation) and for supply of carbon for gluconeogenesis.
- Several disease states produce an increase in metabolic rate:
 - Infection (fever)
 - Injury (trauma, burn injury, or surgery)
- The onset of a hypermetabolic state produce a significant and dangerous loss of protein (Nitrogen) measured by increased urea production.

Protein and Amino Acid Needs in Disease

- Reducing the N loss is not as simple as administering nutritional support (more calories & more amino acids); instead, the metabolic factors that cause the condition must be identified and corrected.
- The factors that produce the hypermetabolic state are categorized into three groups:
 - Stress hormones (cortisol, catecholamines, glucagon)
 - Cytokines (e.g., Tumor necrosis factor, interleukins)
 - Lipid mediators (e.g., Prostaglandins, thromboxanes)
- ✓ **Insulin and growth hormone have been administered to provide anabolic hormonal stimuli to improve N balance**

Protein and Amino Acid Needs in Disease

- Administration of a specific amino acid produce a pharmacologic effect in improving the disease state.
- Examples are administration of glutamine and arginine or the limiting of sulfur amino acid intake.



Top 5 Foods Plentiful In Glutamine



Milk



Being rich in glutamine, milk promotes production of glutathione, an antioxidant that combats oxidative stress

Eggs



Loaded with glutamine, eggs strengthens the immune system and keeps diseases at bay

Nuts



Immense amounts of glutamine and healthy fats in nuts optimize cardiac health and lowers the risk of heart disease

Beans



Excellent source of glutamine, beans heal wounds and speed up the recovery process after an injury

Red Cabbage



Bestowed with glutamine and vitamin C, red cabbage enhances eye health and fortifies bones

Protein and Health

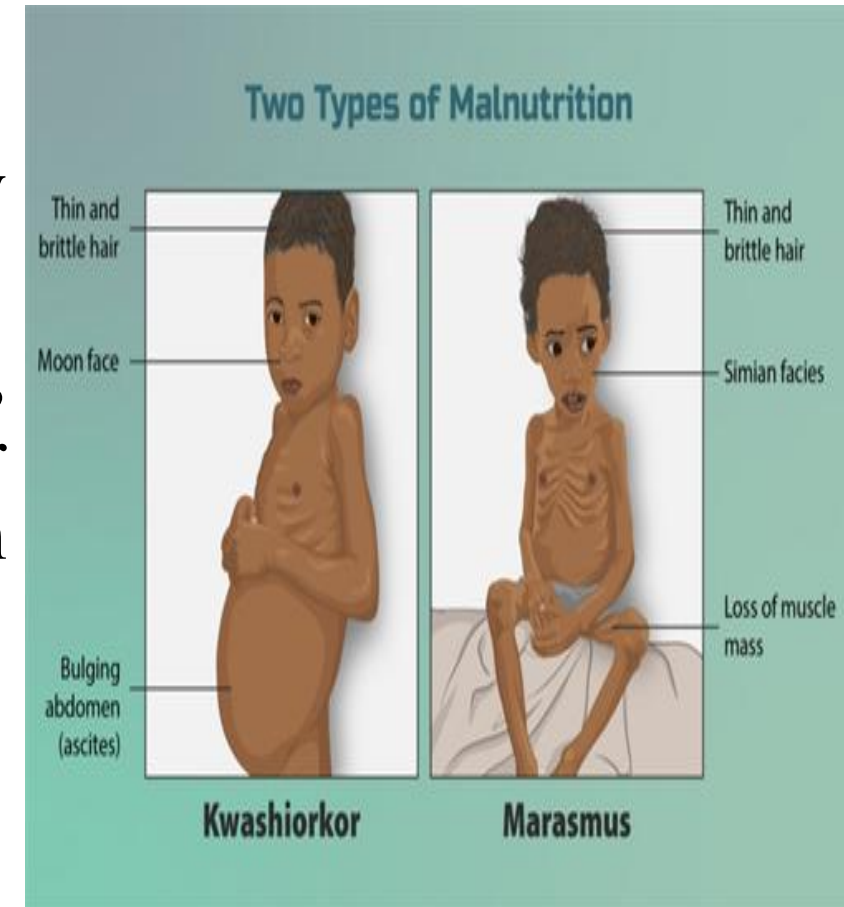
Protein-calorie malnutrition

Inadequate intake of protein and/or energy may be observed.

Protein undernutrition results in stunting, anemia, physical weakness, edema, vascular dysfunction, and impaired immunity with reduced ability to resist infection.

Death from secondary infection is common.

There are two extreme forms of malnutrition are;



Kwahiorkor:

Kwahiorkor: Occurs when there is deficiency of protein only, it is frequently seen in children after weaning at about one year of age, when their diet consists predominantly of carbohydrates.

Typical symptoms include stunted growth, edema, skin lesions, depigmented hair, anorexia, enlarged fatty liver, and decreased plasma albumin concentration.



Marasmus:

Marasmus: Occurs when there is deficiency of dietary protein and calories, usually occurs in children younger than one year of age when the mothers breast milk is supplemented with thin watery gruels of native cereals, which are usually deficient in protein and calories.

Typical symptoms include arrested growth, extreme muscle wasting, weakness, and anemia. Victims of marasmus do not show the edema or change in plasma proteins observed in kwashiorkor.



References

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