Calcium (Ca^{2+})

- Crucial for building and maintaining strong bones and teeth.
- Involved in muscle contraction, nerve signaling, and blood clotting.

Calcium plays a crucial physiological role within the human body. It is essential for the mineralization of bones, muscle contraction, nerve impulse transmission, blood coagulation, and hormone secretion. The primary source of calcium is dietary intake. This mineral predominantly exists as an extracellular cation. The absorption of calcium in the intestines is mainly regulated by the active hormonal form of vitamin D, known as 1,25-dihydroxy vitamin D3. Additionally, parathyroid hormone plays a role in regulating calcium secretion in the kidneys' distal tubule.[1] Calcitonin functions to lower blood calcium levels by acting on bone cells. To diagnose hypocalcemia, it is necessary to assess serum albumin levels to adjust for total calcium. Hypocalcemia is identified when the corrected serum total calcium levels fall below 8.8 mg/dL, which may occur in cases of vitamin D deficiency or hypoparathyroidism. Monitoring serum calcium levels is particularly recommended for patients who have undergone thyroidectomy.[2] Hypercalcemia is characterized by corrected serum total calcium levels exceeding 10.7 mg/dL, commonly associated with primary hyperparathyroidism. Humoral hypercalcemia is often observed in malignancies, primarily due to the secretion of parathyroid hormone-related peptide (PTHrP).[3]

References

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