Glucokathexis
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Abstract
Glucokathexis is a clinical state characterized by low plasma glucose levels, in the presence of adequate glucose precursor stores. We conceive and construct this rubric to initiate interest and inspire insight into this field of metabolic medicine. We list various conditions that can cause true as well as pseudo-glucokathexis.

Keywords: Autoimmunity, counter-regulatory mechanism, diabetes, glucose, hypoglycaemia, insulin, insulin resistance, nutrition.

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Glucose and Kathexis

Glucokathexis

Plasma glucose levels are usually concordant with the levels of precursor molecules such as glycogen and gluconeogenic substrates such as glycerol, lactate, pyruvate and specific amino acids. In certain situations, however, hypoglycaemia may occur in the face of adequate precursor molecule concentration. We term this as glucokathexis. Glucokathexis can be defined as a clinical state characterized by low plasma glucose levels, in the presence of adequate of glycogenolytic and/or gluconeogenic precursors.

True Glucokathexis

Certain inborn errors of metabolism do not allow conversion of glycogen, fatty acid, or sugars to glucose. This leads to a situation of glucokathexis, i.e., hypoglycaemia in spite of adequate precursor stores. Such diseases usually have a poor prognosis. At times, metabolic defects may occur due to poisoning of litchi or ackee fruit. These fruits, if taken by malnourished persons, can block glucogenic biochemical reactions, leading to

Table: Glucokathexis.

True Glucokathexis
- Inborn errors of metabolism
  - Glycogen storage diseases
  - Fatty acid oxidation defect
  - Galactosaemia
  - Hereditary fructose intolerance
- Acquired diseases
  - Litchi induced hypoglycaemia
  - Jamaican ackee fruit sickness
- Malignancies
  - Insulinoma
  - Nesidioblastosis
  - Mesenchymal tumours
  - Secretion IGF-2
- Immune disorders
  - Autoimmune hypoglycaemia
  - Type B insulin resistance syndrome

PSEUDO-GLUCOKATHEXIS
- Nutritional glucokathexis
  - Alcohol intake
  - High fibre diet
- Artefactual glucokathexis
  - Lack of anticoagulant (e.g., fluoride) in collection tube
  - Haemolysed sample
  - Delayed processing
hypoglycaemia. These conditions, too, can be termed as glucokathexis.

Another group of diseases, such as insulinoma, nesidioblastosis and IGF-2 secreting tumours, are characterized by high requirements of glucose. The body, unable to meet the demands of endogenously secreted insulin or insulin-like factors, remains in a state of hypoglycaemia despite increasing adiposity. A similar situation is encountered in autoimmune hypoglycaemia: insulin stores are adequate, but the body, unable to meet the demands of endogenously secreted insulin or insulin-like factors, remains in a state of hypoglycaemia despite increasing adiposity. Type B insulin resistance syndrome can present with a wide spectrum of glucose abnormalities, from severe hypoglycaemia to hyperglycaemia. In states of hypoglycaemia, it fits the definition of glucokathexis.

**Pseudoglucokathexis**

Two groups of conditions fit the rubric of pseudoglucokathexis. The first, nutritional glucokathexis, refers to calorie-rich foods and beverages, such as fibre and alcohol, which may lower glucose levels through lack of digestibility or interference in counter regulatory processes. The second, artefactual glucokathexis, describes glucose values that are erroneously low due to pre-analytical or post-analytical errors.

**Summary**

We define and detail a novel term, glucokathexis, which describes hypoglycaemia in the face of adequate glucose precursor stores. This concept should spur insight and interest in the biochemistry, physiology and clinical science of glucose regulation.

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**References**