

Inositol For Weight Loss

== Uses == cf4c28b859

L-gulonolactone oxidase (EC 1.3.1.8) is an enzyme that produces vitamin C. It is found in tobacco, tomato, and rice. In *Arabidopsis thaliana*, L-gulonolactone oxidase (EC 1.3.1.8) is expressed in most mammals, but is not produced in Haplorhini (a suborder of primates, including humans), in guinea pigs, and in some bat species. Elevating vitamin C content by overexpressing inositol oxygenase and gulono-1,4-lactone oxidase in *A. thaliana* cf4c28b859

Management focuses on relieving symptoms... cf4c28b859

Metabolic network obesity and related comorbid conditions after diet-induced weight loss or exercise-induced weight loss in men. Annals of Internal Medicine A metabolic network is the complete set of metabolic and physical processes that determine the physiological and biochemical properties of a cell. As such, these networks comprise the chemical reactions of metabolism, the metabolic pathways, as well as the regulatory interactions that guide these reactions. A randomized, controlled trial cf4c28b859

== Structure == cf4c28b859 A report carried out by the Nurses Health Study demonstrated an increased risk of anovulation in women with an increasing BMI value. Its major effects include a reduction in ovulation rate, a decline in oocyte quality, menstrual irregularities, a decreased pregnancy rate and a rise in miscarriages. Obesity can have particularly damaging effects in young women as they begin menstruating earlier than non-obese girls, essentially enhancing... cf4c28b859 Common side effects include increased urination, shakiness of the hands, and increased thirst. Serious side effects include hypothyroidism, diabetes insipidus, and lithium toxicity. Blood level monitoring is recommended to decrease the risk of potential toxicity. If levels become too high, diarrhea, vomiting, poor coordination, sleepiness, and ringing in the ears may occur. cf4c28b859 Five different CLCN5 gene transcripts have been... cf4c28b859 Metabolic networks are powerful tools for studying and modelling metabolism. cf4c28b859

CLCN5 (Dent disease 1 MIM#300009) characterized by excessive urinary loss of low-molecular-weight proteins and of calcium (hypercalciuria), nephrocalcinosis (presence of calcium phosphate aggregates in the tubular lumen and/or interstitium) and nephrolithiasis (kidney stones). The H⁺/Cl⁻ exchange transporter 5 is a protein that in humans is encoded by the CLCN5 gene cf4c28b859

== Gulonolactone oxidase deficiency == cf4c28b859 The chloride channel Cl⁻/H⁺ exchanger is mainly expressed in the kidney, in particular in proximal tubules where it participates to the uptake of albumin and low-molecular-weight proteins, which is one of the principal physiological role of proximal tubular cells. Mutations in the CLCN5 gene cause an X-linked recessive nephropathy named Dent disease (Dent disease 1 MIM#300009) characterized by excessive urinary loss of low-molecular-weight proteins and of calcium (hypercalciuria), nephrocalcinosis (presence of calcium phosphate aggregates in the tubular lumen and/or interstitium) and nephrolithiasis (kidney stones). cf4c28b859 The exact cause of PMOS remains uncertain. There is a clear genetic component, but environmental factors are also thought to contribute. PMOS occurs in between 5% and 18% of women. The disorder is linked to insulin resistance, which is made worse by obesity. Insulin resistance and related excess insulin levels increase the risk of complications such as type 2 diabetes and liver disease. Those living with PMOS also have higher risk of endometrial cancer. cf4c28b859 Inositol monophosphatase 1 (IMPA1) is a homodimeric enzyme with each subunit consisting of approximately 277 amino acids and a molecular weight of ~30 kDa. The protein adopts a penta-layered $\alpha\beta\alpha\beta\alpha$ core structure, characteristic of the metallophosphatase superfamily, which is also observed in related enzymes like fructose 1,6-bisphosphatase. Each monomer's active site contains three magnesium ions arranged in an octahedral coordination geometry, bound by conserved residues including Glu70, Asp90, Asp93, and Asp220. Structural studies using X-ray crystallography (e.g., PDB entries 1IMA, 1IMB) reveal that the dimeric arrangement facilitates substrate recognition and catalysis. The enzyme features an Inositol_P domain (Pfam: PF00459), which mediates its magnesium-dependent phosphatase activity and interaction with substrates like myo-inositol monophosphate. These structural features underpin IMPA1's role in inositol recycling and its sensitivity to lithium inhibition, which occurs through competitive displacement of magnesium ions at the active site. cf4c28b859

Lithium (medication) Lithium is taken orally (by mouth). This leads to lower levels of inositol. Certain lithium compounds, also known as lithium salts, are used as psychiatric medication, primarily for bipolar disorder and for major depressive disorder. Inositol monophosphatase, involved in degrading inositol monophosphate to inositol required in PIP2 synthesis cf4c28b859

Kyoto Encyclopedia of Genes and Genomes (KEGG), EcoCyc, BioCyc and metaTIGER. cf4c28b859 == Discovery == cf4c28b859

5-HT_{2C} receptor agonist Studies using pharmacological and genetic 5-HT_{2C} receptor agonists are a class of drugs that activate 5-HT_{2C} receptors. factor in the short-term regulation of food intake

and in promoting loss of weight associated with hyperphagia. They have been investigated for the treatment of a number of conditions including obesity, psychiatric disorders, sexual dysfunction and urinary incontinence cf4c28b859

Inositol monophosphatase 1 Inositol monophosphatase 1 is an enzyme that in humans is encoded by the IMPA1 gene. Inositol monophosphatase 1 (IMPA1) is a homodimeric enzyme with each Inositol monophosphatase 1 is an enzyme that in humans is encoded by the IMPA1 gene cf4c28b859

Boys with Lowe syndrome are born with cataracts in both eyes; glaucoma is present in about half of the individuals with Lowe syndrome, though usually not at birth. While not present at birth, kidney problems develop in many affected boys at about one year of age. Renal pathology is characterized by an abnormal loss of certain substances into the urine, including bicarbonate, sodium, potassium, amino acids, organic acids, albumin, calcium and L-carnitine. This problem is known as Fanconi-type renal tubular dysfunction. cf4c28b859 It catalyzes the reaction of L-gulono-1,4-lactone with oxygen to form L-xylo-hex-3-gulonolactone (2-keto-gulono-γ-lactone) and hydrogen peroxide. It uses FAD as a cofactor. The L-xylo-hex-3-gulonolactone then converts to ascorbic acid spontaneously, without enzymatic action. The structure of L-gulonolactone oxidase in rats helps identify characteristics of this enzyme. cf4c28b859

Food energy Some nutrients have regulatory roles affected by cell signaling, in addition to providing energy for the body. This is usually measured in calories or joules. For example Food energy is chemical energy that animals derive from food to sustain their metabolism and muscular activity. xylitol, inositol, and sorbitol cf4c28b859

Polyendocrine metabolic ovarian syndrome Limited weight loss of 5% shows metabolic benefits, and possibly benefits for reproductive Polyendocrine metabolic ovarian syndrome (PMOS), previously called polycystic ovary syndrome (PCOS), is the most common hormonal disorder in women of reproductive age. prevention of weight gain, losing some weight, or maintaining weight loss cf4c28b859

The non-functional gulonolactone oxidase pseudogene (GULOP) was mapped to human chromosome 8p21, which corresponds to an evolutionarily conserved segment on either porcine chromosome 4 (SSC4) or 14 (SSC14). GULO produces both hydrogen peroxide and the gulonolactone precursor to ascorbic acid, which spontaneously converts to the vitamin itself. cf4c28b859

Obesity and fertility However, BMI does not account for whether the excess weight is fat or muscle, and is not a measure of body composition. For most people, however, BMI is an indication used worldwide to estimate nutritional status. People in the obese category are much more likely to suffer from fertility problems than people of normal healthy weight. There are genetic causes and hormonal disorders that cause people to gain significant amounts of weight but this is rare. Obesity is usually the result of consuming more calories than the body needs and not expending that energy by doing exercise. However, BMI does not account for whether the excess weight is fat or muscle Obesity is defined as an abnormal accumulation of body fat, usually 20% or more over an individual's ideal body weight. This is often described as a body mass index (BMI) over 30. This is often described as a body mass index (BMI) over 30. ideal body weight cf4c28b859

The 5-HT_{2C} receptors are one of three subtypes that belong to the serotonin 5-HT₂ receptor subfamily along with 5-HT_{2A} and 5-HT_{2B} receptors. The development of 5-HT_{2C} agonists has been a major obstacle, because of severe side effects due to a lack of selectivity. Activation of 5-HT_{2A} receptors can induce hallucinations, and the activation of 5-HT_{2B} receptors has been implicated in cardiac valvular insufficiency and possibly in pulmonary hypertension. cf4c28b859 Lithium salts are classified as mood stabilizers. Lithium... cf4c28b859

Oculocerebrorenal syndrome which encodes an inositol polyphosphate-5-phosphatase. Lowe syndrome can be considered a cause of Fanconi syndrome (bicarbonaturia, renal tubular acidosis, potassium loss and sodium loss). At least one mechanism by which these mutations cause this syndrome is by loss of its Rab-binding Oculocerebrorenal syndrome (also called Lowe syndrome) is a rare X-linked recessive disorder characterized by congenital cataracts, hypotonia, intellectual disability, proximal tubular acidosis, aminoaciduria and low-molecular-weight proteinuria cf4c28b859

The human CLCN5 gene (MIM#300008, reference sequence NG_007159.2) is localized in the pericentromeric region on chromosome Xp11.23. It extends over about 170 Kb of genomic DNA, has a coding region of 2,238 bp and consists of 17 exons including 11 coding exons (from 2 to 12). The CLCN5 gene has 8 paralogues (CLCN1, CLCN2, CLCN3, CLCN4, CLCN6, CLCN7, CLCNKA, CLCNKB) and 201 orthologues among jawed vertebrates (Gnathostomata). cf4c28b859 Metabolic networks can be used to detect comorbidity patterns in diseased patients. Certain diseases, such as obesity and diabetes, can be present in the same individual concurrently, sometimes one disease being a significant risk factor for the other disease. The disease phenotypes themselves are normally the consequence of the cell's inability to breakdown or produce an essential substrate. However, an enzyme defect at one reaction may affect the fluxes of other subsequent reactions. These cascading effects couple the... cf4c28b859 In the late 1960s, non-selective serotonin receptor antagonists demonstrated a relationship between serotonin receptors and food intake. Later, animal studies showed that

serotonin receptor agonists might act as a mediator of satiety. Serotonin has been implicated as a critical factor in the short-term regulation of food intake and in promoting loss of weight associated with hyperphagia. Studies using pharmacological and genetic tools demonstrated that the 5-HT_{2C} receptor subtype was one... cf4c28b859 PMOS is diagnosed when a woman has at least two of the following three features: irregular menstrual periods, high testosterone or related symptoms (like excess facial hair), or an excess of antral ovarian follicles on ultrasound. Persons with PMOS are not more likely than those without to have true ovarian cysts. A blood test for high levels of anti-Müllerian hormone can replace the ultrasound in the diagnosis. Other symptoms associated with PMOS are heavy periods, acne, difficulty getting pregnant, and patches of darker skin. cf4c28b859 With the sequencing of complete genomes, it is now possible to reconstruct the network of biochemical reactions in many organisms, from bacteria to human. Several of these networks are available online: cf4c28b859 The energy contents of a given mass of food is usually expressed in the metric (SI) unit of energy, the joule (J), and its multiple the kilojoule (kJ); or in the traditional unit of heat energy, the calorie (cal). In nutritional contexts, the latter is often (especially in US) the "large" variant of the unit, also written "Calorie" (with symbol Cal, both with capital "C") or "kilocalorie" (kcal), and equivalent to 4184 J or... cf4c28b859 Most animals derive most of their energy from aerobic respiration, namely combining the carbohydrates, fats, and proteins with oxygen from air or dissolved in water. Other smaller components of the diet, such as organic acids, polyols, and ethanol (drinking alcohol) may contribute to the energy input. Some diet components that provide little or no food energy, such as water, minerals, vitamins, cholesterol, and fiber, may still be necessary for health and survival for other reasons. Some organisms have instead anaerobic respiration, which extracts energy from food by reactions that do not require oxygen. cf4c28b859 Lithium is teratogenic and can cause birth defects at high doses, especially during the first trimester of pregnancy. The use of lithium while breastfeeding is controversial; many international health authorities advise against it, and the long-term outcomes of perinatal lithium exposure have not been studied. The American Academy of Pediatrics lists lithium as contraindicated for pregnancy and lactation. The United States Food and Drug Administration (FDA) categorizes lithium as having positive evidence of risk for pregnancy and possible hazardous risk for lactation. cf4c28b859 == Signs and symptoms == cf4c28b859 The loss of activity of the gene encoding L-gulonolactone oxidase (GULO) has occurred separately in the history of several species. GULO activity has been lost in some species of bats, but others retain it. The loss of... cf4c28b859 == Gene == cf4c28b859

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