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Biochemistry Assignment

1. Calcium as a food source:

Calcium is a key nutrient that a lot of us overlook in our diets. Almost every cell in the body uses calcium in some way, including the nervous system, muscles, and heart. The body uses calcium to build healthy bones and teeth, keep them strong as you age, send messages through the nervous system, help ones blood clot, muscles contract, and regulate the heart’s rhythm.

Our body is better able to absorb calcium from food than it can from supplements. In fact, studies show that even though people who take calcium supplements have a higher average intake, those who get their calcium from food have stronger bones. Furthermore, using high-dose calcium supplements may increase ones of kidney stones and heart disease.

The food sources of calcium are as follows:

-dairy products

-leafy green vegetables

-certain fish

-oatmeal

- Grains

-tofu

-cabbage

-summer squash

-green beans

-garlic

-sea vegetables

And calcium-fortified foods such as cereals and orange juice.

FUNCTIONS OF CALCIUM

Calcium is one of the most important mineral supplements for the human body. It is important for the formation and maintenance of healthy teeth and bones. A proper level of calcium in the body over a lifetime can help prevent osteoporosis.

Calcium helps one’s body with:

• Building strong bones and teeth

• Clotting blood

• Sending and receiving nerve signals

• Squeezing and relaxing muscles

• Releasing hormones and other chemicals

• Keeping a normal heartbeat

DIETARY SOURCES OF CALCIUM

They include:

• Milk, cheese and other dairy foods

• Green leafy vegetables – such as broccoli, cabbage and okra, but not spinach

• Soya beans

• Tofu

• Soya drinks with added calcium

• Nuts

• Bread and anything made with fortified flour

• Fish where you eat the bones – such as sardines and pilchards

FACTORS AFFECTING ABSORPTION OF CALCIUM

1. A diet high in phytic acid, this is found in the bran coating of whole grains, phytic acid binds calcium and other minerals, making them insoluble and not absorbable in intestines. Calcium then passes out of the body without being absorbed.
2. .High levels of sodium , Excessive salt can interfere with calcium absorption
3. Insufficient vitamin D, Vitamin D is critical to regulating calcium absorption.
4. Coffee and tea consumption, The caffeine in coffee, tea, as well as most sodas acts as a mild diuretic, so that valuable calcium is excreted before the body can make use of it. Consuming these drinks in small quantities is relatively harmless, but excessive use can lead to reduced absorption.
5. Smoking reduces bone mass as it interferes with the absorption of calcium in the intestines.
6. Celiac Disease is an inherited autoimmune disease characterized by gluten intolerance. It often goes undiagnosed in both children and adults. Celiac disease changes the lining of the intestine and impacts absorption of fat-soluble vitamins and minerals, such as vitamin D and calcium.

HYPOCALCAEMIA AND HYPERCALCAEMIA

Hypocalcaemia is a condition in which there are lower-than-average levels of calcium in the liquid part of the blood, or the plasma. Hypocalcaemia may be the result of low calcium production or insufficient calcium circulation in your body. A deficiency of magnesium or vitamin D is linked to most cases of hypocalcaemia.

The symptoms include:

* muscle stiffness
* muscle spasms
* paraesthesia, or feelings of pins and needles, in the extremities
* changes in mood, such as anxiety, depression, or irritability
* memory issues
* hypotension
* difficulty speaking or swallowing
* fatigue
* Parkinsonism
* papilledema, or swelling of the optic disc

The symptoms of severe hypocalcaemia are:

* seizures
* arrhythmias
* congestive heart failure
* laryngospasms, or seizures of the voice box

The long-term symptoms of hypocalcaemia include:

* dry skin
* brittle nails
* kidney stones or other calcium deposits in the body
* dementia
* cataracts
* eczema

The causes are:

The most common cause of hypocalcemia is hypoparathyroidism, which occurs when the body secretes a less than average amount of parathyroid hormone (PTH). Low PTH levels lead to low calcium levels in your body. It can be inherited, or it can be the result of surgical removal of the thyroid gland or cancer of the head and neck. The other causes include:not enough calcium or vitamin D in ones diet, infections,anxiety, intense exercise, irregular magnesium or phosphate levels, kidney disease, diarrhea, constipation, or other intestinal disorders that prevent your body from absorbing calcium properly, phosphate or calcium infusion and cancer that’s spreading.

The people at risk are:

1. people with a vitamin D or magnesium deficiency are at risk of hypocalcemia.
2. a history of gastrointestinal disorders
3. pancreatitis
4. kidney failure
5. liver failure
6. anxiety disorders
7. New born babies since their bodies aren’t fully developed

It can be treated through medications and home care.

HYPERCALCEMIA

Hypercalcaemia, also spelled hypercalcemia, is a high calcium level in the blood serum.Those with a mild increase that has developed slowly typically have no symptoms.In those with greater levels or rapid onset, symptoms may include abdominal pain, bone pain, confusion, depression, weakness, kidney stones or an abnormal heart rhythm including cardiac arrest

Hypercalcemia can be caused by more than 25 separate diseases, several medications and even dehydration. In primary hyperparathyroidism, one or more of the four parathyroid glands, located behind the thyroid gland in your neck, produce too much parathyroid hormone. Normally, the parathyroid glands work with the kidneys, skeleton and intestines to carefully regulate the level of blood calcium. But sometimes a parathyroid gland becomes overactive, resulting in excess parathyroid hormone being released and an elevated blood calcium level.

Common medications such as hydrochlorothiazide and other thiazide diuretics (prescribed for hypertension and edema), lithium, and excessive intake of vitamin D, vitamin A or calcium can result in hypercalcemia. Taking too much calcium carbonate in the form of Tums or Rolaids is actually one of the more common causes of hypercalcemia.

Lung cancer, breast cancer and certain cancers of the blood can cause hypercalcemia that can become severe. Other less common causes of hypercalcemia include:

• Lung diseases such as sarcoidosis and tuberculosis

• Kidney failure

• Hyperthyroidism (an overactive thyroid)

• Being bedridden/immobilized, even for a relatively short period

• Paget’s disease of the bone

• Multiple myeloma

The symptoms include:

• More frequent urination and thirst

• Fatigue, bone pain, headaches

• Nausea, vomiting, constipation, decrease in appetite

• Forgetfulness

• Lethargy, depression, memory loss or irritability

• Muscle aches, weakness, cramping and/or twitches