

# MECOBALAMIN

## MEBAAL-500 / MEBAAL-1500

500 mcg / 1.5 mg Film-coated Tablet  
Vitamin

### FORMULATION:

#### MEBAAL-500

Each film-coated tablet contains:  
Mecobalamin ..... 500 mcg

#### MEBAAL-1500

Each film-coated tablet contains:  
Mecobalamin ..... 1.5 mg

### DESCRIPTION:

Mecobalamin is one of the two active coenzyme forms of vitamin B-12. It is a co-factor to the enzyme methionine synthetase that function to transfer methyl groups for the regeneration of methionine from homocysteine. It is closely involved in folate metabolism, and is pivotal for the synthesis of purines and pyrimidines. It also acts as a methyl donor for the synthesis of lecithin, a major component of myelin sheath.

### PHARMACOLOGY:

- Mecobalamin plays an important role in transmethylation as a coenzyme of methionine synthesis of methionine from homocysteine.
- Mecobalamin is well transported to nerve cell organelles, and promotes nucleic acid and protein synthesis. It is better transported to nerve cell organelles than cyanocobalamin in animals.
- Mecobalamin promotes axonal regeneration. It normalizes axonal skeletal protein transport in sciatic nerve cells from animal models with streptozotocin-induced diabetes mellitus. It exhibits neuropathologically and electrophysiologically inhibitory effects on nerve degeneration in neuropathies induced by drugs, such as adriamycin, acrylamide and vincristine models of axonal degeneration in mice and neuropathies in animals with spontaneous diabetes mellitus.
- Mecobalamin promotes myelination (phospholipid synthesis). It promotes the synthesis of lecithin, the main constituent of medullary sheath lipid and increases myelination of neuron in animal tissue culture more than cobalamin does.
- Mecobalamin restores delayed synaptic transmission and diminished neurotransmitters to normal. It restores end plate potential induction early by increasing nerve fiber excitability in crushed sciatic nerve. In addition, it also normalizes diminished brain tissue levels of acetylcholine in animals fed a choline-deficient diet.
- Mecobalamin promotes the maturation and division of erythroblasts, thereby alleviating anemia. It also promotes nucleic acid synthesis in bone marrow and promotes the maturation and division of erythroblasts, thereby increasing erythrocyte production.
- Mecobalamin brings about a rapid recovery of diminished red blood cell, and hematocrit in vitamin B-12 deficient animals.

### PHARMACOKINETICS:

Naturally found B<sub>12</sub> is dissociated from proteins in the stomach via the action of acid and the enzyme pepsin. The forms of B<sub>12</sub> released by this process are Mecobalamin (methylcobalamin) and adenosylcobalamin. All forms of B<sub>12</sub> bind to proteins called haptocorrins or R proteins, which are secreted by the salivary glands and the gastric mucosa. This binding occurs in the stomach. Pancreatic proteases partially degrade the cobalamin-haptocorrin complexes in the small intestine where cobalamin that is released then binds to intrinsic factor (IF). Intrinsic factor is a glycoprotein which is secreted by gastric parietal cells. The cobalamin-intrinsic factor complex is absorbed from the terminal ileum into the ileal enterocytes, cobalamin is released from the cobalamin-IF complex and then binds to another protein called transcobalamin II that delivers it to the portal circulation. The portal circulation transports cobalamin to the liver which takes up about 50% of the vitamin; the remainder is transported to the other tissues of the body via the systemic circulation. The cobalamin-transcobalamin II complex is degraded intracellularly via lysosomal proteases to yield cobalamin (cyanocobalamin, mecobalamin, adenosylcobalamin, hydroxocobalamin). Cobalamin is metabolized to mecobalamin in the cytosol and to adenosylcobalamin in the mitochondria. Mecobalamin is the principal circulating form of cobalamin. Adenosylcobalamin comprises more than 70% of cobalamin in the liver, erythrocytes, kidney and brain. The total body content of cobalamin ranges from 2-3 mg, with approximately 50% of it residing in the liver.

Mecobalamin in the circulation is bound to the plasma proteins transcobalamin I (TCI), transcobalamin II (TCII) and transcobalamin III (TCIII). Approximately 80% of plasma B<sub>12</sub> is bound to TCI. TCII is the principal B<sub>12</sub> binding protein for the delivery of B<sub>12</sub> to cells, via specific receptors for TCII. This B<sub>12</sub> binding protein (TCII) is identical to the one that delivers B<sub>12</sub> from the enterocytes to the portal circulation.

Total absorption increases with increased intake of the vitamin. However, the absorption efficacy of the vitamin decreases with increased dosage. Significantly, very large doses of mecobalamin are absorbed in the absence of intrinsic factor. Thus, large oral doses may be given for the treatment of deficiency instead of using the parenteral route (usually, intramuscularly). There are now several studies confirming this. The absorption efficiency of mecobalamin from foods is approximately 50%.

Mecobalamin is secreted in the bile and reabsorbed via the enterohepatic circulation. Some of them, which are secreted in the bile, are excreted in the feces. Also, oral B<sub>12</sub> that is not absorbed is excreted in the feces. Reabsorption of mecobalamin via the enterohepatic circulation does not require the intrinsic factor. If the circulating level of B<sub>12</sub> exceeds the B<sub>12</sub> binding capacity of the blood, a situation that unusually occurs following parenteral administration of the vitamin, the excess is excreted in the urine.

Blood levels of patients indicate that sublingual mecobalamin becomes available as early as 15 minutes after administration and is still elevated at 24 hours. It is absorbed through the oral mucosa, which bypasses the need for it to bind with intrinsic factor in the stomach. 80% of B<sub>12</sub> in the plasma is in the mecobalamin form.

#### INDICATIONS:

Peripheral neuropathy, dementia, alcoholic neuropathy, drug-induced neuropathy, trigeminal and occupational neuralgia, Parkinson disease, Bell's palsy, megaloblastic anemia, cancer, male impotence, hyperhomocysteinemia, sleep disturbances.

#### DOSAGE AND ADMINISTRATION:

Take one (1) tablet, once or twice daily, or as recommended by a physician.

#### PRECAUTIONS:

The use of mecobalamin in deficiency states or to treat any medical condition requires medical supervision. A typical dose as nutritional supplements used by pregnant women and nursing mothers is 12 micrograms daily. Pregnant women and nursing mothers should only use doses higher than this if recommended by their physicians. Administration of doses greater than 10 micrograms daily may produce a hematological response in those with anemia secondary to folate deficiency.

#### DRUG INTERACTIONS:

**Antibiotics:** The use of antibiotics may alter the intestinal microflora and may decrease the possible contribution of mecobalamin by certain inhabitants of the microflora (e.g. Lactobacillus species) to the body's requirement for the vitamin. This may particularly be a problem for vegetarians. Garlic, onions, leeks, bananas, asparagus and artichokes, among other vegetables and fruits, contain inulins, which promote the growth of certain colonic bacteria, including Lactobacillus species.

**Cholestyramine:** Cholestyramine may decrease the enterohepatic reabsorption of mecobalamin.

**Colchicine:** Colchicine may cause decreased absorption of mecobalamin

**Colestipol:** Colestipol may decrease the enterohepatic reabsorption of mecobalamin

**H<sub>2</sub> Blockers (cimetidine, famotidine, nizatidine, ranitidine):** Chronic use of H<sub>2</sub> blockers may result to decreased absorption of mecobalamin. They are unlikely to affect the absorption of supplemental B<sub>12</sub>

**Metformin:** Metformin may decrease the absorption of mecobalamin. This possible effect may be reversed with oral calcium supplementation.

**Nitrous oxide:** Inhalation of the anesthetic agent nitrous oxide (not to be confused with nitric oxide) can produce a functional deficiency. Nitrous oxide forms a complex with cobalt in mecobalamin, the cofactor for methionine synthase, resulting in inactivation of the enzyme.

**Para-amino Salicylic Acid:** Chronic use of the anti-tuberculosis drug may decrease the absorption of mecobalamin.

**Potassium chloride:** It has been reported that potassium chloride may decrease the absorption of mecobalamin.

**Proton Pump Inhibitors (Lansoprazole, omeprazole, pantoprazole, rabeprazole):** Chronic use of proton pump inhibitors may result in decreased absorption, naturally found in food sources.

#### ADVERSE EFFECTS:

**Anaphylactic reaction:** Anaphylactic reaction such as decrease in blood pressure or dyspnea may occur. Patient should be monitored after administration of dose.

#### STORAGE:

Store at temperatures not exceeding 30°C

#### CAUTION:

**Foods, Drugs, Devices and Cosmetics Act prohibits dispensing without prescription.**

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