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METHYLCOBALAMIN

A better option than Cynacobalamin?

The science of Methylcobalamin : Part TWO

INRODUCTION

Vitamin B12 (named as cobalamin) is considered to be the largest and one of the most complex vitamin of all the vitamin family. It is known to be unique, as it is the only vitamin that consists of a metal ion, named cobalt in its structure (hence its name). Cobalamin, popularly known as vitamin B12 is an important water-soluble vitamin which is involved in the synthesis of red blood cells , neuronal protection and DNA synthesis which are the vital functions of the body.

FORMS OF VITAMIN B12.

There are four forms of vitamin B12, mainly differentiated by the side group attached to the cobalamin molecule:

- Adenosylcobalamin (AdoCbl)
- Cyanocobalamin (CNCbl)
- Hydroxocobalamin (HOCbl)
- Methylcobalamin (MeCbl)

Methylcobalamin and Adenosylcobalamin are two different co-enzymes and the body requires both of them for different processes.

Cyanocobalamin is the most commonly found form in supplements and fortified foods. It is considered to be the most stable form of all the forms of B12 available because of the side group, cyanide, which is believed to be having the strongest attraction to the cobalamin molecule. It is also considered to be stable in extreme conditions like high temperatures compared to other forms.

Hydroxocobalamin is the form of B12 commonly found in foods. There are not many oral formulations available for people to take and it is normally injected in B12 shots. It is not recommended to be taken orally as the hydroxyl side group has the least attraction to the cobalamin molecule.

Adenosylcobalamin's chemically known as 5′-deoxy-5′-adenosylcobalamin is also known as dibencozide, cobamamide, and cobinamide.

The main aim of this article, is to state the pros and cons of the two forms of B12 that we are concerned with namely methylcobalamin and cyanocobalamin which are available in the market and are the types that are generally found in supplements and suggest the superiority of methylcobalamin over cyanocobalamin which is used commonly.

Dr Sanjay Agrawal

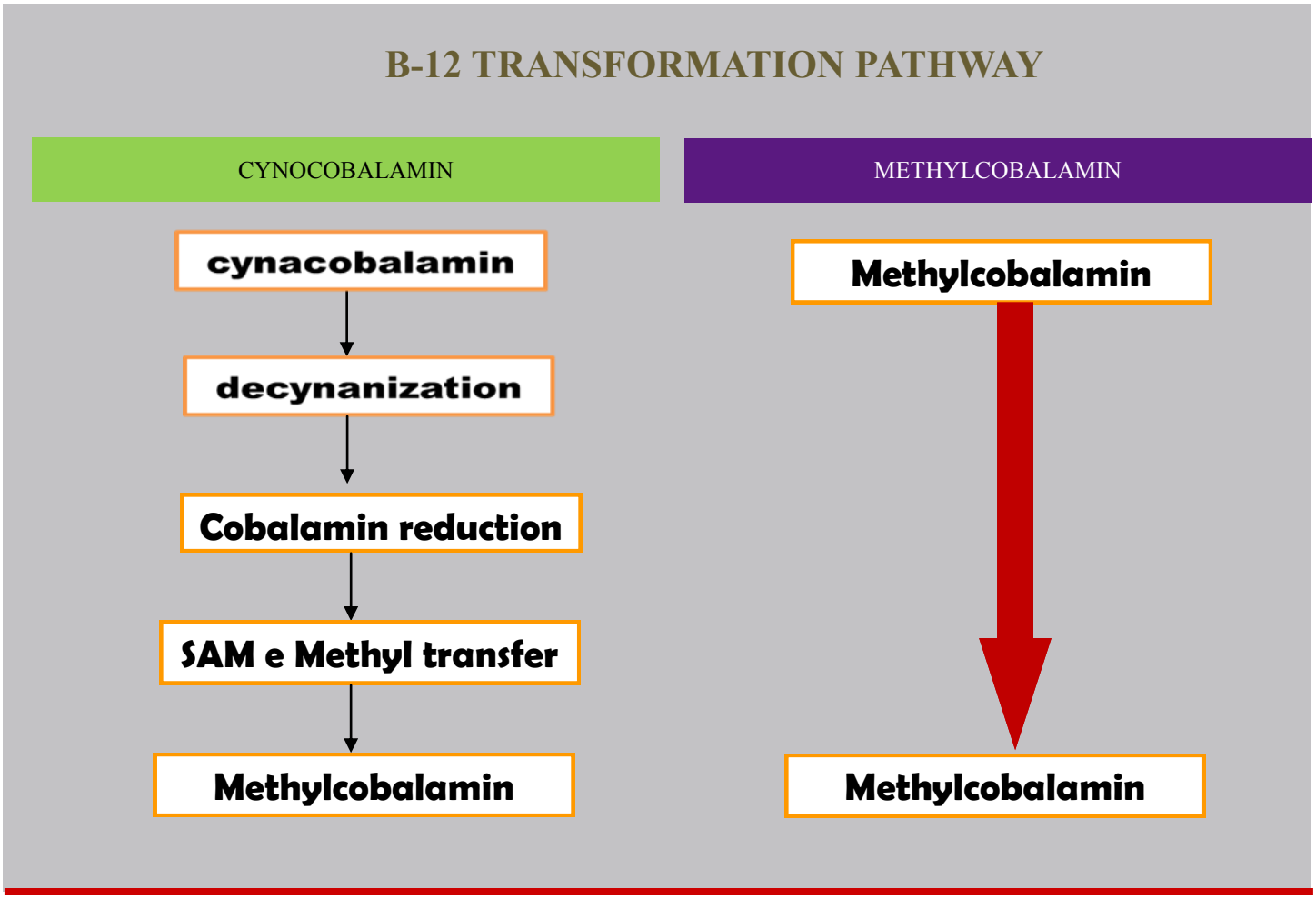
Dr Agrawal founded PHARMA CONSULTANTS and INVENTOR to fulfill his passion, capabilities and desire to assist pharmaceutical companies around the globe. He has actively worked in pharmaceutical and related industries for more than 28 years and started this firm in 2005. He is **Editor-in-Chief** of renowned IJM Today and honorable member of the editorial board of **The Antiseptic**.

CYANOCOBALAMIN

Cyanocobalamin a form of vitamin B12 is considered to be a cheap, synthetic, mild toxic and an inactive form of B12. It consists of a cyanide donor in its chemical structure and is the most commonly used commercial preparation of vitamin B12 used. It is considered as the most stable form, because of the cyanide molecule present in the structure has the great attraction to the cobalamin and protects it from extreme conditions like high temperatures. It is not absorbed well orally and requires methyl groups to detoxify it.

The molecule that is attached to the cobalamin is known as a donor. It's used more frequently in supplements, since it's considered to be more stable and cost -effective than all the other forms of vitamin B12 available. When cyanocobalamin enters your body, it is converted to either methylcobalamin or adenosylcobalamin, these are the two active forms of vitamin B12 in humans. When cyanocobalamin is absorbed, it converts to hydroxocobalamin (which means discarding of the cyanide in the process) and then to methylcobalamin and adenosylcobalamin. When taken through oral route, absorption of this form is enormously reduced in case of any gastric acid problems.

Besides cyanocobalmin takes more than 48 hours to eventually convert to usable and active component methylcobalamin, and even then also only a small amount is converted. During this conversion it requires the interaction of possibly depletion of glutathione and other agents.



METHYLCOBALAMIN

Unlike cyanocobalamin which is synthetic in nature , methylcobalamin is a naturally occurring form of vitamin B12 which can be obtained through supplements, as well as food sources like fish, meat, eggs and milk. Methylcobalamin, is the kingpin, one of the two active, natural forms of B12. It helps in reducing homocysteine concentrations and generates SAMe (S-adenosyl methionine), which is the the most important methyl donor in our body, and supplying methyl groups for critical chemical reactions to help maintain our health. Methylcobalamin shows its greatest utility with people suffering form acute or chronic degenerative neurological symptoms, here it is considered as the only promising treatment available. It bypasses several potential issues in the absorption cycle and helps relieve or completely reverse symptoms.

Cyanocobalamin takes a lot of effort to reduce it to the active form, hence cyanocobalamin absorption varies greatly between individuals. Methylcobalamin is considered significantly better utilized compared to other forms and is around **2.5 times** more more potent (about 1/3 less is excreted in the urine) than cyanocobalamin. Even though similar doses are "absorbed", but once absorbed, Methylcobalamin due to its high plasma protein binding capacity is accumulated and retained in the body much better than cyanocobalamin therefore the retention time is more. In any form, methylcobalamin has higher bioavailability than cyanocobalamin. It is so efficient that even *orally* it was found effective in pernicious anemia.

METHYLCOBALAMIN Vs CYANOCOBALAMIN

	Methylcobalamin	Cyanocobalamin
Nature	Natural	Synthetic
Chemistry	active form	inactive form, cyanide group, slightly toxic form
Absorption	low absorption rate	Stable, high absorption rate
Distribution	High plasma protein binding	Low protein binding
Metabolism	Direct active form	Converted to methylcobalamin and adenosylcobalamin taking almost 48hrs. Detoxification required for cyanide
Excretion	Higher retension time. Can be used in liver and renal toxicity.	Not advised in renal or liver toxicity. Eliminated fastly
Safety	Safe when compared to other forms	Least safe of all forms
Efficacy	Good compared to other forms	Least efficacious.
Commercial	Costly	Very cheap

CONCLUSION

Majority that is 99% of people in the world are in need of extra vitamin B12, and methylcobalamin would be considered as a better option compared to cyanocobalamin. It exhibits many neuroprotective effects, improving brain cognition back to normal levels. Plus, methylcobalamin is donating an extremely valuable methyl group that further enhances our health (and doesn't steal any, like cyanocobalamin does). This is especially important for pernicious anemia patients or anyone suffering from high homocysteine levels. This donation of methyl groups may be the reason why methylcobalamin is helpful to multiple conditions.

~Dr Sanjay Agrawal