

Pediatric Drops

MVW Takes Multivitamins to a **New Level**

CFTR Modulators have been seen to affect fat-soluble vitamins levels in certain individuals on traditional CF-Specific Multivitamins, which can result in elevated serum vitamin A, D and E.

This novel formulation (PCT/US22/37053) combines patient tested and clinically studied absorption technologies, with new and innovative approaches, to better support multivitamin supplementation in individuals prescribed CFTR modulators who have elevated serum levels of A, D, or E.

Lower Preformed Vitamin A To Address The Higher Serum Vitamin A Levels Seen In Some Patients Prescribed Modulators

Preformed vitamin A is **insatiably absorbed**

- Brei et al¹ found that vitamin A exceeded the UL of intake in 69% of studied subjects
- Graham-Maar² found total preformed retinol intake exceeded the DRI tolerable upper intake level in 78% of the subjects

Today, due to the advances in care with modulators, and elevated serum retinol levels seen in some patients³, **this "New CF Multivitamin"TM provides lower amounts and intakes of preformed vitamin A**

Higher Pro-Vitamin A To Better Support An "Individualized" Vitamin A Dosing Strategy

Vitamin A status regulates beta carotene conversion to an active form (retinol)

- Beta carotene conversion cleavage efficiency and absorption is regulated via a negative feedback loop⁴
 - Following (preformed) vitamin A intake, intracellular concentrations of ATRA increase
 - Beta carotene is taken up by the enterocytes, and converted to retinol only as needed
- There is no set tolerable UL for beta carotene

Higher beta carotene content to better manage the variables affecting individuals' vitamin A serum levels

Higher Pro-Vitamin A To Address The Conversion Efficiency Of Beta Carotene Due To Common Genetic Variants

BCMO1 variation has been reported to occur in 27-45%⁵ of the general population

- These individuals are called "poor converters"

Pro-vitamin A conversion, to an active form, is highly affected by variants in the BCMO1 gene⁶

- T allele on both rs12934922 and rs7501331 causes a **69% decreased conversion** of beta carotene to retinol
- Single T in the rs7501331 SNP causes a **decrease of 32%**
- Proteins encoded by the BCMO1 gene, called beta-carotene 15,15'-monooxygenase and beta-carotene 15,15'-dioxygenase, are responsible for converting beta-carotene into the active form of vitamin A

Today, with our understanding of genetics, **CF-Specific Multivitamin supplements may benefit from higher pro-vitamin A (beta carotene) content**



Patent Pending
Pediatric Drops

¹Brei et al, Clinical Nutrition 32 (2013) 805-810.

²Graham-Maar, Am J Clin Nutr 2006; 84: 174-82.

³Data on file: CF Global Services, LLC.

⁴Bohn et al, Proceedings of the Nutrition Society (2019), 78, 68-87.

⁵Leung et al, FASEB. 2009 Apr;23(4):1041-53.

⁶Genetic Lifehacks, February 21, 2020, by Debbie Moon.

Formulated with Lower Vitamin E

Meets CF Foundation recommendations for vitamin E intake⁸

- Specifically formulated for individuals on modulators where vitamin E levels are elevated when taking CF-Specific Multivitamins
- 50% reduction in total daily vitamin E content to address elevated levels seen in some patients on modulators

A Novel Approach To Support The Absorption of Fat-Soluble Vitamins A, D, E and K

The addition of a solubilizer⁹: Polyoxymethylene sorbitan monolaurate (Polysorbate 20)

- Emulsifiers enable the suspension of oil in water, they are not water soluble
 - Results in large droplets suspended in an aqueous solution, like fats and fat-soluble vitamins in the small intestine
 - Emulsification is a critical part of digestion, promoting micelle formation in the presence of bile salts
 - Patient proven and clinically studied emulsifier TPGS
- Solubilizers make otherwise insoluble materials – like fat-soluble vitamins – soluble in water

Higher vitamin C content

- Vitamin C is a regulator of CFTR-mediated chloride secretion in the epithelia¹⁰
- While most focus has been directed to the airways, **high dose vitamin C may have the potential to induce the openings of CFTR chloride channels, reducing viscosity and stickiness of mucus and enhance absorption in the GI tract**



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Supplement Facts

Serving Size 3 ml Servings Per Bottle About 20	Age: 0-12 months 3 ml - 1x day		Age: 1-3 years 3 ml - 2x day	
	Amount Per 3 ml	%Daily Value	Amount Per 6 ml	%Daily Value
Vitamin A (as 93% Beta Carotene & 7% Retinyl Palmitate)	2,000 mcg RAE	400%	4,000 mcg RAE	1,333%
Vitamin C (as Liposomal PureWay-C® and Ascorbic Acid)	150 mg	300%	300 mg	2,000%
Vitamin D (as Cholecalciferol)	19 mcg	190%	38 mcg	253%
Vitamin E (as Alpha-Tocopherol Acid Succinate, d-Alpha-Tocopherol Acetate and Mixed d-Alpha Tocopherol Acetate)	25 mg	500%	50 mg	833%
Vitamin K-1 (as Phytanadione)	500 mcg	20,000%	1,000 mcg	3,333%
Zinc (as Zinc Oxide)	5 mg	167%	10 mg	333%
*Percent daily value based on 1,000 calorie diet				

Other Ingredients: Filtered Water, Glycerin, Medium Chain Triglycerides (MCT Oil), Citric Acid, Phospholipon 85 G, Sucralose, IBATE 20 Polysorbate 20, Vanillin (Rhovanil)

REIMBURSEMENT CODE: 58204-0004-51

Supporting the Needs of "New CF"TM

MVW Modulator Formulation Multivitamin Supplement:

A novel formulation that combines patient tested and clinically studied absorption technologies, with new and innovative approaches, to better support multivitamin supplementation in individuals prescribed CFTR modulators who have elevated serum levels of A, D, or E.



Supporting the Needs of "New CF"TM

Manufactured for:

MVW Nutritionals, Inc., Huntsville, AL 35806

www.cfmultivitamins.com

1-855-236-8584 (CF-MULTI)

MF_PEDDRPS_FL_9.17.23

⁷NIH Office of Dietary Supplements noted that there may be an increased risk of lung cancers for smokers when taking 30mg of beta carotene plus 25,000 IU (7,500mcg RAE) retinyl palmitate daily. No other increased risk of cancer was noted. Among non-smokers there does not appear to be an increased risk. The RAE content of current CF-Specific Multivitamins and MF is less than the amounts and intake studied above.

⁸Borowitz et al, J Pediatr Gastroenterol Nutr, 35: 246-259 September 2002.

⁹Kalivianakis et al, Am J Clin Nutr 1999; 69: 127-34.

¹⁰Fischer et al, Proc Natl Acad Sci U.S.A. 2004 Mar 9; 101 (10): 3691-3696.