

## K-PAX® MITONUTRIENTS™ SUPPLEMENTS MITOCHONDRIAL SUPPORT MULTI-VITAMIN FORMULAS\*

K-PAX® MitoNutrients™ and K-PAX® MitoNutrient™ Activator supplements were formulated by Jon D. Kaiser, MD, who has 25 years of experience in immune and mitochondrial health. The formulas contain a proprietary blend of acetyl L-carnitine, N-acetyl cysteine, alpha-lipoic acid, embedded with key nutrients and cofactors to provide a comprehensive multivitamin approach to mitochondrial health.\*

K-PAX® MitoNutrient™ Activator is specifically designed for a wide variety of individuals to enhance the K-PAX® MitoNutrients™ formula when additional energy support is required.\*

### K-PAX® MITONUTRIENTS™ AND K-PAX® MITONUTRIENT™ ACTIVATOR

- The original formulas feature a unique micronutrient combination to support mitochondrial health and cellular energy support.\*
- K-PAX® MitoNutrients™ is part of an approach that investigated the impact on occasional fatigue and mental alertness.<sup>1\*</sup>





## K-PAX<sup>®</sup> MITONUTRIENTS<sup>™</sup> AND K-PAX<sup>®</sup> MITONUTRIENT<sup>™</sup> ACTIVATOR

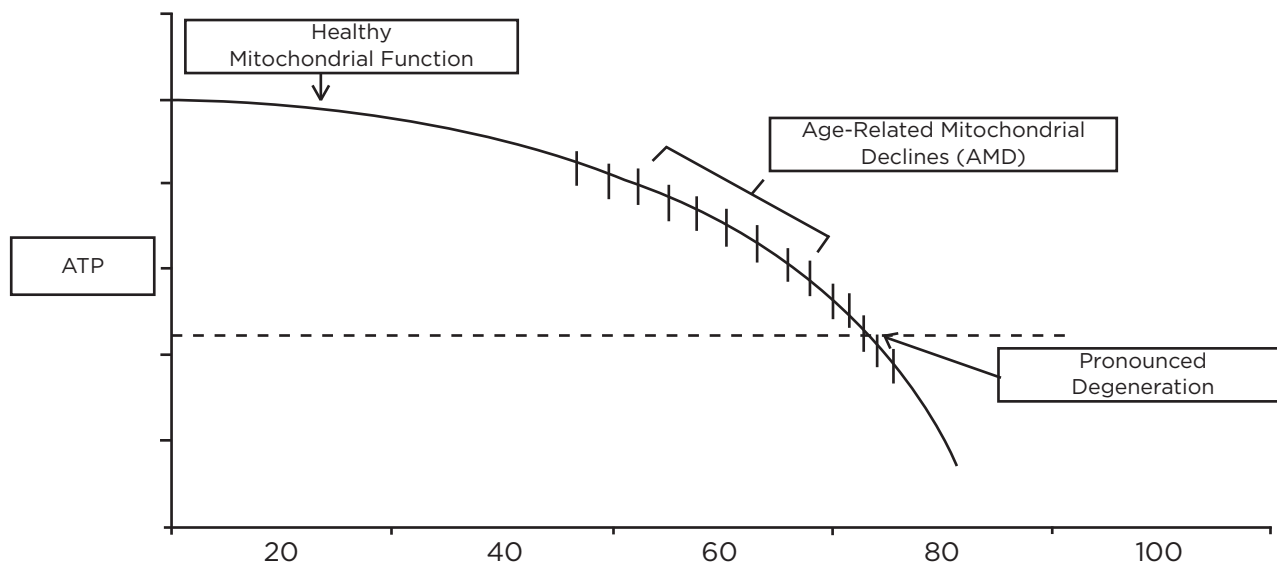
### Background

K-PAX<sup>®</sup> MitoNutrients<sup>™</sup> and K-PAX<sup>®</sup> MitoNutrient<sup>™</sup> Activator supplements are the original formulas designed by Jon D. Kaiser, MD, who is an immune system and mitochondrial health specialist with 25 years of clinical experience utilizing micronutrient therapy in support of immune function and optimal energy metabolism.\* In addition to his role on the clinical faculty at the University of California-San Francisco Medical School, Dr. Kaiser has been performing research focused on the role of supporting mitochondrial health in specific populations experiencing varying levels of fatigue and decreased mental alertness.<sup>1</sup>

The K-PAX<sup>®</sup> MitoNutrients<sup>™</sup> formula was developed to support immune, hepatic, and nervous system function, with specific emphasis on supporting mitochondrial function and reducing oxidative stress.\* A thorough review of the existing literature on mitochondrial health, combined with over two decades of clinical integrative medicine experience, led to the final design of K-PAX<sup>®</sup> MitoNutrients<sup>™</sup>.

As an individual ages, the cumulative result of environmental exposures and insults, recurrent and repeated stressors, poor nutrition, and medication begin to take their toll. Aging and its associated oxidative stressors are contributing factors to a progressive decline in mitochondrial function. The following is a stylized graphic, for illustration purposes only, depicting the effects of aging on mitochondrial function.

### Natural Decline of Mitochondrial Function



## TARGETED MITOCHONDRIAL NUTRITION

All cells, with the exception of red blood cells, contain mitochondria, organelles that produce adenosine triphosphate (ATP), the cellular “energy currency”, from adenosine diphosphate (ADP) and the enzyme, ATP synthase. In addition, mitochondria are involved in many other processes within the body such as cell signaling and regulation of cellular metabolism and apoptosis. Mitochondrial energy metabolism plays a critical role not only in cellular health and function but in overall health of the individual. Certain populations have been reported to have suboptimal mitochondrial function.<sup>1-5</sup>

### Optimal mitochondrial function depends on:

- Quenching of free radicals produced during normal electron transport chain (ETC) activity
- The integrity of mitochondrial cell membranes
- The transport of critical metabolites, such as fatty acids, into the mitochondria

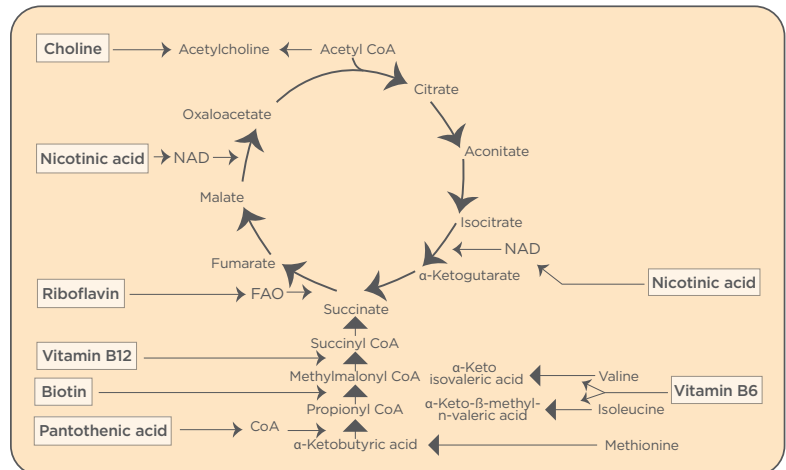
One approach to optimizing mitochondrial function is the provision of micronutrients and antioxidants that support these mechanisms.\* K-PAX® MitoNutrients™ is a unique combination of N-acetyl cysteine, acetyl L-carnitine, alpha-lipoic acid, and other key nutrients that support mitochondrial functioning, based upon ongoing research studies.\*

### K-PAX® MitoNutrients™ Blend - Mechanisms of Action

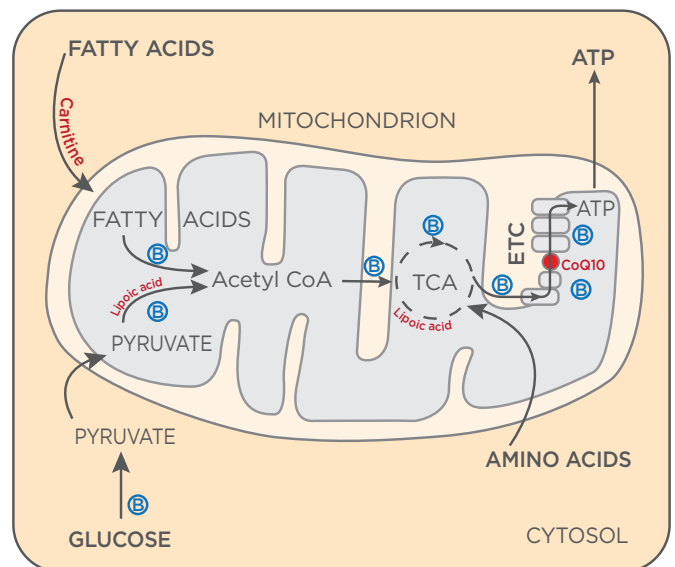
Clinicians and researchers are beginning to utilize the key triad of mitochondrial support micronutrients which include acetyl L-carnitine, alpha-lipoic acid, and N-acetylcysteine.\* These nutrients are believed to work in concert to promote healthy mitochondrial function.

Acetyl L-carnitine (ALC) has been shown to support healthy cognitive and mental function.<sup>6,7</sup> A modified amino acid, ALC is synthesized in the brain, liver, and kidney. One action of ALC is to shuttle free fatty acids across the mitochondrial membrane. Fatty acids and pyruvate act as fuel for mitochondria as part of the Krebs cycle (citric acid cycle).

In experimental animals, ALC has been shown to increase ATP production and has been found, in combination with lipoic acid, to lower oxidative stress.<sup>8,9</sup>



Normal function of the Krebs cycle requires a complex orchestration of enzymes using mineral cofactors and vitamin coenzymes to produce adenosine triphosphate (ATP).



Carnitine supports the transport of fatty acids into the mitochondria to be used as fuel.\* Alpha lipoic acid is a cofactor for certain mitochondrial enzymes.

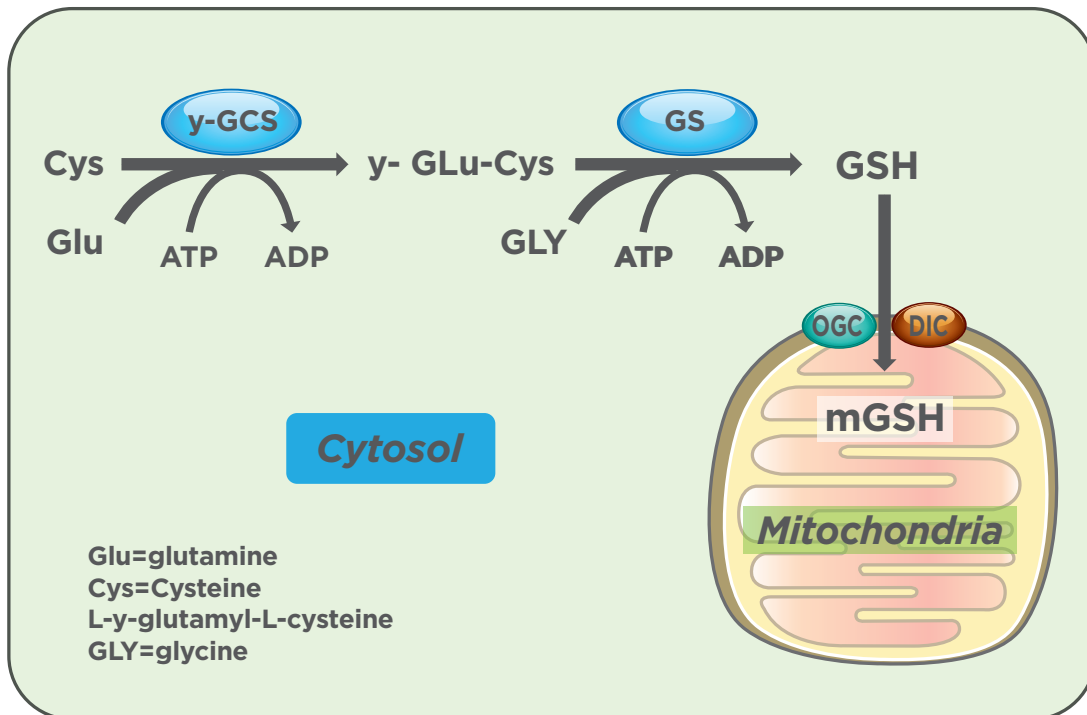
The supportive effects of alpha-lipoic acid (ALA) and its reduced form, dihydrolipoic acid (DHLA), have been well established. It has the ability to scavenge free radicals, chelate metals, regenerate other antioxidants (e.g., vitamin C, vitamin E) and provide reducing equivalents.\*<sup>10</sup> As a dietary supplement, it is highly bioavailable.<sup>11</sup> ALA is produced endogenously and is a cofactor for several mitochondrial enzymes.<sup>12</sup>

N-acetyl cysteine (NAC) is a potent detoxifier.\*<sup>13, 14</sup> It has a low molecular weight and is well absorbed via oral administration. NAC also replenishes intracellular glutathione.\* Mitochondrial glutathione is the main line of defense for the maintenance of the appropriate mitochondrial redox environment that supports healthy mitochondrial function and cellular health.<sup>15</sup>

In addition to the previously referenced key triad of nutrients, all mitochondria require additional co-factors for optimal function.\* This is why the K-PAX® triad is embedded into a complete multivitamin supplement.

*“K-PAX® MitoNutrients™ is designed to be the foundation for your patient’s micronutrient supplement program.”*

*-Dr. Jon Kaiser*



*Mitochondrial glutathione (mGSH) is the main line of defense for the maintenance of the appropriate mitochondrial redox environment that supports healthy mitochondrial function and cellular health. Cysteine (CYS) is a precursor to glutathione and N-acetylcysteine (NAC) is a well*

## ADDITIONAL SUPPORT

K-PAX® MitoNutrient™ Activator is designed to be taken in combination with K-PAX® MitoNutrients™ in those patient populations that require additional support for energy and alertness.\* A differentiating feature is the addition of caffeine along with B-complex vitamins, tyrosine and taurine. Through diligent trial and error, Dr. Kaiser observed that some patients did not experience the desired increase in energy when taking the mitochondrial nutrients alone, but responded well with the addition of low-dose caffeine.\* The low-dose caffeine in K-PAX® MitoNutrient™ Activator is designed to act as a catalyst to the basic mitochondrial support nutrient formula.\* Preclinical and mechanistic studies support the inclusion of caffeine, notably because caffeine increases hippocampal mitochondrial respiratory rates and may induce increased mitochondrial biogenesis.\*<sup>16,17</sup>

Individuals requiring additional support may add 1-2 tablets per day of K-PAX® MitoNutrient™ Activator in addition to K-PAX® MitoNutrients.™ Individuals may take this combination until the desired effects are seen, at which time the K-PAX® MitoNutrient™ Activator may be re-evaluated.

## THE K-PAX® ENERGY SUPPORT PROTOCOL\*

Mitochondrial Support (preventative)\*

K-PAX® MitoNutrients™ - 2-4 tablets per day with breakfast

Mitochondrial Rejuvenation

K-PAX® MitoNutrients™ - 2-4 tablets per day with breakfast

K-PAX® MitoNutrient™ Activator- 1 or 2 tablets with breakfast and/or lunch

K-PAX® MitoNutrient™ Activator is designed to be taken in combination with K-PAX® MitoNutrients™ for individuals seeking additional energy support, including those experiencing fatigue.\*

Through extensive testing in patients, Dr. Kaiser has found that some experience a more rapid difference to their energy level when both products are taken in combination from the start.\* The amount of caffeine provided is very low (less than what is found in 1/2 cup of coffee), and the amount of mitochondrial support nutrients provided is substantial; the occurrence of poor tolerability or adrenal fatigue has not been observed.\*

## References

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K-PAX®  
MITONUTRIENTS™

**Supplement Facts**

Serving Size 4 tablet

Servings per container 30

<b>Amount per 4 tablets</b>		<b>% DV</b>
Calories	10	
Total Carbohydrate	2 g	<1%†
Dietary Fiber	2 g	8%†
Vitamin A (100% Beta-Carotene as Betatene® Mixed Carotenoids)	10,000 IU	200%
Vitamin C (as Calcium Ascorbate)	1,000 mg	1,667%
Vitamin D3 (as Cholecalciferol)	500 IU	125%
Vitamin E (as d-Alpha Tocopheryl Succinate, Mixed Tocopherols)	270 IU	900%
Thiamin (B1 from Thiamine HCl)	30 mg	2,000%
Riboflavin (Vitamin B2)	30 mg	1,765%
Niacin (as Niacinamide)	30 mg	150%
Vitamin B6 (as Pyridoxine HCl)	30 mg	1,500%
Folic Acid (as Folate (Quatrefolic® brand) and Folic acid)	400 mcg	100%
Vitamin B12 (as Methylcobalamin)	500 mcg	8,333%
Biotin	100 mcg	33%
Pantothenic Acid (as d-Calcium Pantothenate)	30 mg	300%
Calcium (as Calcium Ascorbate and Citrate)	200 mg	20%
Iron (from Iron Amino Acid Chelate with aspartic acid, glycine and glutamic acid)	9 mg	50%
Iodine (as Potassium Iodide)	75 mcg	50%
Magnesium (as Magnesium Citrate)	100 mg	25%
Zinc (as Zinc Krebs Cycle Complex)‡	15 mg	100%
Selenium (as Selenomethionine)	100 mcg	143%
Copper (as Copper Bisglycinate Chelate)	1 mg	50%
Manganese (from Manganese Amino Acid Chelate with aspartic acid, glycine and glutamic acid)	5 mg	250%
Molybdenum (as Molybdenum Glycinate Chelate)	150 mcg	200%
Sodium	30 mg	1%
Potassium (as Potassium Citrate)	50 mg	1%
Mitochondrial Support Proprietary Blend	1.8 g	**
N-Acetyl-Cysteine	600 mg	
Acetyl-L-Carnitine	500 mg	
Alpha Lipoic Acid	200 mg	
Mixed Tocopherol Blend	200 mg	
Citrus Bioflavonoid Complex	150 mg	
L-Glutamic Acid	100 mg	
Coenzyme Q10 (CoQ10) (ubiquinone)	50 mg	
Betaine HCl	75 mg	**
Choline (as Choline Bitartrate)	30 mg	**
Inositol	30 mg	**

**Other ingredients:** Cellulose, hydroxypropyl methyl-cellulose, sodium carboxymethyl cellulose, silicon dioxide, magnesium stearate, sodium bicarbonate, citric acid, acacia gum, glycerin, soy lecithin riboflavin color, soybean lecithin, riboflavin color

**Contains Soy**

**Recommendations:** Take 4 tablets daily with food, or as recommended by your healthcare professional.

‡Complexed with citrate, fumarate, malate, succinate and alpha ketoglutarate.

**WARNING:** Accidental overdose of iron containing products is a leading cause of fatal poisoning in children under 6. **Keep this product out of reach of children.** In case of accidental overdose, call a doctor or poison control center immediately.

If pregnant, nursing, or taking prescription drugs, consult your healthcare professional prior to use.

**Contains No:** Sugar, yeast, wheat, gluten, dairy products, artificial flavors or preservatives.

Formulated by K-PAX Pharmaceuticals, Inc.



Integrative Therapeutics™ 120 CT - 10801

K-PAX<sup>®</sup>

MITONUTRIENT™ ACTIVATOR

**Supplement Facts**

Serving Size 1 tablet

Servings per container 60

Amount per 1 tablet		% DV
Vitamin A (100% Beta-Carotene as Betatene <sup>®</sup> Mixed Carotenoids)	2,500 IU	50%
Vitamin C (as Calcium Ascorbate)	100 mg	167%
Vitamin D3 (as Cholecalciferol)	125 IU	31%
Vitamin E (as d-Alpha Tocopheryl Succinate, Mixed Tocopherols)	50 IU	167%
Thiamin (Vitamin B1)	7.5 mg	500%
Riboflavin (Vitamin B2)	7.5 mg	441%
Niacin (as Niacinamide)	7.5 mg	38%
Vitamin B6 (as Pyridoxine HCl)	25 mg	1,250%
Folic Acid (as Folate (Quatrefolic <sup>®</sup> brand) and folic acid)	100 mcg	25%
Vitamin B12 (as Methylcobalamin)	250 mcg	4,167%
Biotin	25 mcg	8%
Pantothenic Acid (as Calcium d-Pantothenate)	7.5 mg	75%
Calcium (as Calcium Citrate, Ascorbate)	50 mg	5%
Iron (from Ferrous Bisglycinate Chelate)	2.2 mg	12%
Iodine (as Potassium Iodide)	18 mcg	12%
Magnesium (as Magnesium Citrate)	25 mg	6%
Zinc (as Zinc Krebs Cycle Complex)‡	3.7 mg	25%
Selenium (as L-Selenomethionine)	25 mcg	36%
Copper (as Copper Bisglycinate Chelate)	250 mcg	13%
Manganese (from Manganese Bisglycinate Chelate)	1.2 mg	60%
Molybdenum (as Molybdenum Glycinate Chelate)	37 mcg	49%
Sodium	5 mg	<1%
Potassium (as Potassium Citrate)	12 mg	<1%
Mitochondrial Support Proprietary Blend	487 mg	**
Acetyl L-Carnitine	125 mg	
L-Tyrosine	125 mg	
N-Acetyl-Cysteine	125 mg	
Alpha Lipoic Acid	50 mg	
Taurine	50 mg	
Coenzyme Q10 (CoQ10) (ubiquinone)	12.5 mg	
Caffeine USP	60 mg	**
Mixed Tocopherol Blend	50 mg	**
Choline (as Bitartrate)	7.5 mg	**
Inositol	7.5 mg	**
Boron (as boric acid/Boron Krebs Cycle intermediate blend)‡	250 mcg	**

†Percent Daily Values (DV) are based on a 2,000 calorie diet.

\*\*Daily Value not established.

**Other ingredients:** Cellulose, hydroxypropyl cellulose, sodium carboxymethyl cellulose, silicon dioxide, magnesium stearate, sodium bicarbonate, hydroxypropyl methylcellulose, citric acid, soy lecithin, glycerin, riboflavin color

**Contains soy**

**Recommendations:** Take 1 tablet twice daily with food, or as recommended by your healthcare professional.

‡Complexed with citrate, fumarate, malate, succinate and alpha ketoglutarate.

**WARNING:** Accidental overdose of iron-containing products is a leading cause of fatal poisoning in children under 6. **Keep this product out of reach of children.** In case of accidental overdose, call a doctor or poison control center immediately.

**Caution:** Not recommended for use by pregnant or nursing women or by children under 18 years of age. Do not use if sensitive to caffeine. Each serving of this product contains 60 mg of caffeine. If taking prescription drugs, consult your healthcare professional prior to use.

**Contains No:** Sugar, yeast, wheat, gluten, dairy products, artificial flavors or preservatives.

Formulated by K-PAX Pharmaceuticals, Inc.

K-PAX<sup>®</sup> MitoNutrient™ Activator is designed to complement K-PAX<sup>®</sup> MitoNutrients™ in individuals who require additional energy support.



Integrative Therapeutics™ 60 CT - 10800

\*THESE STATEMENTS HAVENOT BEEN EVALUATED BY THE FOOD AND DRUG ADMINISTRATION. THESE PRODUCTS ARE NOT INTENDED TO DIAGNOSE, TREAT, CURE, OR PREVENT ANY DISEASE.

