Designs For Health
Evail™ Series

All natural process and formulation that improves the absorption and delivery of nutrients that are otherwise difficult to absorb
Berb-Evail™ combines 400mg of the plant alkaloid berberine (from *Berberis aristata*) for the primary purpose of supporting healthy blood sugar levels and enhancing insulin sensitivity. As downstream effects of these main actions, berberine may also help improve dyslipidaemia and other features of metabolic syndrome. Additionally, berberine has been shown to exhibit antimicrobial properties.

**The Designs for Health Evail™ Process – for enhanced absorption of berberine**

Berb-Evail™ is manufactured using the Designs for Health Evail™ technology, which is an all-natural formulation that improves the absorption and delivery of berberine. This process uses a proprietary blend of MCT oils, non-soy derived lecithin, and vitamin E, without the use of potentially harmful surfactants.

**Insulin and Blood Glucose Management**

The most prominent of berberine’s pharmacological properties are its beneficial effects on insulin and blood glucose management. Berberine exerts its effects independently of the mechanisms of metformin and other common hypoglycaemic agents, so the compound may be used alone or in conjunction with conventional pharmaceutical drugs. In fact, berberine has been shown to be as effective as the popular drug metformin in lowering fasting blood glucose and haemoglobin A1c (HbA1c), LDL-C, triglycerides, and fasting insulin. When added to the existing medication regimens of patients with poorly controlled diabetes, berberine significantly reduced fasting and postprandial blood glucose, insulin, HbA1c and HOMA-IR. These changes were observed after just five weeks of berberine supplementation.

Research supports berberine’s impressive effects on diabetes management and shows that it may be especially effective for diabetic patients with compromised liver function, for whom the potential adverse side-effects of conventional hypoglycaemic drugs may not be an option. In study subjects with chronic hepatitis, berberine supplementation resulted in decreased enzyme markers for liver damage (ALT and AST), as well as decreased gamma-glutamyl transferase (GGT) in subjects without liver damage.

There are multiple mechanisms behind berberine’s influence on blood glucose control and insulin sensitivity. In diabetics using insulin, the addition of berberine resulted in increased fasting and postprandial C-peptide levels, which suggests that long-term use of berberine might improve endogenous insulin secretion in patients who fail to respond, or who respond poorly, to oral hypoglycaemic agents. In addition to increasing insulin secretion, berberine has been shown to increase insulin receptor expression in cultured human liver and muscle cells, which may improve insulin sensitivity. Moreover, contrary to thiazolidinedione drugs (TZDs), berberine “suppresses the differentiation of pre-adipocytes, and reduces the accumulation of lipid droplets.” This suggests berberine might be especially useful in cases of overweight or obese diabetics, where the potential for additional weight gain and oedema associated with conventional pharmaceuticals would be undesirable.

Another biochemical mechanism behind berberine’s impressive effects is the inhibition of intestinal carbohydrate-digesting enzymes. Diabetic rats supplemented orally with berberine showed significant, dose-dependent
Berberine has been shown to exert favourable effects on blood lipids and non-alcoholic fatty liver. Unlike statin drugs, berberine does not affect the complex cholesterol biosynthesis pathway, and therefore does not present the same undesirable side-effects. Berberine upregulates the expression of LDL receptor mRNA and increases liver expression of LDL receptors, allowing for more effective clearance of LDLs from the bloodstream. Diabetic, dyslipidemic rats supplemented with berberine showed favourable changes to total cholesterol, triglycerides, LDL-C, ApoB, and HDL-C. For some parameters, the effects were more powerful than those achieved with rosiglitazone and fenofibrate.

In rats fed a fatty liver-inducing diet, supplemental berberine resulted in decreased total body weight, visceral adiposity, total cholesterol, LDL-C and triglycerides, while also reducing serum ALT and AST, which suggests a protective effect for liver function. These markers were reduced compared to fatty liver rats not supplemented with berberine, but more notably, some of these parameters were reduced to levels seen in a healthy control group fed a normal diet. Rats supplemented with berberine had lower liver weights and lower triglyceride content in the liver. Researchers concluded that berberine has direct effects upon the methylation status of genes involved in deposition of triglycerides in the liver.

Berberine has also been demonstrated to reduce fibrosis in chemically induced liver damage. Because the liver is a key player in glycaemic control, compounds that aid in blood sugar handling while simultaneously conferring significant protection to liver function may be powerful tools in the arsenal against metabolic syndrome.

Antimicrobial Effects
Beyond its role as a powerful agent for blood sugar regulation, berberine has long been recognised as an anti-microbial, anti-viral, and anti-parasitic compound. Berberine extracts have demonstrated bactericidal effects against diarrhoea-causing strains of *Vibrio cholera* and *Escherichia coli*, and anti-parasitic effects against *Giardia lamblia*, *Entamoeba histolytica*, and *Trichomonas vaginalis*. Berberine may be as effective as the common antibiotic Flagyl against giardiasis. Other common organisms shown to be subject to the antimicrobial action of berberine include Candida, Chlamydia, Salmonella, Klebsiella, Clostridium, Shigella, and Cryptococcus.

When to consider **Berb-Evail™**
- **Blood Glucose:** Consider using **Berb-Evail™** when additional support for blood sugar management and insulin resistance is desired.
  - **Berb-Evail™** should be added to a protocol that first includes **Metabolic Synergy™**, our foundational glucose support formula, along with **Sensitol™**, which helps with insulin resistance.
  - Additional glucose support formulas may be included, such as **Chromium Synergy™**.
• **Antimicrobial Effects in the GI**: Consider Berb-Evail™ when short term (4-6 weeks) adjunctive therapy to a foundational regimen of GI Microb-X™ and Oil of Oregano may be warranted.

**Cautions**
- Due to the potential for additive effects resulting from inhibition of DPP IV by berberine, special consideration should be given when adding this product to the supplement regimen of patients who may already be taking a DPP IV inhibitor.
- Due to berberine’s antimicrobial activity, it is recommended that long-term use of this product be accompanied by monitoring of the GI microbiota, such as with the DFH GI-MAP molecular stool analysis through Diagnostic Solutions Labs, to assure that changes to intestinal microflora, which may benefit from probiotic supplementation, can be addressed with Probiotic Synergy™, Probiotic Supreme™ or Probiophage DF™.

**Recommended Use:**
As a dietary supplement, take one softgel per day, or as directed by a health care practitioner.

**References**
**Curcum-Evail™**

Highly bioavailable curcumin formula for superior absorption

---

**Curcum-Evail™** is a patent pending, highly bioavailable curcuminoid formulation. This product contains a unique combination of three bioactive, health-promoting curcuminoids: curcumin, bisdemethoxy curcumin and demethoxy curcumin, along with turmeric oil. The three curcuminoids are the strongest, most protective and best researched constituents of the turmeric root. Naturally occurring turmeric root powder contains only 5-7% curcumin, while the blend in Curcum-Evail™ is concentrated to contain 95% curcuminoids, of which curcumin represents 70%.

The crystalline structure of curcumin renders it difficult to absorb in the GI tract. According to researchers, “The potential health benefits of curcumin are limited by its poor solubility, low absorption from the gut, rapid metabolism and rapid systemic elimination.”\(^1\) For this reason, Curcum-Evail™ is manufactured using the new Designs for Health Evail™ process, which is an all-natural formulation that improves the absorption and delivery of curcumin.

This process uses a proprietary blend of MCT oils, non-soy derived lecithin, and vitamin E, without the use of potentially harmful surfactants. This delivery technology increases the absorption rate and reduces the absorption time for nutrients and may allow for superior effects through lower dosages.

Curcum-Evail™ is unique in that it has been shown to increase tetrahydrocurcumin as well as curcumin, demethoxycurcumin and bisdemethoxycurcumin in plasma. Tetrahydrocurcumin is a major metabolite of curcumin and demonstrates remarkable antioxidant properties exceeding those of curcumin alone.\(^2\)\(^-\)\(^4\) Compared to reference products containing equal concentrations of curcuminoids, Curcum-Evail™ exhibited several-fold higher absorption, resulting in plasma levels of tetrahydrocurcumin that were nearly 30 times higher. Area under the curve (AUC) amounts for plasma levels of all three curcuminoids in this formula were significantly higher than for the reference products.
Curcumin and the Inflammatory Response
Excessive inflammation is a common risk factor for disease occurrence and progression. Inflammation may lead to joint tissue destruction, cancer, cardiovascular events, insulin resistance/diabetes and brain/liver/kidney degenerative diseases. Research shows curcumin helps support a healthy inflammatory response. It was shown to reduce both acute and chronic inflammation caused by physical injury, joint wear and tear (as in osteoarthritis), chronic infections or inadequate antioxidant protection. Curcumin was shown to be more effective than certain NSAIDs in reducing inflammation and pain associated with rheumatoid arthritis or post-operative trauma. It has a better cardiovascular safety profile than aspirin because, unlike aspirin, it does not inhibit the arterial protective factor prostacyclin. Curcumin acts on the mother compound NF Kappa beta. By suppressing this inflammatory marker, curcumin has a domino effect that reduces the entire cascade of inflammatory compounds that would be produced thereafter.

Curcumin has an advantage over pharmacological anti-inflammatory agents because it is a powerful antioxidant, so it can also reduce COX expression along with being a COX 1 and COX 2 inhibitor. Where NSAIDs are known to have potential GI side effects such as GI bleeding, one study showed that curcumin was able to heal GI injury caused by the NSAID indomethacin. Amazingly, curcumin and resveratrol have been proven to be even stronger anti-inflammatories than ibuprofen and aspirin.

Allergies and Histamine Release
Curcumin has been shown to decrease histamine release, suggesting that it plays a significant role in exerting both anti-oxidative and anti-allergic activities. Research shows that curcumin’s potential beneficial effect on the allergic response works by inhibiting the production of cytokines affecting eosinophil function and IgE synthesis.

Autoimmune Conditions
Curcumin downregulates mediators characteristic of rheumatoid arthritis, and was shown to reduce disease activity in a model of multiple sclerosis in animals. "These findings highlight the fact that curcumin inhibits experimental encephalomyelitis by blocking IL-12 signalling in T cells and suggest its use in the treatment of MS and other Th1 cell-mediated inflammatory diseases."

By boosting NK cell activity, curcumin may also enhance the body's ability to fight infections.

Additional Research
There are many studies on curcumin and cancer. For patients undergoing chemotherapy, curcumin does not need to be avoided as it has been shown to enhance chemotherapy effectiveness. Curcumin was the highlight of human clinical trials performed at the M.D. Anderson Cancer Institute in Houston, Texas.
“In addition to anti-oxidation, curcumin could also induce apoptosis by targeting mitochondria, affecting p53-related signalling and blocking NF-kappaB activation. To further dissect its anti-carcinogenic mechanisms, a number of curcumin targets were identified. These included the aryl hydrocarbon receptor, cytochrome P450, glutathione S-transferase, serine/threonine kinases, transcription factors, cyclooxygenase, ornithine decarboxylase, nitric oxide synthase, matrix metalloproteinases and tyrosine kinases.” 44

Many spices protect the body from bacteria and parasites in food, while boosting the body’s antioxidant abilities. Research shows curcumin to have antimicrobial activities. Curcumin was shown to reduce transcription of Epstein Barr and HIV virus. Curcumin may work to inhibit the growth of Staphylococcus aureus, Staphylococcus albus, and Bacillus typhosus, and is also effective against nematode parasites and certain protozoa.4

GI Protection
Curcumin may benefit ulcer, proctitis (inflammation of the rectum common in ulcerative colitis and Crohn’s disease) and may reduce leaky gut syndrome.

“We conclude that antilulcer activity of curcumin is primarily attributed to matrix metalloproteinases-9 inhibition, one of the major pathways of ulcer healing.” 8 “A pure curcumin preparation was administered in an open label study to five patients with ulcerative proctitis and five with Crohn’s disease. All proctitis patients improved, with reductions in concomitant medications in four, and four of five Crohn’s disease patients had lowered CDAI scores and sedimentation rates.” 13

Cardiovascular Protection
Curcumin may lower total cholesterol, fibrinogen and platelet aggregation, while increasing HDL and decreasing lipid peroxidation.30, 38, 22, 41

In one study, “The effect of curcumin administration in reducing the serum levels of cholesterol and lipid peroxides was studied in ten healthy human volunteers, receiving 500mg of curcumin per day for 7 days. A significant decrease in the level of serum lipid peroxides (33%), increase in HDL Cholesterol (29%), and a decrease in total serum cholesterol (11.63%) were noted.” 30 According to another study, “Our reviewed data show that, in human healthy subjects, the daily intake of 200mg of the above extract results in a decrease in total blood lipid peroxides as well as in HDL and LDL-lipid peroxidation. This anti-atherogenic effect was accompanied by a curcuma antioxidant-induced normalization of the plasma levels of fibrinogen and of the apo B/apo A ratio, that may also decrease the cardiovascular risk.” 38

Brain Protection
Curcumin pre-treatment reduced brain damage following ischemia/stroke and from heavy alcohol intake.54 Curcumin reduced development and severity of Alzheimer’s disease in animal models by reducing plaque aggregation and plaque induced oxidative stress and was even capable of dissociating existing plaque.21 Its chelating ability for iron and copper ions is also believed to play a beneficial role in reducing the progression of the disease.57

“Initially, we reported the impact of non-steroidal anti-inflammatory drugs (NSAIDs), notably ibuprofen, which reduced amyloid accumulation, but suppressed few inflammatory markers and without reducing oxidative damage. Safety concerns with chronic NSAIDs led to a screen of alternative NSAIDs and identification of the phenolic anti-inflammatory/anti-oxidant compound curcumin, the yellow pigment in turmeric that we found targeted multiple AD
pathogenic cascades. The dietary omega-3 fatty acid, docosahexaenoic acid (DHA), also limited amyloid, oxidative damage and synaptic and cognitive deficits in a transgenic mouse model. Both DHA and curcumin have favourable safety profiles, epidemiology and efficacy, and may exert general anti-aging benefits (anti-cancer and cardio-protective).  

Liver Protection

Curcumin pre-treatment was shown to reduce the liver damage induced by alcohol\(^8\) and aflatoxin\(^9\) (the fungal toxin often found along with peanuts/peanut butter).

How to Take

- Take one softgel per day with a meal, or as directed by a health care practitioner.
- There is no upper level of toxicity established for turmeric or curcumin. A range of 200-1200mg/day was used for various applications with significant benefits. The effective dose may depend on the severity of inflammation. One factor that affects inflammation and proliferation is the AA/EPA ratio in cell membranes. The higher the AA/EPA ratio the higher the demand for the inhibition of COX and LOX enzymes, so a higher dose of curcumin may be beneficial.

Interactions

- Not recommended during pregnancy.
- Individuals on blood thinning therapy,\(^14\) or anyone with gallstones (stimulates bile flow), ulcers, and GI inflammatory conditions should be monitored closely.
- Inhibits various P450 enzymes.\(^67\)
- Inhibits growth of lactobacillus\(^5\) so probiotics supplementation is recommended.

References

DIM-Evail™

Highly Absorbable Diindolylmethane softgels

This information is provided for the use of physicians and other licensed health care practitioners only. This information is intended for physicians and other licensed health care providers to use as a basis for determining whether or not to recommend these products to their patients. This medical and scientific information is not for use by consumers. The dietary supplement products offered by Designs for Health are not intended for use by consumers as a means to cure, treat, prevent, diagnose, or mitigate any disease or other medical condition.

Plant indoles, also called glucosinolates, found in cruciferous vegetables provide health benefits to humans. Cruciferous vegetables are known for their cancer protection. Two such indoles provided by cruciferous vegetables are I3C (Indole-3-Carbinol) and DIM (Diindolylmethane). DIM is not naturally present in these plants. It gets released with the help of enzymes upon crushing of the broccoli, cauliflower, cabbage or brussel sprouts or during human digestion.¹,³ Stomach acid, or HCl, can also aid the joining of two indole 3 carbinols to make diindolylmethane. Lack of HCl will hinder one’s ability to make DIM from I3C.²

Basically, DIM is two molecules of I3C combined together. I3C in a capsule is not shelf stable because it is sensitive to light, heat and moisture. I3C is irritating to the stomach and research tells us that it can have very negative side effects in doses over 300mg daily such as dizziness and unsteady gait which may be due to nervous system toxicity. One study shows evidence that 90% of orally consumed I3C converts to other compounds. It may be these other compounds that cause these side effects. One compound I3C converts to is ICZ, or indolocarbazole. This compound causes DNA damage.⁴ DIM studies show no toxicity when given triple the dose in humans.

The Designs for Health Evail™ Process
Due to its crystalline structure, absorption of DIM is minimal when given orally. For this reason, DIM-Evail™ is manufactured utilising the new Designs for Health Evail™ process, which is an all-natural formulation that improves the absorption of DIM. This process uses a proprietary blend of MCT oils, non-soy derived lecithin, and vitamin E, without the use of potentially harmful surfactants.

What Actions Does DIM Have on the Body that Make it Beneficial to our Health?
It has been suggested that a low level of the 2-hydroxyestrone metabolites (2-OHE) and a high level of 16 alpha-hydroxyestrone (16 alpha-OHE1) is associated with an enhanced risk of breast cancer. DIM increases 2 hydroxyestrone and therefore improves the 2/16 hydroxyestrone ratio, making it very protective for women at high risk for this condition.⁵

Research by Bradlow says that DIM also reduces availability of 4-androstenedione for aromatisation to estrone.⁷ He concludes that DIM is more potent than I3C at protecting against mammary carcinoma due to decreased formation of 16 alpha-hydroxyestrone from estrone.⁶

Doesn’t Research Support the Use of I3C for Cancer Prevention Such as Breast Cancer?
There are positive studies on supplementation of I3C because they are looking at limited parameters such as improvement in the 2/16 hydroxyestrone ratio. When we take a broader look, however, I3C raises 4-hydroxyestrogen with the potential of aggravating cancers such as breast, endometrial and prostate cancer. I3C increases 4-hydroxyestrogen production in animals and in humans.⁸ DIM does not. 4-hydroxyestrogens and CYP1B1, the only CYP source of 4-hydroxyestrogen, have both been implicated in the causation of prostate and breast cancer in humans. 4-hydroxyestrogens and CYP1B1 are also implicated in the causation and growth of uterine fibroid tumours and endometriosis.
Researchers from the Department of Pathology, Sasaki Institute, Tokyo, Japan concluded the following: “These results suggest that induction of the CYP1 family in the liver and sequential modulation of estrogen metabolism to increase 4HE might play a crucial role in promoting the effects of dietary I3C on endometrial adenocarcinoma development.”

What About Toxicity Studies?
In acute toxicity studies in mice, “DIM produced no observable 24-hr acute toxicity up to 4 g/kg body weight, except for a slight decrease in haematocrit. However, I-3-C exhibited a dose-dependent toxicity above 100 mg/kg body weight, including a decrease in hepatic reduced glutathione after 2 hr and severe neurological toxicity, and the release of liver enzymes to the plasma at 24 hr.”

Bottom Line: Supplementation of DIM should be recommended over supplementation of I3C for safety purposes.

DIM is a More Potent Antioxidant Than I3C
When tested side by side with I3C, DIM was shown to be a more potent antioxidant with greater activity than vitamin E because of its hydrogen (electron) donating ability.

Should We Just Eat Cruciferous Vegetables?
Eating two pounds of cruciferous vegetables like raw cabbage or broccoli can ultimately supply, via I3C conversion into DIM, about 20-30 mg of DIM. Therefore, supplementation is ideal along with consuming cruciferous vegetables.

What Does DIM Do?
Research clearly shows that 4 hydroxyestrogen and 16 hydroxyestrogen are not favourable when elevated. Many doctors are now performing clinical tests on their patients to screen for risk of breast cancer. Low risk for breast cancer is marked by a high 2/16 ratio (2 hydroxy to 16 hydroxy estrogen). It is clearly established by research that DIM raises the 2/16 ratio without elevating 4 hydroxyestrogen. DIM helps men too because it is an aromatase inhibitor. DIM helps to block the conversion of testosterone to estrogen. Regarding dosing, I3C needs to be given at 3-4 times the dosage of DIM to provide the same positive benefits. (Note: 300-400mg I3C as compared to 60-100mg DIM). I3C in low doses, like the amounts found in cruciferous vegetables is safe. I3C ingested at higher doses needed to shift estrogen ratios may be problematic.
**Can DIM be Taken with Medications?**

DIM is safe when taken with Tamoxifen, birth control pills and other herbs such as St. John’s Wort that affect cytochrome p450 enzymes. Because of its effects on CYP enzymes, I3C, however, should not be taken with any of these. I3C blocks ovulation, can interfere with birth control pills and may alter the effects of many herbs such as St John’s Wort and could lead to Tamoxifen toxicity if taken simultaneously. Researchers in Minneapolis found that DIM does not affect the metabolism of Tamoxifen. I3C on the other hand, converts Tamoxifen into N-desmethyl-Tamoxifen 3 fold, which itself gets transformed into a genotoxic metabolite. Research titled *Endocrine Disruption by I3C and Tamoxifen: Blockage of Ovulation* may be disturbing to some. This is a quote from the Gao ovulation study: “In the current study, I3C disrupted ovulation already at doses that did not elicit systemic toxicity as indicated by a lack of reduced body weight gain, which was then observed at higher doses.” Gao asserts that “I3C appears to have TCDD-like inhibitory effects on ovulation.” TCDD is a strong dioxin chemical. Researchers in Denmark state “Indolo[3,2-b]carbazole (ICZ), which is formed in the acidic environment of the stomach after intake of I3C, has a similar structure to, and shares biological effects with, the well-known tumour promoter 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD).” This is the conclusion of their study: “Further studies are needed in order to clarify the anti-carcinogenic/carcinogenic effects of I3C and ICZ before high doses of I3C may be recommended as a dietary supplement.” They feel that ICZ’s tumour promoting activity is due to its activation of the Ah receptor and stimulation of certain cytochrome p450 enzymes mainly Cyp1a1, Cyp1a2 and Cyp1b1.

DIM’s proven safety means that DIM can be used by women wishing to get pregnant but should be discontinued during pregnancy and lactation. There are no known contraindications for DIM supplementation.

**Should Men Take DIM?**

Men who wish to prevent prostate cancer and men with a family history of prostate cancer should take DIM. Research published in the *British Journal of Cancer, 2004* states, “Prostate cancer mortality results from metastases to the bones and lymph nodes and progression from androgen-dependent to androgen-independent disease. Although androgen ablation was found to be effective in treating androgen-dependent prostate cancer, no effective life-prolonging therapy is available for androgen-independent cancer.” Results of this study suggest that DIM induces apoptosis in PC3 cells, through the mitochondrial pathway suggesting that DIM is hopeful as a therapeutic strategy for the treatment of androgen-independent prostate cancer.

According to UC Berkeley researchers, “DIM exhibits potent anti-proliferative and anti-androgenic properties in androgen-dependent human prostate cancer cells. DIM suppresses cell proliferation of LNCaP cells and inhibits dihydrotestosterone (DHT) stimulation of DNA synthesis.” DIM is a strong competitive inhibitor of DHT binding to the androgen receptor. This study is titled: *Plant-derived 3,3'-Diindolylmethane Is a Strong Androgen Antagonist in Human Prostate Cancer Cells.* An in vivo study in rats showed that DIM cut in half testosterone 16 alpha and 2 alpha-hydroxylation.
References

4. Park JY, Shigenaga MK, Ames BN. Induction of cytochrome P4501A1 by 2,3,7,8-tetrachlorodibenzo-p-dioxin or indolo(3,2-b)carbazole is associated with oxidative DNA damage.
Q-Evail™ offers highly bioavailable ubiquinone coenzyme Q10 (CoQ10) in easy-to-swallow softgels. It is manufactured via a new, proprietary emulsification process that uses all-natural ingredients, including vitamin E, medium chain triglycerides (MCT) and lecithin, and is free of polysorbates, castor oil, and polyoxyethylated chemicals. Superior bioavailability has been demonstrated in an in-house human clinical trial, showing this material to be up to 390% more bioavailable than our previous, superior absorption, Q-Avail formulation.

Coenzyme Q10
Coenzyme Q10 is a fat-soluble, high molecular weight compound produced by the body for the basic functioning of cells. It is synthesised endogenously on a branch of the mevalonate pathway, which also produces cholesterol. CoQ10 plays a central role in cellular energy metabolism that produces adenosine triphosphate (ATP), the energy currency for muscle contraction and other cellular processes. Organs with high energy demands, such as the heart and liver, have the highest concentrations of CoQ10.

CoQ10 is recognised for its significant role in the electron transport chain as well as being one of the body’s most vital antioxidants. It is found in the mitochondria, the energy-producing center or “powerhouse” of the cell. In addition to being produced in the body, CoQ10 can also be obtained in small amounts through certain dietary sources, such as fish (salmon and tuna) and organ meats (heart, liver and kidney). These amounts (internal and dietary), however, may often be inadequate to meet the body’s demands. Additionally, age and various illnesses, as well as the use of various medical classes, increase the need for this valuable nutrient. Thus, as is the case with many vitamins and minerals, supplemental amounts of CoQ10 may be beneficial for ameliorating specific health conditions and helping to prevent or limit oxidative damage.

CoQ10 Demystified
CoQ10 exists in both ubiquinone and ubiquinol forms, its names derived from the word “ubiquitous” because it is present everywhere in the human body. The number ten in “CoQ10” refers to its biochemical structure, which consists of ten isoprene units attached to a benzoquinone “head.”

In the mitochondrial electron transport system, CoQ10 undergoes continuous reversible oxidation and reduction. It is converted to ubiquinol (reduced form) when it accepts electrons and to ubiquinone (oxidized form) when it donates electrons. As an antioxidant, CoQ10 regulates membrane fluidity, recycles radical forms of vitamin C and E, and protects membrane phospholipids against peroxidation (the process whereby free radicals “steal” electrons from the lipids in cell membranes, which can result in cell damage).

Why is CoQ10 Important?
Low levels of ubiquinone have been documented in people experiencing various conditions including:

- Chronic fatigue syndrome
- Congestive heart failure
- Angina pectoris
- Coronary artery disease
- Cardiomyopathy
- Chronic obstructive pulmonary disease
- Parkinson's disease
- Cancer
- Periodontal disease
- Asthma
- Age-related macular degeneration
- Hyperthyroidism
- HIV/AIDS
- Cerebellar ataxia

Who May Benefit
Supplementation with CoQ10 has been shown to provide a wide range of health benefits and may help support the following:

- Cardiovascular health
- Hypertension
- Aging
- Fatigue
- Dental health
- Eye health
- Renal health
- Migraines
- Neural and brain health
- Chemotherapy
- Genetic CoQ10 deficiencies
- Male infertility

To contact Invivo Clinical, please call us on 0333 241 2997, or visit us at www.invivoclinical.co.uk
Medications and CoQ10 Depletion
CoQ10 is synthesized in the same pathway as cholesterol, and therefore also involves the HMG CoA reductase enzyme. CoQ10 production is negatively affected by the use of cholesterol-lowering statin drugs because they interfere with this enzyme by design. Research suggests that some statin drugs decrease serum CoQ10 levels by as much as 40%. In addition, other drugs (gemfibrozil, adriamycin, beta blockers) have been found to decrease serum CoQ10.

CoQ10 Supplementation
- Most healthy individuals are able to convert ubiquinone to ubiquinol. It has been shown that 80-95% of circulating CoQ10 following oral ingestion of a ubiquinone supplement is in the form of ubiquinol. However, there is evidence that suggests the ability to convert ubiquinone to ubiquinol may diminish with age. Thus, consider recommending Q-Evail® along with CoQnoil®, highly absorbable ubiquinol, for comprehensive intake of CoQ10, especially in the elderly.
- Q-Evail® can be taken along with Mitochondrial NRGT™ for additional mitochondrial support and improvement in overall cellular and tissue vitality and health.

References
3. Non-GMO
**Q-Evail™ Absorption Study**

Q-Evail™ is a bioavailable proprietary CoQ10 formulation in a softgel format from Designs for Health.

Oral supplementation of coenzyme Q10 (CoQ10) is often desired to enhance antioxidant capabilities and improve immune function, mitochondrial metabolism and energy production in order to help support fatigue-related disorders, the enhancement of athletic performance, prevention of periodontal problems, and the support of cardiomypathy and neurodegenerative conditions such as Parkinson’s. One of the main concerns with CoQ10 is its poor bioavailability in humans. Many commercial dietary supplement formulations employ various strategies to improve absorption such as size reduction, solubility enhancement and use of novel carriers. Designs for Health (DFH) has developed a proprietary CoQ10 formulation that was shown in an in-house human study to be more bioavailable than its Q-Avail™ softgel.

**Study**

The absorption of the DFH Q-Evail™ softgel relative to DFH Q-Avail™ softgel was determined during a randomised crossover study with six healthy participants in August 2014. Blood samples were collected at baseline and at 2, 4 and 8 hours after oral ingestion of a single dose of 100mg ubiquinone following an overnight fast on an empty stomach. CoQ10 levels in plasma were assayed by a national clinical testing laboratory.

<table>
<thead>
<tr>
<th>Formulation</th>
<th>CoQ10 mg/dose</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFH Q-Evail™</td>
<td>100</td>
<td>Softgel</td>
</tr>
<tr>
<td>DFH Q-Avail™</td>
<td>100</td>
<td>Softgel</td>
</tr>
</tbody>
</table>

**Results**

The changes in plasma CoQ10 concentrations from baseline following oral ingestion of the formulations were determined and plotted as mean plasma CoQ10 concentration-time curves. Ingestion of DFH Q-Evail™ resulted in a higher increase in plasma CoQ10 above baseline.

The area under the plasma CoQ10 concentration time- curves (AUCs) were calculated and relative absorptions between formulations were determined by dividing the AUC value of Q-Evail™ by that of Q-Avail™ for each subject (as shown in Figure 1).

The in-house bioavailability study showed that CoQ10 in Q-Evail™ was up to 390% more absorbed than Q-Avail™.

**References**