

# HydroEye®

## SoftGels

### Description

HydroEye is a unique, patented oral formulation that helps provide relief for dry eyes. Its proprietary blend of key nutrients works to produce a healthy tear film and support ocular surface health.

### HydroEye Highlights

- ▶ Offers relief for dry eyes with a proprietary blend of omega-3 and omega-6 fatty acids, vitamin A, antioxidant vitamin C and other nutrient cofactors involved in fatty acid metabolism
- ▶ Features highest quality, USP®-verified fish oil from the purest sources
- ▶ Promotes long-lasting relief with continued use; results typically experienced within 30-60 days
- ▶ Manufactured in NSF®-certified facilities from the finest quality, bioavailable ingredients
- ▶ Four softgels taken orally per day
- ▶ HydroEye is an effective stand-alone formulation for dry eye support\*

*\*HydroEye can be appropriately combined with any other ScienceBased Health product*

### What is Dry Eye?

Dry eye syndrome (keratitis or keratoconjunctivitis sicca) is characterized by chronic dryness of the eye's conjunctiva and cornea due to inadequate tear fluid or excessive loss of tears. People with dry eye frequently experience itching, burning or gritty sensations. Some also notice a flood of tears after eye irritation. These symptoms can be aggravated by prolonged visual efforts such as reading, working on the computer, driving or watching TV. Environmental factors such as low humidity, air travel, heating or air conditioning, and contact lens wear can also contribute to or worsen dry eye. In addition to discomfort, dry eye can also reduce visual function during everyday activities such as reading or driving<sup>1</sup>.

### Causes of Dry Eye

Many researchers view the ocular surface, along with the main tear gland and the

nerves connecting them, as a functional unit. The cornea, conjunctiva, accessory tear (lacrimal) glands, and oil secreting (meibomian) glands are all considered part of the ocular surface. When one part of this unit is compromised, normal support of the ocular surface can be impaired<sup>2</sup>.

In Sjögren's syndrome, for example, damage to the lacrimal gland causes diminished tear formation and dry eye. Conditions such as rosacea can affect the oil producing glands. By altering the quality of the tear's oily outer layer, tears evaporate more readily and dry eye can result. Dry eye commonly follows surgical procedures such as laser in-situ keratomileusis (LASIK) and photorefractive keratectomy (PRK)<sup>3</sup>. Even aging and the loss of hormones after menopause can disrupt ocular surface support and promote dry eye<sup>4</sup>.

### Inflammation: A Critical Factor in Dry Eye

Although the causes of dry eye are varied, evidence supports chronic inflammation as a common underlying factor<sup>2,5,6</sup>. Researchers believe that ocular dryness leads to cellular damage and the release of small proteins called cytokines that initiate or amplify the body's immune and inflammatory response. Increased levels of cytokines have been detected in the tear fluid and conjunctiva of people with dry compared to normal eyes<sup>7</sup>. Certain cytokines prompt cells to produce other compounds that play a role in the development of inflammation such as prostaglandins, enzymes and free radicals.

### Dietary Fats: Pro- or Anti-inflammatory

Dietary fatty acids are stored in cell membranes. With injury or insult, some of these fatty acids can be mobilized and transformed into prostaglandins,

small hormone-like compounds that help regulate a variety of processes in the body, including inflammation.

Dietary fats include the omega-6 and omega-3 families. Some members of these families become building blocks for prostaglandins. Certain fatty acids can be converted in the body to anti-inflammatory prostaglandins (PGE1 and PGE3). These anti-inflammatory fats include gamma-linolenic acid (GLA) of the omega-6 family, as well as eicosapentaenoic (EPA), docosahexaenoic (DHA) and alpha-linolenic (ALA) acids of the omega-3 family. Other fatty acids form a pro-inflammatory prostaglandin (PGE2).

The typical American diet is rich in meats, dairy and other oils containing fatty acids that can become pro-inflammatory prostaglandins. The American diet is also less abundant in fish and oils whose metabolic products are anti-inflammatory. Altering the kinds of fats we consume can influence the kinds of prostaglandins produced, and help quiet inflammation<sup>8</sup>.

### Rationale for Key Ingredients

**Omega Fatty Acids:** GLA (235 mg) from Black Currant Seed Oil, EPA (100 mg) and DHA (70 mg) from USP-Verified Fish Oil

GLA, a unique and specialized omega-6 fatty acid from black currant seed oil, is found only in ultra trace amounts in the diet. GLA can be converted to the

anti-inflammatory prostaglandin, PGE1, which supports normal tear secretion. Clinical studies report that GLA reduces symptoms and calms inflammation in those with dry eye<sup>9</sup>, improves symptoms and increases tear production in people undergoing corrective laser procedures<sup>10</sup>, and improves contact lens comfort<sup>11</sup>. It also reduces symptoms and increases anti-inflammatory prostaglandin levels in those with Sjögren's syndrome<sup>12</sup>.





**Suggested Use:** Take a total of four softgels daily, with meals.

**Note:** Using HydroEye with anticoagulants, such as coumadin, may increase their effect. Prothrombin time (bleeding time) can be assessed by the primary care physician to ensure the safe addition of HydroEye to an anticoagulant regimen. Sufficient scientific evidence for safe use of GLA during pregnancy or breastfeeding is not available. Individuals with medical conditions should consult a physician before using. Keep out of the reach of children.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.

## Supplement Facts

Serving Size: 4 softgels  
Servings Per Container: 30

	Amount Per Serving	% Daily Value*
Calories	30	
Calories from Fat	20	
Total Fat	2.5 g	4%
Vitamin A (from retinyl palmitate and cod liver oil)	2080 IU	42%
Vitamin E (d-alpha tocopherol)	12 IU	40%
Vitamin C (as ascorbic acid)	240 mg	300%
Vitamin B6 (from pyridoxal 5-phosphate)	12.6 mg	630%
Magnesium (from magnesium sulfate)	40 mg	10%
Black Currant Seed Oil [15% gamma linolenic acid (GLA); also contains 12-15% alpha linolenic acid (ALA)]	1570 mg	†
Omega-3 Fatty Acids (100 mg EPA, 70 mg DHA from USP®-verified fish oil)	170 mg	†
Mucin Complex (60% mucin)	100 mg	†

\*Percent Daily Values are based on a 2,000 calorie diet.  
† Daily Value not established.

**Other Ingredients:** Gelatin, Glycerin, Water, Beeswax, Lecithin, Titanium Dioxide, Lemon Oil and Caramel Color.

Contains lecithin made from soybeans.



1.888.433.4726  
www.sciencebasedhealth.com

## Omega Fatty Acids: GLA, DHA and EPA (Continued)

Black currant seed oil also contributes alpha linolenic acid, an important omega-3 fatty acid. A controlled study in healthy older individuals found that black currant seed oil decreased production of the pro-inflammatory prostaglandin, PGE2, and improved immune function compared to a placebo<sup>13</sup>.

Fish oil is a concentrated source of the omega-3 fats EPA and DHA. Higher dietary intake of EPA and DHA may reduce the risk of dry eye in women<sup>14</sup>, in addition to providing well established cardiovascular benefits. Combining fish oil EPA and DHA with GLA from black currant seed oil in balanced amounts helps block the formation of inflammatory prostaglandins<sup>15</sup>. HydroEye features highest quality USP®-verified fish oil from the purest sources.

## Vitamin C (240 mg)

Vitamin C is the most abundant water-soluble antioxidant in tear fluid. It acts to neutralize free radicals and helps recharge the antioxidant vitamin E. Biomarkers of oxidative damage are higher in the tear fluid of dry eye patients compared to controls<sup>16</sup>. Levels of vitamin C are also known to drop significantly in the tears of people undergoing laser surgery – procedures known to generate free radical activity<sup>17</sup>. In addition to its free radical fighting role, vitamin C may also stimulate the formation of less inflammatory prostaglandins from GLA metabolism<sup>18</sup>.

## Other Essential Nutrients

HydroEye delivers vitamin A, an essential nutrient for the health of the epithelial cells of the eye's cornea and conjunctiva. Vitamin A is also required for the manufacture of mucin, the primary component of the mucous or innermost layer of the tear film<sup>19</sup>. HydroEye contributes mucin, which is secreted by goblet and epithelial cells of the conjunctiva to protect, lubricate and ensure even distribution of tear fluid. Loss of goblet cells has been associated with chronic inflammation of the ocular surface in tear deficient dry eye<sup>20</sup>.

Dietary shortfalls of magnesium and vitamin B6 are not uncommon, especially among women and older individuals (groups in which dry eye commonly occurs). HydroEye includes these nutrients, which are important cofactors for the conversion of linoleic acid from black currant seed oil into GLA. One of the critical catalysts for this conversion is an enzyme whose activity declines with nutrient deficiencies<sup>21</sup>, as well as with age, certain diseases, increased stress hormones and excessive intakes of saturated fats<sup>13</sup>.

## References

- Goto E, et al. Impaired functional visual acuity of dry eye patients. *Am J Ophthalmol* 133: 181-186, 2002.
- Stern ME, et al. The pathology of dry eye: the interaction between the ocular surface and lacrimal glands. *Cornea* 17: 584-589, 1998.
- Ang RT, et al. Dry eye after refractive surgery. *Curr Opin Ophthalmol* 2: 318-322, 2001.
- Azzarolo AM, et al. Androgen support of lacrimal gland function. *Endocrine* 6: 39-45, 1997.
- Baudouin C. Dry eye: an unexpected inflammatory disease. *Arch Soc Esp Ophthalmol* 76: 205-206, 2001.
- Pflugfelder SC, et al. Diagnosis & management of dry eye: A 25-year review. *Cornea* 19: 644-649, 2000.
- Solomon A, et al. Pro- and anti-inflammatory forms of interleukin-1 in the tear fluid and conjunctiva of patients with dry eye disease. *Invest Ophthalmol Vis Sci* 42: 2283-2292, 2001.
- Zuier RB, et al. Gamma-linolenic acid treatment of rheumatoid arthritis: A randomized, placebo-controlled trial. *Arthritis Rheum* 39: 1808-1817, 1996.
- Barabino S, et al. Systemic linoleic and gamma-linolenic acid therapy in dry-eye syndrome with inflammatory component. *Cornea* 22: 97-101, 2003.
- Macri A, et al. Effect of linoleic acid and gamma-linolenic acid on tear production, tear clearance and on the ocular surface after photorefractive keratectomy. *Graefes Arch Clin Exp Ophthalmol* 241: 561-6, 2003.
- Kokke KH, et al. Oral omega-6 essential fatty acid treatment in contact lens associated dry eye. *Contact Lens Anterior Eye* 31:141-146, 2008.
- Aragona P, et al. Systemic omega-6 essential fatty acid treatment and PGE1 tear content in Sjogren's syndrome patients. *Invest Ophthalmol Vis Sci* 46: 4474-4479, 2005.
- Wu D, et al. Effect of dietary supplementation with black currant seed oil on the immune response of healthy elderly subjects. *Am J Clin Nutr* 70: 536-543, 1999.
- Miljanovic B, et al. Relation between dietary n-3 and n-6 fatty acids and clinically diagnosed dry eye syndrome in women. *Am J Clin Nutr* 82: 887-93, 2005.
- Barham JB, et al. Addition of EPA to GLA-supplemented diets prevents serum arachidonic acid accumulation in humans. *J Nutr* 130: 1925-31, 2000.
- Augustin AJ, et al. Oxidative reactions in the tear fluid of patients suffering from dry eye. *Graefes Arch Clin Exp Ophthalmol* 233: 694-698, 1995.
- Bilgihan A, et al. Ascorbic acid levels in human tears after photorefractive keratectomy (PRK), transepithelial photorefractive keratectomy, and laser in situ keratomileusis (LASIK). *J Cataract Refract Surg* 27: 585-588, 2001.
- Horrobin DF, et al. The regulation of prostaglandin E1 formation: A candidate for one of the fundamental mechanisms involved in the action of vitamin C. *Med Hypotheses* 5: 849-858, 1979.
- Tei M, et al. Vitamin A deficiency alters the expression of mucin genes by the rat ocular surface epithelium. *Invest Ophthalmol Vis Sci* 4: 82-88, 2000.
- Kunert KS, et al. Goblet cell numbers and epithelial proliferation in the conjunctiva of patients with dry eye syndrome treated with cyclosporine. *Arch Ophthalmol* 120: 330-337, 2002.
- Bordoni A, et al. Dual influence of aging and vitamin B6 deficiency on delta-six desaturation of essential fatty acids in rat liver microsomes. *Prot Leukot Ess Fatty Acids* 58: 417-420 1998.

