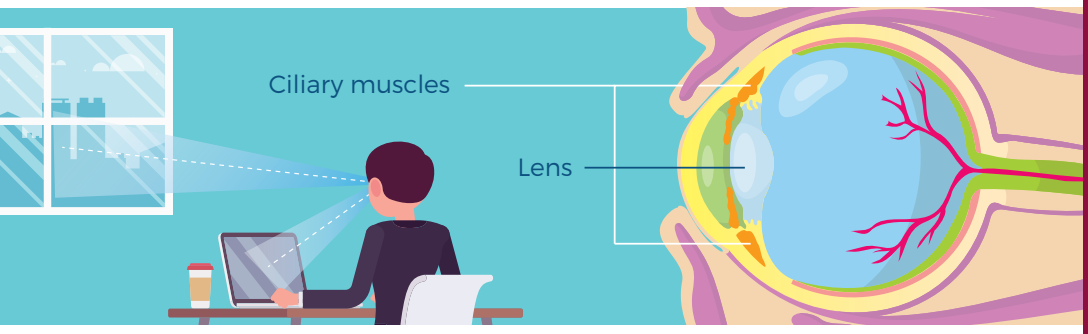
IMPROVE EYE HEALTH WITH ASTAREAL® ASTAXANTHIN

Benefits of natural astaxanthin for accommodation & aging eyes

HOW ASTAREAL® ASTAXANTHIN WORKS IN THE EYES

The front of the eye holds all our focusing power in the cornea and the lens. While the cornea accounts for ~60% of the eye's total optical power, its focus is fixed. In contrast, the lens is flexible and allows for dynamic focus so we can see the world around us from 7cm to infinity. Dynamic focus occurs by changing the shape of the lens, which is controlled by ciliary muscles and ligaments at the front of the eye. When we focus on objects ≤20 feet away, the ciliary muscles contract to round out the lens. When we focus on objects ≥20 feet away, the ciliary muscles relax, and the lens flattens out. These changes in the eye allow dynamic focus and are part of a coordinated process called accommodation.

Accommodation ability is affected by both age and lifestyle. We tend to lose near vision as we age, leading to presbyopia. Furthermore, our digital lifestyles mean that the average American spends 7.5 hours every day focused on screens at an average distance of 13-14 inches. This means people are overworking their ciliary muscles



on a daily basis. This constant contracting contributes to eye strain, which is experienced by 65% of American computer users, and approximately 60 million people worldwide.

Eye strain and fatigue are often symptoms associated with computer vision syndrome (CVS) as well as prolonged exposure to blue light emitted by devices. High energy blue light reduces contrast therefore causing eyes to constantly have to re-adjust focus and overwork ciliary muscles. Tired ciliary muscles directly cause eyes to feel strained and fatigued. Studies show that AstaReal® Astaxanthin improves ciliary muscle endurance and recovery helping alleviate eye fatigue.

ASTAREAL® ASTAXANTHIN FOR FOCUS & EYE HEALTH

Clinical studies with AstaReal® Astaxanthin support the following suggested structure/function claims for focus and digital eye strain*:

- AstaReal® Astaxanthin helps to focus strained eyes[1, 2, 3, 4]
- AstaReal® Astaxanthin relieves tired eyes (eye fatigue)[5, 6, 7, 8]
- AstaReal® Astaxanthin helps alleviate eye strain[1, 3, 8]
- AstaReal® Astaxanthin helps eyes resist and recover from screen time[1, 3, 7, 9]
- AstaReal® Astaxanthin helps promote visual acuity[10]
- AstaReal® Astaxanthin helps enhance depth perception[11]

REFERENCES	DOSAGE
1. Nagaki N. et al. 2010. Japanese Review of Clinical Ophthalmology, Folia Ophthalmologica Japonica, 3(5):461-468.	9 mg/day
2. Nitta T. et al. 2005. Journal of Clinical Therapeutics and Medicines, 21(5): 79-92.	6 and 12 mg/day
3. Nagaki Y. et al. 2002. Journal of Traditional Medicines, 19(5): 170-173.	5 mg/day
4. Nagaki Y. et al. 2006. Journal of Clinical Therapeutics and Medicines, 22(1): 41-54.	6mg/day
5. Iwabashi M. et al. 2009. Anti-Aging Medicine, 6(4): 15-21.	12 mg/day
6. Nagaki Y. et al. 2005. Journal of Clinical Therapeutics and Medicines, 21(5): 73-78.	6mg/day
7. Takahashi N. et al. 2005. Journal of Clinical Therapeutics and Medicines, 21(4): 43-48.	6 mg/day
8. Kajita M. et al. 2009. Medical Consultation & New Remedies, 46(3): 325-329.	6 mg/day
9. Shiratori K. et al. 2005. Journal of Clinical Therapeutics and Medicines, 21(6): 65-78.	6 mg/day
10. Nakamura A. et al. 2004. Rinsho Ganka (Jpn J Clin Ophthalmol) 58 (6): 1051-1054.	0, 2, 4, & 12 mg/day
11. Sawaki K. et al.. 2002. Journal of Clinical Therapeutics and Medicines 18(9):73-88.	6 mg/day

*These are suggested structure/function claims based on AstaReal studies. These suggested structure/function claims have not been verified for promotional use by a regulatory team. We encourage you to review the studies together with your regulatory affairs team to confirm their suitability for promotional applications.

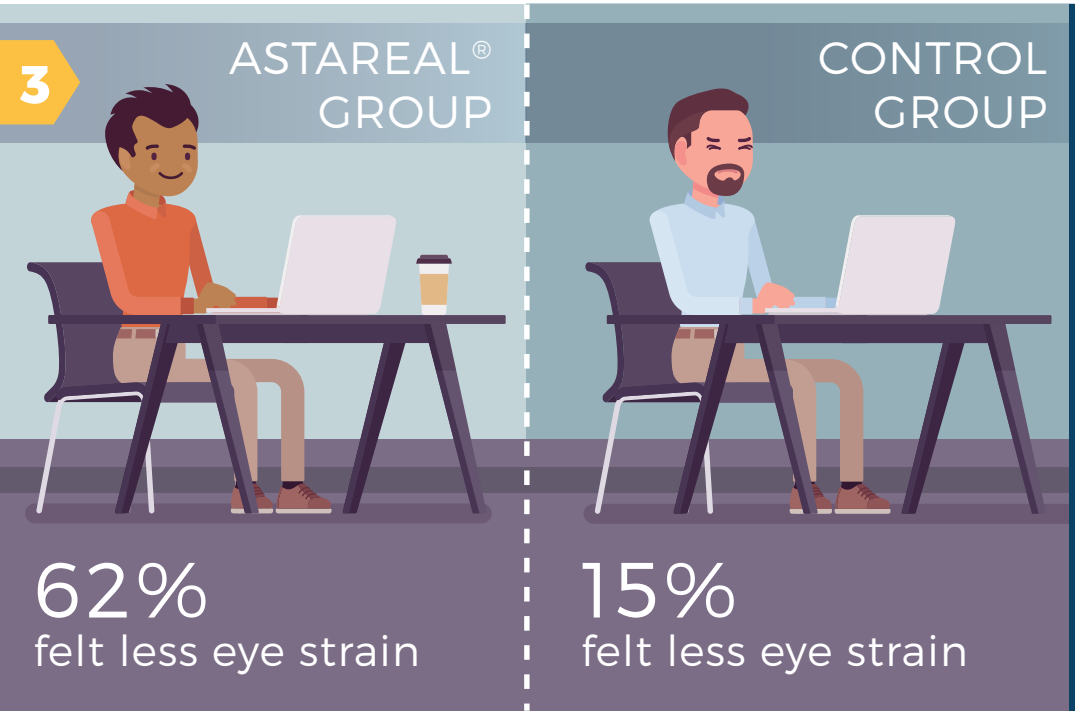
ASTAREAL® ACCOMMODATION AND EYE FATIGUE STUDIES

1 Nagaki et al. 2006 published a double blind randomized placebo-controlled study in which 48 computer workers experiencing eye strain on a daily basis (ages 30-45) supplemented with 6mg/day AstaReal® (n=25) or placebo softgels (n=23) for 4 weeks. The amplitude of accommodation of the participants was measured at 0 weeks and 4 weeks of supplementation using binocular opening constant point refraction near point ruler (D'Acomo, Wold Optical Corp.). The AstaReal® group had a significant increase ($p<0.05$) in amplitude of accommodation (4.69±1.17 D) after 4 weeks of supplementation compared to the placebo group (4.03±1.12 D) as measured by D'Acomo.

2 Nitta et al. 2005 published a double-blind placebo-controlled study in which 30 computer workers (ages 20-60) supplemented with 6mg/day (n=10), 12mg/day (n=10) AstaReal®, or placebo softgels (n=10) for 4 weeks. Accommodation amplitude (range of focus) was measured as an indicator of the degree of eye strain. The group supplementing with 12mg/day AstaReal® had a significantly greater accommodation range and positive accommodation speed after 4 weeks compared to before supplementation ($p<0.05$). A significant increase in positive accommodation speed was also observed at 6mg/day AstaReal® at 4 weeks compared to before supplementation ($p<0.05$). No improvement was measured in the placebo group after 4 weeks.

In a subjective survey, participants supplementing with 6mg/day or 12mg/day AstaReal® for 4 weeks reported improvements in symptoms of eye pain and bleariness compared to before supplementation, in contrast to the placebo group who did not report any improvement in these symptoms.

3



Nagaki et al. 2010 reported a double blind randomized placebo-controlled study, in which 82 computer workers (ages 30-45) supplemented with 9mg/day AstaReal® (n=42), or placebo softgels (n=40) for 4 weeks. Of all participants reporting moderate to severe eye strain before supplementation, 62% in the AstaReal® group and only 15% in the placebo group said their symptoms improved after 4 weeks. This result represented a significant improvement in the AstaReal® group as compared to the placebo group ($p<0.05$).

4 Sawaki et al. 2002 published a double blind placebo controlled study, in which 18 members of a university handball team (average age, 20) supplemented with 6mg/day AstaReal® (n=9), or placebo softgels (n=9) for 4 weeks. 55.4% improved accuracy of depth perception in astaxanthin group after 4 weeks at 6mg/day and exercise compared to control group (AstaReal®, 7.86mm vs. Placebo, 17.60mm; $p<0.05$)

ASTAREAL® ASTAXANTHIN ANTIOXIDANT AND BLOOD FLOW STUDIES:

1 In Hashimoto et al. 2007, 2009, 2011, 2013, and 2016, the oxidative stress and inflammation markers in the aqueous humor were assessed in a total of 177 participants undergoing cataract surgery (average age 70-72). In Hashimoto et al. 2007, 37 participants supplementing with 6mg/day AstaReal® were examined for flare intensity levels caused by accumulation of proteins in the aqueous humor post-surgery. The AstaReal® group exhibited significantly lower flare intensity 3 days after surgery compared to the control group, suggesting reduced post-surgery inflammation (AstaReal® group, 10.8± 3.03 photon count/msec; control group, 13.6±5.57 photon count/msec; $p<0.01$).

In subsequent Hashimoto et al. studies, oxidative stress markers were examined after surgery on the first eye, followed by supplementation with 6mg/day AstaReal® for 2 weeks, and a subsequent surgery on the second eye. Participants exhibited a significant increase in superoxide scavenging activity levels (Hashimoto et la. 2009, 2013, and 2016; $p<0.05$) and a significant decrease in total hydroperoxides levels (Hashimoto et al. 2011, 2013, and 2016; $p<0.05$) in the aqueous humor of the eye operated on after supplementation as compared to the eye operated on before supplementation.

2 Saito et al. 2012 published a randomized double-blind placebo-controlled study in which 20 participants (average age 38) supplemented with 12mg/day AstaReal® (n=10) or placebo softgels (n=10) for 4 weeks. Blood flow velocity at the macula was measured using laser speckle flowgraphy to determine the square blur rate (SBR) as an indicator of choroidal blood flow. The SBR increased by 15.3% after 4 weeks of supplementation as compared to 0 weeks ($p<0.05$). No significant increase was observed in the placebo group after 4 weeks.

3 Nagaki et al. 2005 reported a randomized double-blind placebo-controlled study in which 36 subjects (average age 41) supplemented with 6mg/day AstaReal® (n=18) or placebo softgels (n=18) for 4 weeks. Retinal capillary blood flow increased significantly in both eyes of the AstaReal® group after ingestion as compared to before (9.0% increase in the right eye, 10.7% increase in the left eye; $p<0.01$). Increased blood flow in the AstaReal® group was significantly better compared with the placebo group ($p<0.01$) for both eyes. Participants also reported improvement in eye fatigue after 4 weeks of supplementation compared to the placebo group ($p<0.05$).

ASTAREAL® ASTAXANTHIN FOR AGING EYES

Clinical studies with AstaReal® Astaxanthin support the following suggested structure/function claims for aging eyes*:

- AstaReal® Astaxanthin promotes good circulation and nourishment of eyes[1]
- AstaReal® Astaxanthin helps alleviate oxidative stress in eyes[2, 3, 4, 5]

References	DOSAGE
1. Nagaki Y. et al. 2005. Journal of Clinical Therapeutics and Medicines, 21(5): 73-78.	6mg/day
2. Hashimoto H. et al. 2009. Atarashii Ganka (Journal of the Eye), 26 (2):229-234.	6mg/day
3. Hashimoto H. et al. 2013. Journal of Clinical Biochemistry and Nutrition, 53(1): 1-7.	6mg/day
4. Hashimoto H. et al. 2016 . Journal of Clinical Biochemistry and Nutrition, 59(1): 10-15.	6mg/day
5. Hashimoto H. et al. 2011. Rinsho Ganka (Jpn J Clin Ophthalmol), 65(4): 465-470.	6mg/day

Antioxidant levels drop with age, making the lens more vulnerable to free radicals from UV, air pollution, and smoking.

Free radicals affect lens clarity, which contributes to cataracts.

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WHY CHOOSE ASTAREAL® ASTAXANTHIN

1

AstaReal pioneered the commercial use of natural astaxanthin as a preventative healthcare approach and built the global astaxanthin market with its unrivaled investment in quality, safety and efficacy. Our vision is helping people all over the world lead happier and healthier lives with our clinically proven astaxanthin brand - AstaReal® Astaxanthin.

2

AstaReal® Astaxanthin is the most studied brand of natural astaxanthin worldwide, with over 60 human clinical studies supporting muscle performance, skin health, eye health, cardiovascular health, and cognitive health.

3

AstaReal® Astaxanthin is the most trusted manufacturer of astaxanthin in over 45 countries and the only natural astaxanthin brand certified by USP and certified Informed-Choice/Informed-Sport.

4

AstaReal has two manufacturing facilities utilizing a fully enclosed indoor cultivation proprietary method. This process uses HEPA filtered air and RO filtered water at every stage to provide the cleanest possible environment for algae and ensures that it is not contaminated by persistent organic air pollutants. The carefully controlled indoor environment also allows for precisely timed harvests that maximizes astaxanthin content and minimizes chlorophyll contamination that can compromise stability.

5

With over 30 years of experience studying and developing novel natural astaxanthin products, AstaReal is not only a preferred natural astaxanthin supplier, but a preferred partner. Formulate with AstaReal® brand Astaxanthin today and experience the benefits of our unsurpassed technical and marketing expertise.

AstaReal
Be you, Just healthier

To learn more about natural astaxanthin and your health visit www.astaxanthin.net

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