



DOSSIER · SUBSTANCE

Astaxanthin

Astaxanthin is a red carotenoid from algae and marine animals; controlled studies show mainly higher HDL cholesterol, less muscle damage after exertion and, in diabetes, better blood glucose levels.

1,154

STUDIES IN
TOTAL

93

IN HUMANS

40

OF WHICH
CONTROLLED

251

IN ANIMALS

177

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-15

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Astaxanthin at a Glance

Malondialdehyde, a marker of oxidative damage, fell more strongly than under placebo in two randomized studies ³⁸⁷⁵; meta-analyses found no clear effect ¹⁰²⁷.

Total antioxidant capacity in the blood rose more strongly than under placebo in two randomized studies ³⁸⁷⁶.

Fasting blood glucose and HbA1c fell compared with control in a meta-analysis in prediabetes and type 2 diabetes ²; another meta-analysis found no effect ²⁹. HDL cholesterol rose in three meta-analyses ²¹⁵²⁹, while for LDL and total cholesterol they are inconsistent ²⁶¹⁵.

After exertion, creatine kinase, a marker of muscle damage, was lower than under placebo in a meta-analysis; endurance performance did not improve there ¹⁰.

We evaluated 139 human studies on Astaxanthin, including 54 randomised controlled trials and 32 meta-analyses or systematic reviews; the controlled studies include 2,957 participants in total. As of 5 October 2026.

1. What Is Astaxanthin? Occurrence, Origin and Forms

Astaxanthin is a red carotenoid of the xanthophyll group. It gives marine animals such as crabs, shrimp and salmon, as well as flamingo feathers, their pink to red colour. It is sold as a dietary supplement in capsules, and in aquaculture it is used to pigment farmed fish.

Astaxanthin is formed in microalgae, above all in *Haematococcus pluvialis*, and in yeasts such as *Xanthophyllomyces dendrorhous*. Through the food chain it accumulates in krill, shrimp, crabs and salmon; in humans it is studied as a dietary supplement.

For study material, astaxanthin is mostly obtained from cultivated *Haematococcus pluvialis* algae, and also from yeast fermentation and chemical synthesis. What is tested are oil-based capsules with esterified or free astaxanthin, algal extracts, and occasionally preparations applied to the skin.

Forms and Preparations Studied

- Algal extract from *Haematococcus pluvialis*
- Astaxanthin from yeast fermentation
- Synthetically produced astaxanthin
- Esterified astaxanthin in an oil carrier
- Free astaxanthin
- Preparation for application to the skin

Not covered on this page:

- Krill oil and fish oil as a whole: they contain astaxanthin but are mixtures of omega-3 fatty acids and further substances.
- Other carotenoids such as beta-carotene, lutein, zeaxanthin and lycopene.
- Canthaxanthin, a different carotenoid that is likewise used for pigmentation.
- Astaxanthin as a feed additive in aquaculture when humans are not the subjects studied.

2. What Does Astaxanthin Do? Results by Area

AREA	RESULT IN CONTROLLED STUDIES	STRENGTH OF EVIDENCE	STUDIES	PARTICIPANTS
Oxidative stress and inflammation	mostly improved	high	10 meta-analyses · 27 controlled · 22 other	1,198
Cardiometabolic markers	mostly improved	high	9 meta-analyses · 14 controlled · 13 other	810
Exercise and physical performance	mostly improved	high	3 meta-analyses · 12 controlled · 6 other	268
Skin	mostly improved	high	2 meta-analyses · 2 controlled · 6 other	88
Cognition	mostly no difference	moderate	2 meta-analyses · 2 controlled · 7 other	121
Eyes	mostly improved	low	0 meta-analyses · 1 controlled · 6 other	64
Tolerability and safety	mostly no difference	unclear	0 meta-analyses · 2 controlled · 15 other	45
Other investigations	mixed	high	7 meta-analyses · 14 controlled · 19 other	614

How to read the table: counted are human studies whose results concern the area. “High” means at least one meta-analysis and two controlled studies showing improvement, or at least three controlled studies of which three quarters show improvement, with at least 300 participants in total. “Moderate” means at least two controlled studies showing improvement, as a majority, or one meta-analysis alongside controlled studies. “Low” means one controlled study showing improvement. Where an area has no controlled study, the strength of evidence is at most “low” (result “reviews only” or “observational data only”). Everything else is “unclear”. A study counts as showing improvement when at least half of its outcomes in this area improved. Reviews of combination products do not count as meta-analyses; results that only describe side effects or shares of users do not count as an effect. The same study is counted only once.

3. What the Studies Show in Detail

Astaxanthin, Oxidative Stress and Inflammation: Human Studies

Compared with placebo, malondialdehyde, a marker of lipid peroxidation, fell more strongly in two randomized studies: in heart failure and after exhaustive cycling ³⁸⁷⁵. In the heart failure study, total antioxidant capacity and superoxide dismutase also rose more strongly than under placebo ³⁸. In women with PCOS, catalase and total antioxidant capacity rose more strongly than under placebo, while malondialdehyde and superoxide dismutase did not ⁷⁶. In type 2 diabetes under metformin, superoxide dismutase and catalase rose more strongly than under placebo, while malondialdehyde did not differ ⁵⁵. Another randomized study found no difference from placebo for malondialdehyde ⁷³, and a meta-analysis classifies the antioxidant effect overall as unclear ²⁷. Inflammatory markers fell more strongly than under placebo in two randomized studies: TNF-α in heart failure ³⁶, interleukin-6 and TNF-α in pneumonia ³⁷. C-reactive protein fell in a meta-analysis only with a higher dose or longer intake ²⁹. With dark chocolate in lycosome form, malondialdehyde and oxidized LDL fell more markedly than with astaxanthin alone ⁶⁵. It remains open in which patient groups and at which doses the effect occurs reliably; this requires larger studies with uniform measures.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹ Zhong et al. 2025	meta-analysis · 1,626 participants	Antioxidant supplementation, including astaxanthin; vs. Control (placebo/no supplementation)
³ Ma et al. 2022	meta-analysis · 380 participants	Astaxanthin supplementation (source not reported); at least 1 week; vs. Placebo
⁸ You et al. 2026	meta-analysis · 188 participants	Astaxanthin supplementation, source not reported; 4-28 mg per day; 4 days to 12 weeks; vs. Control group of included RCTs
⁹ Malcangi et al. 2026	systematic review · 15 participants	Astaxanthin (ASX) supplementation; vs. not reported (review)
¹⁰ Liu et al. 2026	meta-analysis	Oral astaxanthin supplementation; vs. Placebo or control
¹¹ Paparozzi et al. 2026	systematic review	Astaxanthin as one of several carotenoids in a nutraceutical review; vs. different nutraceuticals compared with each other
¹² Dehpahni et al. 2026	meta-analysis	Astaxanthin (origin, esterification and carrier not reported); vs. Placebo in the clinical trials
¹³ Wang et al. 2026	systematic review	Astaxanthin from Haematococcus pluvialis, dietary supplement

Further studies in this area: [14](#) [21](#) [22](#) [27](#) [29](#) [35](#) [36](#) [37](#) [38](#) [42](#) [45](#) [46](#) [48](#) [49](#) [51](#) [53](#) [54](#) [55](#) [56](#) [57](#) [61](#) [63](#) [66](#) [68](#) [72](#) [73](#) [75](#) [76](#) [77](#) [78](#) [79](#) [82](#) [90](#) [95](#) [102](#) [103](#) [104](#) [105](#) [107](#) [108](#) [109](#) [110](#) [112](#) [115](#) [116](#) [118](#) [119](#) [121](#) [126](#) [127](#) [128](#)

Astaxanthin and Cardiometabolic Markers: Human Studies

In prediabetes and type 2 diabetes, astaxanthin lowered fasting blood glucose, HbA1c, triglycerides, total and LDL cholesterol and raised HDL cholesterol compared with control in a meta-analysis ². In type 2 diabetes, two randomized studies with the same design found lower blood glucose, HbA1c and blood lipid levels than under placebo ⁵¹⁵². In women with PCOS, fasting blood glucose, insulin resistance and LDL cholesterol decreased in a placebo-controlled study, while HDL cholesterol increased ⁴⁸. In coronary heart disease, however, blood glucose levels did not differ from placebo ⁵⁴. For blood lipids, the meta-analyses are inconsistent: HDL cholesterol increased in three of them ²¹⁵²⁹. LDL cholesterol decreased in two reviews ²⁵, while three others found no effect on LDL and total cholesterol ⁶¹⁵²⁹. Body weight and body mass index did not change in two meta-analyses ²¹⁹. Combinations with red yeast rice, berberine, policosanol, folic acid and coenzyme Q10 lowered LDL cholesterol, also in addition to a statin; this does not allow any statement about astaxanthin alone ³⁰³². It remains open whether the better laboratory values translate into fewer cardiovascular events; studies with such endpoints are still pending.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON	RESULTS
² Molani-Gol et al. 2026	meta-analysis · 403 participants	Astaxanthin supplementation (origin/esterification not reported); vs. Control group	Fastin
⁵ Leung et al. 2022	systematic review · 321 participants	Astaxanthin (source, esterification, dose not reported); vs. Control groups of included RCTs	Total c
⁶ Ursoniu et al. 2015	meta-analysis · 280 participants	Oral astaxanthin supplementation; vs. Control group (117 participants)	Total c
⁹ Malcangi et al. 2026	systematic review · 15 participants	Astaxanthin (ASX) supplementation; vs. not reported (review)	Endot
¹³ Wang et al. 2026	systematic review	Astaxanthin from Haematococcus pluvialis, dietary supplement	insulir
¹⁵ Fornari et al. 2025	meta-analysis	Astaxanthin supplement, source not stated; 6-24 mg/d, analyzed 6-20 mg/d; vs. Control groups of included RCTs	HDL c
¹⁹ Laurindo et al. 2025	meta-analysis	Astaxanthin dietary supplement; dose-response assessed, not specified; vs. Control groups	Body
²⁰ Wan et al. 2024	meta-analysis	Antioxidant functional lipid supplements, including astaxanthin; vs. Placebo	LDL c

Further studies in this area: [21](#) [25](#) [29](#) [30](#) [35](#) [36](#) [38](#) [42](#) [43](#) [44](#) [47](#) [48](#) [49](#) [51](#) [54](#) [62](#) [67](#) [85](#) [89](#) [95](#) [102](#) [108](#) [109](#) [110](#) [118](#) [123](#) [127](#) [128](#)

Astaxanthin, Exercise and Physical Performance: Human Studies

The most consistent finding is on recovery: in a meta-analysis of randomized studies, creatine kinase, a marker of muscle damage, was lower after exertion than under placebo ¹⁰. Randomized studies showed the same in young soccer players and after exhaustive cycling ⁶⁶⁷⁵. For performance, the meta-analyses are inconsistent: one found better physical performance when taken together with training ⁴. A larger meta-analysis, by contrast, found no improvement in maximum oxygen uptake, time trial performance or maximum performance ¹⁰. In small randomized studies with cyclists, astaxanthin shortened the time trial time and lengthened the time to exhaustion ⁷⁴⁷⁵. In older nursing home residents, the walking distance in the six-minute walk test was greater than under placebo ⁸². Fat burning during cycling was higher than under placebo in two randomized studies ⁷¹⁷⁴, but not in another ⁷³. An algal extract with astaxanthin and lutein did not reduce muscle damage after strength training ⁸³; a crossover study with strength athletes also found no difference from placebo ⁸⁵. It remains open whether the better recovery values translate into noticeably faster regeneration.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁴ Liu et al. 2024	meta-analysis · 346 participants	Dietary astaxanthin supplement, source not reported; Subgroup analysis: dose ≥ 20 mg; 8–12 weeks; subgroup anal
⁹ Malcangi et al. 2026	systematic review · 15 participants	Astaxanthin (ASX) supplementation; vs. not reported (review)
¹⁰ Liu et al. 2026	meta-analysis	Oral astaxanthin supplementation; vs. Placebo or control
⁶² Liu et al. 2021	randomised controlled · 42 participants	Astaxanthin formulation (source not stated); 3 months; vs. Placebo during endurance training
⁶³ Baralic et al. 2015	randomised controlled · 40 participants	Astaxanthin (Asx); 4 mg Asx; 90 days; vs. Placebo
⁶⁶ Djordjevic et al. 2012	randomised controlled · 32 participants	Astaxanthin (Asx) supplementation; 90 days; vs. placebo, double-blind randomized

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁷⁰ Fleischmann et al. 2019	randomised controlled · 22 participants	Astaxanthin (ATX), source not stated; 12 mg/day per os; 30 days; vs. placebo (PLA), randomized double blind
⁷¹ Barker et al. 2026	randomised controlled · 20 participants	Astaxanthin (AX), source/esterification not stated; 12 mg per day; 2 weeks supplementation, 2-week washout; vs. pl.

Further studies in this area: [73](#) [74](#) [75](#) [82](#) [83](#) [84](#) [85](#) [94](#) [95](#) [110](#) [117](#) [121](#) [124](#)

Astaxanthin and Skin: Human Studies

In a small randomized study, skin tolerated more UV light until redness and lost less moisture when irradiated under astaxanthin than under placebo ⁶⁹. In a placebo-controlled study with women in Japan, wrinkles and skin moisture worsened over the autumn months only under placebo, not under astaxanthin ⁷⁹. **Suspicion:** A systematic review sees advantages for skin structure, wrinkles, moisture and UV protection; many of the included studies were small and company-funded ²⁶. A combination with collagen hydrolysate improved elasticity and water loss of facial skin compared with placebo, but does not allow any statement about astaxanthin alone ⁸⁰. It remains open whether the protective effect is confirmed in larger studies and outside Japan.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹⁶ Yang et al. 2025	meta-analysis	Oral dietary supplements, including astaxanthin; typically ≤ 24 weeks; vs. Placebo
¹⁸ Ntarelli et al. 2025	systematic review	Dietary supplements incl. astaxanthin, carotenoids, polyphenols; vs. various supplements or controls
²¹ Frumuzachi et al. 2024	systematic review	Chocolate enriched/fortified with bioactive components, including co-crystallized astaxanthin; Chocolate intake 5 to
²⁶ Ng et al. 2021	systematic review	Astaxanthin supplementation (source not stated); 3 to 6 mg/d; vs. Placebo in six randomized, double-blind trials; ma
⁶⁹ Ito et al. 2018	randomised controlled · 23 participants	capsule with 4 mg algal astaxanthin; 4 mg astaxanthin daily; 9 weeks of supplementation (10-week study); vs. place
⁷⁹ Tominaga et al. 2017	controlled · 65 participants	Oral astaxanthin, source not stated; 6 mg or 12 mg daily; 16 weeks; vs. Placebo
¹⁰¹ Tominaga et al. 2012	study	Astaxanthin from Haematococcus pluvialis, oral and topical; 6 mg/day oral; 2 ml (78.9 µM) topical daily; 8 weeks (wc
¹¹⁴ Januszewski et al. 2023	review	Astaxanthin as a nutritional supplement

Further studies in this area: [116](#) [118](#)

Astaxanthin and Cognition: Human Studies

In healthy older adults with forgetfulness, individual cognitive tests improved with Haematococcus algae extract, without a confirmed difference from placebo ³⁴. A meta-analysis found no effect on reaction time and only a borderline effect on cognitive accuracy ⁴. Clearer advantages over placebo were shown by combinations: with tocotrienols for memory ⁵⁹, with Bacopa, lycopene and vitamin B12 in the Trail-Making Test and for verbal fluency ⁴⁰. In athletically active young women, after mental fatigue, reaction time and speed in two tasks improved only with astaxanthin, not with placebo ⁸¹. **Hypothesis:** A review of older people sees indications of better cognition that are not statistically confirmed ²³. For astaxanthin alone, larger studies with memory tests as the primary aim are needed.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁴ Liu et al. 2024	meta-analysis · 346 participants	Dietary astaxanthin supplement, source not reported; Subgroup analysis: dose ≥ 20 mg; 8–12 weeks; subgroup analysis >
²³ Utomo et al. 2024	systematic review	astaxanthin supplementation (source not stated)

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
24 Martini et al. 2022	systematic review	Carotenoids, including astaxanthin, lutein, lycopene
28 Nouchi et al. 2020	systematic review	Oral carotenoid intake (lutein, astaxanthin); 10 mg lutein per day (astaxanthin dose not reported); twelve months (lutein); 12 months (astaxanthin)
34 Katagiri et al. 2012	randomised controlled · 96 participants	Capsule with astaxanthin-rich Haematococcus pluvialis extract; 6 mg or 12 mg astaxanthin per day; 12 weeks; vs. Placebo
81 Barker et al. 2025	controlled · 25 participants	Astaxanthin or placebo; 12 mg/day; 4 weeks; vs. Placebo
106 N et al. 2026	review	Astaxanthin, fucoxanthin and canthaxanthin (marine xanthophylls)
111 Cunha et al. 2024	review	Astaxanthin from Haematococcus pluvialis

Further studies in this area: [113](#) [116](#) [118](#)

Astaxanthin and Eyes: Human Studies

In schoolchildren with eye strain from screens, astaxanthin in a randomized study reduced complaints and visual fatigue more than placebo; visual acuity and accommodation did not change ⁴⁵. A mixture with anthocyanin and lutein improved pupil response and focusing complaints in adults with screen fatigue compared with placebo ⁵⁸. In dry eye, an antioxidant mixture with anthocyanosides, vitamins and herbal extracts improved the overall impression compared with placebo, but sicca complaints did not differ ⁶⁰. Without a comparison group, in people of middle and older age with dry eye, complaints and tear film stability improved under algae extract from Haematococcus pluvialis ⁹¹. It remains open whether the findings of the mixtures are due to astaxanthin or to the combination partners.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
17 Martinez- Perez et al. 2025	systematic review	Nutritional supplementation with carotenoids, including astaxanthin; vs. Placebo or active controls
24 Martini et al. 2022	systematic review	Carotenoids, including astaxanthin, lutein, lycopene
45 Hecht et al. 2025	randomised controlled · 64 participants	Astaxanthin (AstaReal®) soft capsule; 4 mg daily; 84 days; vs. Placebo, double-blind randomized
91 Tian et al. 2021	study · 60 participants	Astaxanthin tablets (Weihong Haematococcus Pluvialis Astaxanthin); 6 mg orally twice daily; 30 ± 2 days; vs. no control
93 Hsu et al. 2023	study · 34 participants	Lutein/DHA complex with 30 mg astaxanthin from red algae extract; 30 mg astaxanthin (red algae extract) daily; 12 weeks
100 D'Aloisio et al. 2022	case-control study	Oral nutritional supplement with astaxanthin, bromelain, vitamin D3, folic acid, lutein, and antioxidants; at least 6 months
118 Donoso et al. 2021	review	Astaxanthin (origin, esterification, dose not stated)

Astaxanthin, Tolerability and Safety: Human Studies

Under astaxanthin alone, in controlled studies neither side effects nor differences in safety values compared with placebo were noted ³⁴⁴⁵⁴⁹⁸⁸. In pneumonia, astaxanthin as an addition to standard therapy was safe and well tolerated ³⁷. Two systematic reviews report no serious adverse events or notable laboratory findings ²³²⁶. Mixed preparations with astaxanthin, for example with krill oil and hyaluronic acid or with red yeast rice and berberine, were also well tolerated ³¹³³. Data on intake for more than a few months are still pending.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
²³ Utomo et al. 2024	systematic review	astaxanthin supplementation (source not stated)
²⁶ Ng et al. 2021	systematic review	Astaxanthin supplementation (source not stated); 3 to 6 mg/d; vs. Placebo in six randomized, double-blind trials; manufa
³⁴ Katagiri et al. 2012	randomised controlled · 96 participants	Capsule with astaxanthin-rich Haematococcus pluvialis extract; 6 mg or 12 mg astaxanthin per day; 12 weeks; vs. Placeb
³⁷ Youssef et al. 2025	randomised controlled · 80 participants	Astaxanthin (ASX) as adjunct to standard antibiotic therapy; 12 mg/day; 7 days; vs. Placebo in addition to standard antibi
⁴⁵ Hecht et al. 2025	randomised controlled · 64 participants	Astaxanthin (AstaReal®) soft capsule; 4 mg daily; 84 days; vs. Placebo, double-blind randomized
⁴⁹ Urakaze et al. 2021	randomised controlled · 53 participants	astaxanthin or placebo, source not stated; 12 mg astaxanthin once daily; 12 weeks; vs. placebo, randomized controlled
⁶⁴ Spiller et al. 2003	randomised controlled · 35 participants	Algal extract (H. pluvialis) in safflower oil gelcaps; 6 mg astaxanthin/day (3 gelcaps of 2 mg); 8 weeks; vs. Placebo (saffli
⁷⁵ Tsao et al. 2025	randomised controlled · 10 participants	oral astaxanthin, source not stated; 28 mg/day; 4 days; vs. placebo

Further studies in this area: ^{78 88 92 96 102 122 123 127 128}

Astaxanthin: Further Outcomes in Studies

In women with PCOS before artificial fertilization, the proportion of mature eggs was higher than under placebo in two randomized studies ⁵⁶⁷⁶. In one of them, the proportion of high-quality embryos also increased ⁷⁶. A meta-analysis confirms the higher maturation proportion; pregnancy rates did not differ either there or in the randomized study ²²⁷⁶. In men with impaired sperm quality, astaxanthin did not change any semen parameter in a randomized study ³⁹. In rheumatoid arthritis, disease activity fell more than under placebo ⁴⁶, in pneumonia, severity scores improved in addition to standard therapy ³⁷. In knee or hip osteoarthritis, a mixed preparation of krill oil, astaxanthin and hyaluronic acid relieved joint pain more than placebo ³¹. These findings each come from individual small studies and need independent replication.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹ Zhong et al. 2025	meta-analysis · 1,626 participants	Antioxidant supplementation, including astaxanthin; vs. Control (placebo/no supplementation)
⁴ Liu et al. 2024	meta-analysis · 346 participants	Dietary astaxanthin supplement, source not reported; Subgroup analysis: dose ≥ 20 mg; 8–12 weeks; subgroup analysis >
⁷ Arefpour et al. 2024	meta-analysis · 196 participants	Astaxanthin supplement, source not reported; 6 to 12 mg/day; 4 to 48 weeks; vs. placebo group
⁹ Malcangi et al. 2026	systematic review · 15 participants	Astaxanthin (ASX) supplementation; vs. not reported (review)
¹² Dehpahni et al. 2026	meta-analysis	Astaxanthin (origin, esterification and carrier not reported); vs. Placebo in the clinical trials

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹³ Wang et al. 2026	systematic review	Astaxanthin from Haematococcus pluvialis, dietary supplement
¹⁴ Rodrigues et al. 2025	meta-analysis	Astaxanthin supplementation (source not stated); variable, not specified in abstract; not reported in abstract; vs. Control g
²¹ Frumuzachi et al. 2024	systematic review	Chocolate enriched/fortified with bioactive components, including co-crystallized astaxanthin; Chocolate intake 5 to 101 g

Further studies in this area: [22](#) [24](#) [36](#) [37](#) [38](#) [39](#) [46](#) [50](#) [53](#) [54](#) [56](#) [70](#) [76](#) [86](#) [87](#) [88](#) [90](#) [92](#) [94](#) [97](#) [98](#) [99](#) [103](#) [104](#) [108](#) [109](#) [110](#) [116](#) [118](#) [120](#) [125](#) [129](#)

4. How Is Astaxanthin Dosed? Preparation, Dose and Duration in Studies

The studies used predominantly oral astaxanthin capsules, some with algal extract from Haematococcus pluvialis or extract from Paracoccus carotinifaciens, some without stated origin. Individual investigations tested combination preparations, for example with lutein, tocotrienols, krill oil, collagen or dark chocolate. Origin and esterification of the astaxanthin are not reported in many studies; the doses are shown in the table.

PREPARATION OR FORM	DOSE	DURATION	STUDY
FlexPro MD (krill oil, astaxanthin, hyaluronic acid)	once daily	12 weeks	³¹
Armolipid Plus (red yeast rice, policosanol, berberine, folic acid, coenzyme Q10, astaxanthin) plus low-dose statin	—	3 months	³²
Armolipid Plus (nutraceutical mixture containing astaxanthin)	—	3 months, then 12 months combination	³³
Capsule with astaxanthin-rich Haematococcus pluvialis extract	6 mg or 12 mg astaxanthin per day	12 weeks	³⁴
astaxanthin supplementation (source not stated)	8 mg/day	8 weeks	³⁵
Astaxanthin 20 mg/day or placebo, double-blind	20 mg/day	8 weeks	³⁶
Astaxanthin (ASX) as adjunct to standard antibiotic therapy	12 mg/day	7 days	³⁷
astaxanthin capsules (source not stated)	20 mg/day	8 weeks	³⁸
Oral astaxanthin, source not stated	16 mg daily	3 months	³⁹
Antioxidant mix containing bacopa, lycopene, astaxanthin, and vitamin B12	—	8 weeks, once daily	⁴⁰
Nutraceutical-combined pill containing astaxanthin 0.5 mg	Astaxanthin 0.5 mg daily	12 months	⁴¹
oral astaxanthin (source not stated)	10 mg/day	12 weeks	⁴²
astaxanthin capsule or placebo	20 mg/d daily	12 weeks	⁴³
Astaxanthin capsule or placebo	20 mg/day	12 weeks	⁴⁴
Astaxanthin (AstaReal®) soft capsule	4 mg daily	84 days	⁴⁵

5. Is Astaxanthin Safe? Side Effects in Studies

In placebo-controlled studies with astaxanthin alone, no side effects or differences in safety values were observed ³⁴⁴⁵⁴⁹. In a study on a combination preparation of krill oil, astaxanthin and hyaluronic acid, fewer participants reported adverse events than under placebo; gastrointestinal complaints were most common in both groups ³¹. Long-term data are still pending, because the studies were mostly small and lasted from a few weeks to months.

STUDY	REPORTED SIDE EFFECTS
⁷ Arefpour et al. 2024	not reported
¹⁴ Rodrigues et al. 2025	Long-term safety and benefits stated as needing further study
¹⁶ Yang et al. 2025	All oral supplements safe during study period
²³ Utomo et al. 2024	no unwanted issues on physical and laboratory examinations

STUDY	REPORTED SIDE EFFECTS
²⁶ Ng et al. 2021	No serious adverse events reported
³¹ Hill et al. 2023	Adverse events 4% vs. 16% placebo, mostly gastrointestinal
³² Marazzi et al. 2017	6 patients (3 per group) dropped out due to myalgia
³³ Marazzi et al. 2015	no important undesirable effects
³⁴ Katagiri et al. 2012	No adverse effects observed
³⁷ Youssef et al. 2025	ASX was safe and well-tolerated
⁴¹ Marazzi et al. 2011	No differences in safety parameters; well tolerated
⁴⁵ Hecht et al. 2025	no significant differences in safety variables

6. What Remains Open: Limits of the Evidence

- Origin and esterification of the astaxanthin are not reported in many studies; which form is most effective remains open.
- Many controlled studies are small and short, which limits the transferability of the results.
- Some of the findings come from combination preparations and do not allow any statement about astaxanthin alone.
- Most findings concern blood and measured values; for clinical endpoints such as pregnancy rate, the studies found no difference.

7. Bottom Line: What Is Established About Astaxanthin

Astaxanthin is a carotenoid from the xanthophyll group that is offered as a dietary supplement in capsules. The clearest evidence is for higher HDL cholesterol and less muscle damage after exertion, and in prediabetes and diabetes also for better blood glucose levels. For oxidative stress, the results are inconsistent; for skin, eyes and memory, the evidence comes from small studies and partly from combination preparations. Meta-analyses showed no effect on body weight, maximum oxygen uptake and reaction time. The findings apply to the preparations studied, mostly capsules, often with algal extract from *Haematococcus pluvialis*; combination preparations do not allow any statement about astaxanthin alone. Next, larger and longer studies with clearly described preparations are needed that also capture clinical endpoints.

Frequently Asked Questions

How well has Astaxanthin been studied in humans?

We evaluated 139 human studies on Astaxanthin, including 54 randomised controlled trials and 32 meta-analyses or systematic reviews; the controlled studies include 2,957 participants in total. As of 5 October 2026.

Does Astaxanthin help with oxidative stress and inflammation? What the studies show

We evaluated 10 meta-analyses or systematic reviews, 27 controlled studies and 22 further studies; the controlled studies include 1,198 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [1389](#)

Does Astaxanthin help with cardiometabolic markers? What the studies show

We evaluated 9 meta-analyses or systematic reviews, 14 controlled studies and 13 further studies; the controlled studies include 810 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [2569](#)

Does Astaxanthin help with exercise and physical performance? What the studies show

We evaluated 3 meta-analyses or systematic reviews, 12 controlled studies and 6 further studies; the controlled studies include 268 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [491062](#)

Does Astaxanthin help with skin? What the studies show

We evaluated 2 meta-analyses or systematic reviews, 2 controlled studies and 6 further studies; the controlled studies include 88 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [16182126](#)

Does Astaxanthin help with cognition? What the studies show

We evaluated 2 meta-analyses or systematic reviews, 2 controlled studies and 7 further studies; the controlled studies include 121 participants in total. Result of the controlled studies: mostly no difference. Strength of evidence under our published rules: moderate. Sources: [4232428](#)

Does Astaxanthin help with eyes? What the studies show

We evaluated one controlled study and 6 further studies; the controlled studies include 64 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: low. Sources: [17244591](#)

What is astaxanthin?

Astaxanthin is a red carotenoid from the xanthophyll group. It colors marine animals such as crabs, shrimp and salmon as well as the feathers of flamingos pink to red. As a dietary supplement it is offered in capsules, and in aquaculture it serves to pigment farmed fish.

What effects do studies in humans show?

Meta-analyses show higher HDL cholesterol, less muscle damage after exertion and, in prediabetes or diabetes, better blood glucose levels than under control [21029](#). Meta-analyses found no effect on body weight, maximum oxygen uptake and reaction time [41019](#).

Which forms of astaxanthin were studied?

The studies used predominantly oral capsules, some with algal extract from *Haematococcus pluvialis* or extract from *Paracoccus carotinifaciens*, some without stated origin. Individual investigations tested combination preparations, for example with lutein, tocotrienols, krill oil, collagen or dark chocolate. Origin and esterification of the astaxanthin are not reported in many studies.

How well tolerated is astaxanthin?

In placebo-controlled studies with astaxanthin alone, no side effects or differences in safety values were noted [344549](#). In a study on a combination preparation of krill oil, astaxanthin and hyaluronic acid, fewer participants reported adverse events than under placebo; the most common in both groups were gastrointestinal complaints [31](#). Long-term data beyond several months are still pending.

What should be considered with combination preparations?

Many preparations combine astaxanthin with other substances, for example lutein, tocotrienols, krill oil or collagen; their results do not allow any statement about astaxanthin alone. Thus the advantages over placebo for memory and eyes come predominantly from combinations, for example with tocotrienols, bacopa or lutein [405859](#). A distinction must also be made between measured values in the blood or skin and clinically detectable endpoints.

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Research, put in context. Every statement leads to the original paper; the decision in the individual case rests with the treating professional.
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