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### 1. Review Articles

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<td>472</td>
<td>Review: Pycnogenol® is considered to have therapeutic benefits in ADHD, as it increased antioxidant levels, reduced oxidative damage and improved neurochemical status.</td>
<td>Verlaat AAJ, Maasakers CM, Hermans N, Savelkoul HFJ Rationale for Dietary Antioxidant Treatment of ADHD. Nutrients 10, 405; doi: 10.3390/nu10040405, 2018</td>
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<td>Ross SM Allergic Rhinitis. A proprietary extract of Pinus pinaster Aiton (Pycnogenol®) is found to improve the symptoms associated with allergic rhinitis. Hollist Nurs Pract 30: 301-304, 2016</td>
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<td>This article reviews earlier clinical Pycnogenol® research of the group, identifying improved skin elasticity and hydration, highlighting new findings on oral Pycnogenol® supporting fairer skin complexion, as well as improved skin barrier function.</td>
<td>Grether-Beck S, Mariné A, Jaenicke T, Krutmann J French Maritime Pine Bark Extract (Pycnogenol®) Effects on Human Skin: Clinical and Molecular Evidence. Skin Pharmacol Physiol 29: 13-17, 2016</td>
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<td>415</td>
<td>This review article comprises the current knowledge on Pycnogenol® for improvement of health of individuals with metabolic syndrome and diabetes.</td>
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Review: A summary of investigations related to biological activities and clinical actions of Pycnogenol® related to oedema, ulcers, thromboses, CVI and haemorrhoids.  
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This review article comprises the current knowledge on Pycnogenol® for improvement of health of individuals with metabolic syndrome and diabetes.  
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CLINICAL STUDY: Endothelial function is improved by Pycnogenol®. Results of this open registry study indicate an important preventive possibility for borderline hypertensive, hyperglycemic and hyperlipidemic subjects.  
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Pycnogenol® supplementation improves health risk factors in subjects with metabolic syndrome.  

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<td>CLINICAL STUDY: Pycnogenol® supplementation lowered total cholesterol and LDL and increased HDL, resulting in a better atherosclerotic index.</td>
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Prevention of recurrent venous thrombosis and post-thrombotic syndrome.
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Postpartum Vancose Veins: Supplementation with Pycnogenol® or Elastic Compression - A 12-Month Follow-Up.

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Improvement of signs and symptoms of chronic venous insufficiency and microangiopathy with Pycnogenol®: A prospective, controlled study.
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Pycnogenol® Treatment of Acute Hemorrhoidal Episodes.
Phytother Res 24: 438-444, 2010

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Treatment of chronic venous insufficiency and prevention of economy class syndrome.

Ref. 206  CLINICAL STUDY: Pycnogenol® provides relief in venous microangiopathy.
Rapid Relief of Signs/Symptoms in Chronic Venous Microangiopathy With Pycnogenol®: A Prospective, Controlled Study.
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Control of Edema in Hypertensive Subjects Treated With Calcium Antagonist (Nifedipine) or Angiotensin-Converting Enzyme Inhibitors with Pycnogenol®.

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Riccioni C, Sarcinella R, Izzo A, Palermo G, Liguori L
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Die Kapillarwandresistenz und ihre Beeinflussung durch wasserlösliche Flavonervitate bei spontan hypertonischen Ratten.  
Phlebologie 22: 178-182, 1993
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A review suggesting Pycnogenol® as adjunct treatment to conventional therapy for hepatitis-associated diabetes.
Ezzikouri S, Jadid FZ, Hamdi S, Wakrim L, Tsukiyama-Kohara K, Benjelloun S
Supplementing Conventional Treatment with Pycnogenol® May Improve Hepatitis C Virus-Associated Type 2 Diabetes: A Mini Review.

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Supplementation with Pycnogenol® as add-on to metformin medication sugests similar effects in diabetic animal model.
Jankyova S, Rubintova D, Janosikova L, Panek P, Foltanova T, Kralova E
The Effects of Pycnogenol® as Add-on Drug to Metformin Therapy in Diabetic Rats.

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Gulati O
Pycnogenol® in Metabolic Syndrome and Related Disorders.

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Muchova J, Orszaghova Z, Zitnanova I, Trebaticky B, Breza J, Durackova Z
The effect of natural polyphenols on the oxidative stress markers in patients with diabetic nephropathy.

Ref. 397
Pycnogenol® improves the function of the heart in rats with experimental diabetes mellitus.
Kralova E, Jankyova S, Mucaji P, Gresakova E, Stankovicova T
Pycnogenol and its fractions influence the function of isolated heart in rats with experimental diabetes mellitus.
J Pathology Research & Practice, 211: 156-161, 2015

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Pycnogenol® shows beneficial effects in metabolic and cardiovascular health.
Aribal-Ayral P, Özelci-Kavas G, Elhan AH
Pycnogenol® supplementation and its beneficial effects in healthy rats.

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Bentley G, Schönlaub F, Zibadi S, Watson R
Cost of Pycnogenol® Supplementation and Traditional Diabetes Treatments per Unit of Improved Health Outcome.

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Králová E, Jankyová S, Pekárk A, Cubon J, Stankovicová T
Carvedilol and Pycnogenol® improve the function of diabetic heart in rats.
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CLINICAL STUDY: Pycnogenol® improves all signs and symptoms of metabolic syndrome to healthy values within three months.
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Kim YJ, Kim YA, Yokozawa T
Pycnogenol® modulates apoptosis by suppressing oxidative stress and inflammation in high glucose-treated renal tubular cells.

Pycnogenol® provides antioxidant protective effects to the liver in an animal diabetes model.
Parveen K, Khan MR, Mujeeb M, Siddiqui WA
Protective effects of Pycnogenol® on hyperglycemia-induced oxidative damage in the liver of type 2 diabetic rats.

Pycnogenol® is shown in an in vitro model to facilitate better glucose uptake by fat cells which suggests anti-diabetic benefits.
Effect of Pycnogenol® on glucose transport in mature 3T3-L1 adipocytes.
Phytother Res 24: 1242-1249, 2010

CLINICAL STUDY: Pycnogenol® improves kidney function of metabolic syndrome patients as judged by lowered urinary albumins and improved kidney perfusion.
Stuard S, Belcaro G, Cesarone MR, Ricci A, Cornelli U, Gizzi G
Kidney function in metabolic syndrome may be improved with Pycnogenol®.
Panminerva Med 52 (suppl. 1 to No. 2): 27-32, 2010

Pycnogenol® improves endothelial function and blood vessel morphology in an animal model.
Effects of melatonin and Pycnogenol® on small artery structure and function in spontaneously hypertensive rats.
Hypertension 55: 1373-1380, 2010

CLINICAL STUDY: Pycnogenol® taken at early stages of diabetic retinopathy may partially restore vision further to strengthening retinal capillaries.
Pycnogenol® improves microcirculation, retinal edema, and visual acuity in early diabetic retinopathy.

This review article comprises the manifold contributions of Pycnogenol® to people who have diabetes.
Rohdewald P
Regulation of diabetes by Pycnogenol®.

CLINICAL STUDY: Pycnogenol® given in addition to diabetic and hypertensive medication significantly further improves blood sugar and cardio-vascular risk factors and allows a majority of patients to lower anti-hypertensive medication.
Zibadi S, Rohdewald P, Park D, Watson RR
Reduction of cardiovascular risk factors in subjects with Type 2 Diabetes by Pycnogenol® supplementation.

Pycnogenol® lowers platelet hyperactivity more effectively than aspirin in a type I diabetes pharmacologic model suggesting a protective effect from thrombosis in diabetes.
Nocun M, Ulicna O, Muchova J, Durackova Z, Watala C
French maritime pine bark extract (Pycnogenol®) reduces thromboxane generation in blood from diabetic male rats.
## Ref. 209

Pycnogenol® inhibits dietary carbohydrate absorption by inhibition of alpha-glucosidase.

Schäfer A, Högger P
Oligomeric procyanidins of French maritime pine bark extract (Pycnogenol®) effectively inhibit alpha-glucosidase.


## Ref. 199

**CLINICAL STUDY:** Pycnogenol® reduces diabetic microangiopathy.


Improvement of diabetic microangiopathy with Pycnogenol®: A prospective, controlled study.

Angiology 57: 431-436, 2006

## Ref. 195

**CLINICAL STUDY:** Pycnogenol® accelerates healing of diabetic ulcers.


Diabetic ulcers: microcirculatory improvement and faster healing with Pycnogenol®.


## Ref. 184

Pycnogenol® increases anti-oxidative enzyme concentrations in the retina of rats, suggesting a lower risk for retinopathy and cataract formation.

Kamuren ZT, McPeek CG, Sanders RA, Watkins JB

Effects of low-carbohydrate diet and Pycnogenol® treatment on retinal antioxidant enzymes in normal and diabetic rats.


## Ref. 156

Pycnogenol® either alone or in combination with other antioxidants stimulates antioxidant enzyme activities in the retina of diabetic rats.

Dene BA, Maritime AC, Sanders RA, Watkins JB

Effects of Antioxidant Treatment on Normal and Diabetic rat retina enzyme activities.


## Ref. 153

Pycnogenol® either alone or in combination with other antioxidants reduces parameters of oxidative stress in diabetic rats.

Berryman AM, Maritim AC, Sanders RA, Watkins JB

Influence of treatment of Diabetic rats with combinations of Pycnogenol®, beta-carotene, and alpha-lipoic acid on parameters of oxidative stress.

J Biochem Mol Toxicol 18: 345-352, 2004

## Ref. 142

**CLINICAL STUDY:** Pycnogenol® supplementation to diabetic patients lowers glucose levels.


Antidiabetic effect of Pycnogenol® French maritime pine bark extract in patients with diabetes type II.

Life Sci, 75: 2505-2513, 2004

## Ref. 109

**CLINICAL STUDY:** In a dose-finding study Pycnogenol® lowers glucose levels of type II diabetic patients and improves endothelial function.

Liu X, Zhou H-J, Rohdewald P

French maritime pine bark extract Pycnogenol® dose-dependently lowers glucose in type II diabetic patients.

Diabetes Care 27: 839, 2004

## Ref. 110

Pycnogenol® inhibits in vitro the Maillard reaction which results in advanced glycation end products (AGE) in diabetes.

Zhang TM, Han CH, Han YW, Gong H, Zhang EY, Zhang Y

Inhibitory effect of Pycnogenol® on generation of advanced glycation end products in vitro.

<table>
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<th>Study Description</th>
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<td>080</td>
<td>CLINICAL STUDY: Pycnogenol® reduces blood pressure, as shown in a randomized, double-blind, placebo-controlled study performed in mildly hypertensive patients. Furthermore, Pycnogenol® significantly decreases the level of the vasoconstrictor factor (thromboxane) in blood of these patients. Hosseini S, Lee J, Sepulveda RT, Rohdewald P, Watson RR. A randomized, double-blind, placebo-controlled, prospective, 16 week crossover study to determine the role of Pycnogenol® in modifying blood pressure in mildly hypertensive patients. Nutr Res 21: 1251-1260, 2001</td>
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Min Endocrinol, ahead of print, 2018
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