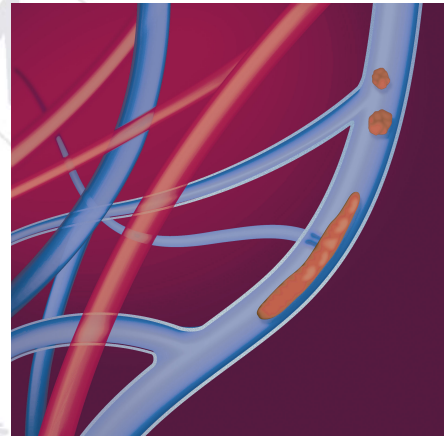


# PYCNOGENOL<sup>®</sup> FOR HEALTHY PLATELET FUNCTION

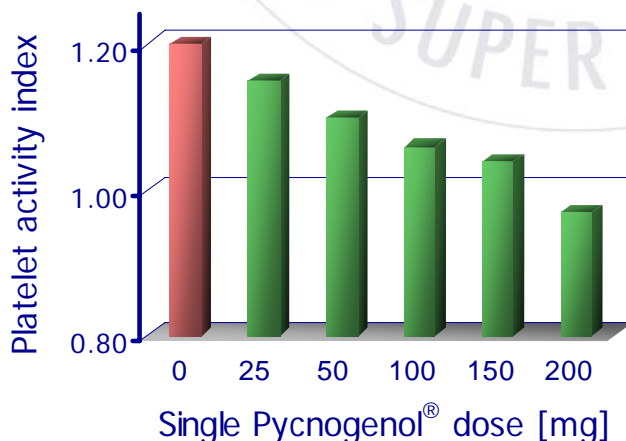
Platelets (thrombocytes) are white blood cells predominantly responsible for forming a blood clot (thrombus) during injuries to limit blood loss. Platelets patrol in the blood stream to recognize structures representing damaged blood vessel walls, the incident which prompts them to aggregate and form a thrombus. Platelets respond to various molecules, such as hormones, which may increase their alertness to prepare a thrombus in the incident of an injury. The stress hormone adrenaline (epinephrine) activates blood platelets to increase their "adhesiveness". This allows them to more rapidly form a thrombus and bring bleedings to a halt.

In various pathologies, however, platelets may form a thrombus in absence of an injury. During prolonged periods of stress with high adrenaline levels platelets remain in a hypercoagulable state. This typically occurs, as an example, in cigarette smokers. Platelets are further activated when blood vessel walls show signs of harm, such as in the case of cholesterol deposits in atherosclerosis. An impaired blood circulation (stasis) such as in swollen veins contributes to thrombosis as this further activates platelets. This is the phenomenon responsible for catching a thrombosis during traveling, when remaining seated for prolonged periods of time.

Thrombosis may cause clogging of a blood vessel (embolism) and subsequently interrupt the blood flow to certain areas of the body. This may be life-threatening when a blood clot obstructs arteries of the lung, disabling vital oxygen uptake (pulmonary embolism). When arteries supporting heart muscle (coronaries) are affected, oxygen supply is interrupted causing heart infarction.



Increased platelet activity is naturally released in the body primarily by nitric oxide (NO), a messenger molecule generated in cells of blood vessel walls. This serves as positive feedback-loop from blood vessels indicating their functionality. Pycnogenol<sup>®</sup> acts on the enzyme (endothelial nitric oxide synthase) to more efficiently process the amino acid L-arginine into NO [Fitzpatrick et al., 1998].



Pycnogenol<sup>®</sup> was tested in individuals with increased platelet activity: cigarette smokers. Blood was drawn before and 2 hours after administration of a single Pycnogenol<sup>®</sup> dose. The results clearly showed a dose-dependent reduction of platelet activity. Already the lowest dose of 25 mg gave a significant effect on blood platelets [Pütter et al., 1999].

Pycnogenol® was shown to be as effective for controlling platelet activity as aspirin in these experiments [Pütter et al., 1998]. Moreover, Pycnogenol® was found not to increase bleeding time, an effect which is well known in case of aspirin, which significantly prolongs bleeding. Unlike, aspirin which irreversibly alters COX enzymes, Pycnogenol® supports body-own mechanisms to normalize platelet function.

It was shown that Pycnogenol® supplementation lowers pro-aggregatory thromboxane in individuals with high serum thromboxane levels. In contrast, Pycnogenol® did not further lower thromboxane levels in healthy individuals with normal thromboxane values [Araghi-Niknam et al., 1999].

The application of Pycnogenol® for regulation of platelet function  
is patented (US 5,720,956)

Pycnogenol® was tested in a group of high-risk individuals for developing thrombosis [Belcaro et al., 2004]. These 200 subjects had previous incidents of thrombosis, varicose veins, severe obesity, limited mobility or clinical cardiovascular disease. In this study subjects were remaining in sedentary position for prolonged time during long-haul travel exceeding 8 hours. These conditions are known to cause pooling of venous blood in the legs which contributes to the development of thrombosis.

The treatment group received 2 Pycnogenol® tablets (100 mg each) prior to departure and again after 6 hours plus 1 tablet the following day upon arrival. The control group was given placebos. The presence of thrombosis at destination was evaluated using ultrasound scanning.

The result showed one incident of deep vein thrombosis and four cases of superficial vein thrombosis in the 97 subjects (5.15 %) who completed the study of the placebo group. In contrast, none of the 101 high-risk subjects in the Pycnogenol®-treated group developed thrombosis during the long-haul flight. These results indicate significant protection against thrombosis by supplementation with Pycnogenol®.

The normalization of platelet function is understood to result from Pycnogenol's stimulation on nitric oxide synthase causing improved production of NO. As this molecule also relaxes constricted arteries, Pycnogenol® was found to be helpful for people with hypertension. In addition, Pycnogenol® also offers a safe nutritional approach to maintain a healthy blood lipid profile [Watson, 2003]. Thus, Pycnogenol® supports a healthy cardiovascular system by addressing the major risk factors simultaneously. For more information please check [PYCNOGENOL® FOR HEART HEALTH](#).

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